

**Capital Cost of Pipeline Assets Used in Transporting Federal Royalty Oil:
Critique of Treatment Under Current MMS Oil Valuation Rule**

Edward D. Porter

**Research Manager
Policy Analysis and Statistics
American Petroleum Institute**

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Introduction

Under MMS's current royalty oil valuation rule¹, issued in 2000, the transportation allowance under non-arm's-length arrangements for movement of oil produced from Federal lands to a point of sale off the lease includes a capital cost element equal to the Standard & Poor's BBB industrial bond rate². This is intended as an administratively simplified way to approximate the cost of capital faced by petroleum producing firms holding pipeline assets or investing in such assets. This paper investigates whether such a measure is a plausible approximation of such cost.

First, we present a conceptual framework for an appropriate measure of capital cost suitable for the rule. Such a measure must include both debt and equity cost, regardless of the specific financing earmarked for a specific asset. Second, using readily available current information from independent financial analysts, we conclude that the BBB bond rate itself appears far too low to cover the capital cost of the typical oil and gas firm represented by this data. This recent data suggests that an allowance of 1.6 to 1.8 times the BBB rate would be more appropriate for such a rule. Several variations on this analysis suggest that this key result, particularly the floor of 1.6 on an appropriate multiple, is insensitive to substantial variations in the choice of industry sample or the choice of time period.

¹ 30 CFR 206.111(b), (i).

² As measured by the Standard and Poor's Corporate and Government Bond Yield Index, BBB Industrial, as published in the monthly *Standard and Poor's Bond Guide*. Appendix A presents the historical values of the monthly index through October 2002.

The Cost of Capital

The appropriate basis for measuring the allowance for transportation is the cost of capital to the firm. The cost of capital is the return that the market requires in order to attract funds to an investment. To survive in the long run, a firm must earn a return at least equal to its cost of capital. If a project cannot be expected to earn a return sufficient to cover the cost of capital, it should not be considered for investment. In the case of the MMS rule, setting the allowance at a level below that required to cover capital cost would provide an active and significant disincentive to development, especially in areas where pipeline investments are an essential component, such as the deep waters of the OCS.

Firms typically raise capital by issuing both debt and equity. The cost of issuing debt is typically lower than that of equity. Given this relationship, there is a natural question as to why firms should ever resort to equity finance. Both are used because a firm's access to the less expensive debt market (its "debt capacity") is limited by the fact that investors perceive excessive debt as risky. In the case of a bankruptcy, for instance, the firm is obligated to pay debt holders before equity holders. Consequently, there is less risk associated with debt than equity³.

In the regulatory area, the cost of capital is typically measured by a firm's weighted average cost of raising investment funds. *This is the appropriate measure of the firm's cost of capital regardless of the specific financing used to fund any particular project.* That is, even if debt alone finances a specific project, the cost of debt finance alone fails to capture the cost of capital because the firm will have used up part of its debt capacity and will be forced to earmark higher cost equity capital to other projects.

Capital Structure

In the petroleum industry, there is a distinctive difference in the capital structure of the producers who fall into the refining industry (SIC291), and those who fall into the oil and gas extraction industry (SIC131)⁴. While some firms in SIC291 are in fact exclusively refiners, most are large integrated firms engaged in production as well. As a consequence, the petroleum producing industry is composed of two SIC's. SIC291 consists principally of integrated majors, while SIC131 consists of independent producers. Using a sample of firms developed independently by Ibbotson and Associates for a widely used reference on capital cost⁵, we can estimate the capital structure of the two segments of the petroleum industry. About a third of the capital of independent producers, and about 11% of the capital of the integrated majors, currently consists of debt, as seen in Table 1.

Table 1. Debt share of total capital (%)

	SIC131	SIC291
Latest	33.92%	11.30%
Last 5 years	32.99%	8.40%

Source:

Ibbotson Associates, Cost of Capital 2002 Yearbook,
Monthly supplement with data through September 2002

³ In fact, a study done in 2000 by the Energy Information Administration examined the characteristics of independent petroleum producers who survived the severe price collapse in the industry in 1998 and 1999. It found that a key difference between survivors and nonsurvivors was not their skill at finding and producing oil, as measured by their costs of reserve replacement, but rather the level of debt of the firm as it entered the period. Firms with higher than average debt ratios faced markedly lower odds of survival. US Department of Energy [2000].

⁴ Both industries are engaged in oil and gas extraction, but the SIC classification is made on the basis of the primary activity. As a consequence, independent producers generally fall in SIC131, while integrated producers generally fall into SIC291, since their refining activity dominates.

⁵ Ibbotson and Associates, 2002 Capital Cost Yearbook, monthly supplement with data through September 2002.

Cost of Debt

The cost of debt to a firm depends on its credit-worthiness as determined by its bond rating (as determined by Standard and Poor's or Moody's), as well as on its marginal tax rate⁶. Specifically,

$$K_d^{post-tax} = K_d^{pre-tax} (1 - t)$$

In both areas the two industry segments differ. First, there are very different levels of credit-worthiness between the large integrated firms and the independent producers, as reflected in the Standard & Poor's bond ratings shown in Table 2. Note that of the independent producers, 90 of the 99 firms in the sample are below BBB or not rated. On the other hand, 6 of the 11 integrated firms have bond ratings BBB or better.

Table 2. Debt Rating by SIC

S&P Debt Rating	SIC131		SIC291	
	Capital (billions of \$)	No. of Firms	Capital (billions of \$)	No. of Firms
AAA, AA, A	11.10	1	322.10	3
BBB	81.80	8	20.90	3
BB,B,CCC,CC,D	25.90	20	1.90	2
Not Rated	10.90	70	0.40	3
TOTAL	129.70	99	345.20	11

Source: Ibbotson Associates, *Cost of Capital 2002 Yearbook*,
Monthly supplement with data through September 2002

This gives rise to substantially higher debt costs (pre-tax) faced by independents relative to the integrateds, and to debt costs faced by a substantial proportion of independents that alone (apart from equity cost) are unambiguously higher than the BBB rate offered by MMS. Second, integrated firms and independents face differing marginal tax rates, arising both from explicit statutory differences in tax provisions faced by the two segments and by dynamic features of the tax code which give rise to systematic differences in rates across all firms⁷. Generally, these rate differences favor the smaller independents, tending to offset part of the difference in pretax debt costs arising from credit ratings. As seen in Table 3, the marginal tax rates faced by independents was 22.7%, while the integrated firms faced a rate of 34.5%, nearly the full maximum statutory rate⁸.

⁶ The tax effect arises from the deductibility of interest expense. It should be noted that any published bond rate, such as the BBB index referenced in the MMS rule, is a pre-tax rate.

⁷ In a static sense, the marginal tax rate is simply the statutory federal rate (35%) plus state and local rates between 1% and 12%, thought to average 5% (See KPMG, "Corporate Tax Rate Survey," January 2002). However, when one takes into account the dynamic effects of loss limitations, carryforward and carryback provisions, the Alternative Minimum Tax (AMT), etc., this is no longer the case. See Graham, J. [1996]. "Proxies for the Corporate Marginal Tax Rate," *Journal of Financial Economics*, Vol. 42, pp. 187-221.

⁸ Private communication with Tara McDowell, Ibbotson Associates, November 21, 2002.

Table 3. Marginal Tax Rates (%)

SIC131	SIC291
22.72%	34.48%

Source: Ibbotson Associates data⁹

Cost of Equity

While there is no universally accepted method for measuring the cost of equity capital, there are a number of common methods used to estimate such costs. Despite some criticism, and the availability of alternative models, the most widely used model for estimating the cost of equity capital, particularly for large firms, is the Capital Asset Pricing Model (CAPM)¹⁰. The CAPM model is based on a view that the difference between the cost of equity and the rate of return offered by a risk-free security is a linear function of the systematic risk¹¹ associated with holding that firm's stock. Specifically,

$$K_e = R_f + \beta(K_m - R_f)$$

Where K_e is the cost of equity¹², R_f is the risk-free rate of return (usually a Treasury bill), K_m is the market rate of return (measured as the return on the whole market), and beta is a measure of systematic risk in the company stock.

For the Ibbotson sample, Table 4 presents the estimated cost of capital for the two segments of the oil and gas industry¹³. As seen in the Table, the cost of equity capital is between 2% and 3% higher for independent producers than for integrated majors.

Table 4. Cost of Equity Capital, Alternate Models

	SIC131	SIC291
CAPM	10.48%	8.31%
CAPM+Size Premium	11.20%	8.31%

Source: Ibbotson Associates, Cost of Capital 2002 Yearbook
Monthly supplement with data through September 2002

⁹ Calculated by Ibbotson Associates as the market capitalization weighted sum of the marginal tax rates for each firm. Firm rates are provided by John Graham, using methods described in the Graham [1996,1998].

¹⁰ Pratt, S. [2002]. *Cost of Capital: Estimation and Applications*, Second Edition, John Wiley and Sons, Hoboken, NJ, p.70.

¹¹ Systematic risk is the uncertainty of future returns to a particular company stock attributable to a systematic relationship of that stock value to that of the market as a whole.

¹² While not described here, for the purpose of keeping the exposition simple, in the actual Ibbotson calculation this is the cost of common stock equity. The numbers presented here actually include a separate category of capital for preferred stock, whose cost is the issuance of preferred dividends. However, the proportion of these shares is typically so low that such shares may be neglected.

¹³ The size premium adjustment to the CAPM measure reflects a finding in many empirical studies that realized returns on many small companies have been substantially larger over a long time period than the original CAPM formulation would have predicted.

Weighted Average Capital Cost

These components, debt cost and capital cost, may be summed with the appropriate weights and tax rates to compute either a post-tax weighted average capital cost (WACC) for each industry segment in the Ibbotson sample, equal to

$$WACC^{post-tax} = \alpha K_d^{pretax} (1-t) + (1-\alpha) K_e$$

where alpha is the debt share of the firm's capital¹⁴,

or a pre-tax WACC, equal to

$$WACC^{pre-tax} = \alpha K_d^{pretax} + (1-\alpha) K_e / (1-t)$$

Because of the dominance of equity in the capital structure of both segments, particularly the integrated firms, the lower debt cost has little influence on the computed WACC. As seen below in Table 5, the integrated firms are estimated to have a capital cost of 8.2%, only slightly below their cost of equity. Independents are estimated to have post tax capital costs between 2% to 3% higher than the integrated producers, though still only slightly below their own equity cost.

Table 5. Weighted Average Post-tax Cost of Capital

	SIC131	SIC291
CAPM	10.41%	8.16%
CAPM+Size Premium	10.91%	8.16%

Source: Ibbotson Associates, Cost of Capital 2002 Yearbook
Monthly supplement with data through September 2002

Alternately, using the estimated federal marginal tax rates shown in Table 3, and neglecting any state income tax¹⁵, this pre-tax WACC may be computed by dividing the entries in Table 5 by the quantity (1-t). Using the above data, this implies a pretax range of 13.5% to 14.1% for SIC131, and 12.5% for SIC291, as shown in Table 6. The higher pretax cost reflects the fact that the income tax raises the necessary hurdle rate of return required to cover the cost of any project.

Table 6. Weighted Average Pre-tax Cost of Capital

	SIC131	SIC291
CAPM	13.5%	12.5%
CAPM+Size Premium	14.1%	12.5%

Source: Calculated from Tables 3 and 5.

¹⁵ This is a reasonable approximation given that most of the resources involved are located on federal offshore lands outside of state jurisdiction.

Implied Multiple of the BBB Rate

Compared to the BBB rate, these cost measures are substantially higher. The published Ibbotson measures are point estimates of WACC as of October 2002¹⁶. The closest corresponding published BBB rate, for October 2002, was 7.68%. As seen in Table 7, the implied multiple of BBB bond rates during this period was 1.62 for the integrated firms, and 1.76 to 1.84 for the independents.

Table 7. Ratio of Weighted Average Pre-tax Cost of Capital to BBB Bond Rate

	SIC131	SIC291
CAPM	1.76	1.62
CAPM+Size Premium	1.84	1.62

Source: calculated as ratio of pre-tax WACC (Table 6) to October 2002 BBB rate

It is easily shown that an alternate measure, using the lower post-tax WACC, is precisely equivalent, when compared to the BBB rate adjusted to a comparable post-tax basis. That is,

$$\frac{WACC^{post-tax}}{BBB^{post-tax}} = \frac{WACC^{pre-tax}(1-t)}{BBB^{pre-tax}(1-t)} = \frac{WACC^{pre-tax}}{BBB^{pre-tax}}$$

As a consequence, it is clear that current MMS treatment significantly understates the capital cost associated with transportation assets. One approach to correcting this problem would be to adjust the BBB bond rate upward by a multiple designed to correct this understatement. The current data, for example, would require a multiple from 1.76 to 1.84 for SIC131, and 1.62 for SIC291.

While somewhat imprecise, a simple multiple of the BBB bond rate avoids the burden of individually tailored cost allowances by substituting an administrative expedient that offers a reasonable prospect, on average, of covering the capital costs associated with pipeline assets. Establishing such a rule at too high a level would provide an unintended subsidy to such investment; establishing it at too low a level provides an unintended penalty to such investment. The data presented above suggest that the current rule falls far short of the capital cost required to leave the investment choice undistorted. As a consequence, the current rule provides an active and significant disincentive to development, especially in areas where pipeline investments are an essential component, such as the deep waters of the OCS.

Key Sensitivities

A key question: How robust is this conclusion to the particular data and methodology selected? In particular, two key sensitivities warrant examination, namely, the sample of companies used in the analysis and the time period selected for the analysis.

¹⁶ Communication with Mike Barad, Ibbotson Associates, November 21, 2002

Sample Selection

Because one constraint on the analysis was to rely as much as possible on readily available public data of known reliability, the samples of companies used by Ibbotson Associates in its most recent update to its 2002 *Capital Cost Yearbook* was taken to be representative of the SIC131 and SIC291 components of the petroleum producing industry. However, it was recognized that these samples were less than perfect representatives of the universe of petroleum producing firms building and operating pipeline assets. In particular, it seemed likely that the 11 firms in the Ibbotson SIC291 sample underrepresented the major integrated firms operating offshore, and that the 99 firms in the Ibbotson SIC131 sample overrepresented small independent producers with few if any pipeline assets. Because the larger firms typically have lower WACC than the smaller firms, this sample composition offered the potential for upwardly biasing the WACC and the estimated multiple of the BBB rate.

To test for such a systematic bias, API commissioned Ibbotson Associates to complete a study of capital cost for an alternate sample, namely the sample of 30 companies whose financial performance is routinely monitored by the Department of Energy as part of the Financial Reporting System (FRS). This set of FRS companies, shown in Appendix B, consists of the nation's largest energy producers, and has been a widely used barometer of US energy industry performance since the mid-70s. It contains all of the integrated oil companies as well as the largest independent producers and refiners. Consequently, it is likely to contain virtually all of the SIC291 firms with pipeline assets and all of the largest SIC131 firms with pipeline assets. By excluding all of the smaller independents unlikely to hold pipeline assets, it eliminates any potential upward bias resulting from their inclusion in the original Ibbotson sample. However, it neglects those middle size independents who may hold pipeline assets. Since these omitted firms are likely to have higher WACC than the FRS companies, the FRS sample has a clear and known bias toward lower than average industry WACC, so that its estimated WACC may properly be interpreted as a floor to the industry WACC. Table 8 presents a summary of the main results, along with a comparison with the Ibbotson yearbook sample.

Table 8. Comparison of FRS and Ibbotson Samples

	Ibbotson Sample, SIC131	Ibbotson Sample, SIC291	FRS
Tax Rate	0.23	0.34	0.30
Debt Share	0.34	0.11	0.17
Equity Share	0.66	0.89	0.83
Cost of Equity (pre-tax)	14.49	12.68	13.39
Cost of Equity (post-tax)	11.20	8.31	9.43
WACC (post-tax)	10.91	8.16	8.60
WACC (pre-tax)	14.12	12.45	12.22
BBB (post-tax)	5.94	5.03	5.41
BBB (pre-tax)	7.68	7.68	7.68
Ratio (WACC/BBB)	1.84	1.62	1.59

As seen in the table¹⁷, the estimated post-tax WACC is 8.6%. Given the estimated 29.6% marginal tax rate, this implies a pre-tax WACC of 12.2% in October 2002, or 1.59 times the October 7.68% BBB bond rate, almost identical to the lower bound of the range developed on the basis of the original Ibbotson sample data. Given the known conservative bias of the FRS sample, these results provide a sound estimate of a lower bound on an appropriate multiple to be introduced as a part of any rulemaking. Consequently, they confirm the results presented based on the Ibbotson sample: the multiple specified by a simple rule must be at least about 1.6 times the BBB rate to plausibly cover the capital cost associated with pipeline assets.

Time Period

There is no reason to expect *a priori* that the estimate of the multiple should be stable over time or that the particular value for October 2002 should be a representative estimate for any other particular date. Rather, an empirical test is needed to assess whether either is true. Therefore, a second analysis was conducted, estimating the multiple at the beginning¹⁸ of each year from 1997 to 2002, and comparing these estimates to that obtained for the most recent data, October 2002. This was a period of enormous change in both the structure and the market environment of the industry, as it consolidated in the face of extraordinary variations in revenue and spending associated with extraordinary price volatility. Tables 9 and 10 present the results of this examination for each of the two industry sectors.

Table 9. Behavior of Estimated Multiple for SIC131, 1997-2002

	1997	1998	1999	2000	2001	2002	October 2002
Tax Rate	0.350	0.239	0.264	0.065	0.156	0.212	0.227
Debt Share	0.280	0.376	0.301	0.238	0.209	0.278	0.339
Equity Share	0.720	0.624	0.699	0.762	0.791	0.722	0.661
Cost of Equity (pre-tax)	22.85	14.94	19.14	15.52	15.09	15.64	14.49
Cost of Equity (post-tax)	14.85	11.37	14.08	14.52	12.74	12.32	11.20
WACC (post-tax)	12.28	10.09	11.85	12.59	12.09	11.95	10.91
WACC (pre-tax)	18.47	13.26	16.11	13.46	14.32	15.17	14.12
BBB (post-tax)	5.56	5.43	5.58	8.10	6.98	6.55	5.94
BBB (pre-tax)	7.84	7.13	7.58	8.66	8.27	8.31	7.68
Ratio (WACC/BBB)	2.21	1.86	2.13	1.55	1.73	1.83	1.84

¹⁷ The complete Ibbotson study of the FRS companies is presented as Appendix D to this report.

¹⁸ Ideally, this would have been January of each year, insofar as the MMS rule specifies the use of a January BBB rate. However, Ibbotson only publishes the Yearbook with data through March, along with quarterly supplements at the end of June, September and December. The March publication was chosen for the analysis on the strong recommendation by Ibbotson that its relative completeness and consistency made it the most appropriate choice for a multi-year comparison. In particular, it appeared that the alternative (end-December) resulted in severe underreporting of debt in the petroleum industry, distorting the capital structure toward equity. Ibbotson's recommendation is attached to this report as Appendix E. Tables 9 and 10 calculate the multiple on the basis of a comparison of the March WACC with the March BBB rate. However, there is no significant difference if the January BBB rate is used as an alternative.

Table 10. Behavior of Estimated Multiple for SIC291, 1997-2002

	1997	1998	1999	2000	2001	2002	October 2002
Tax Rate	0.350	0.315	0.319	0.348	0.345	0.347	0.345
Debt Share	0.128	0.104	0.104	0.109	0.064	0.026	0.113
Equity Share	0.873	0.896	0.896	0.892	0.936	0.974	0.887
Cost of Equity (pre-tax)	18.40	16.23	16.31	14.78	15.97	14.13	12.68
Cost of Equity (post-tax)	11.96	11.11	11.11	9.64	10.47	9.23	8.31
WACC (post-tax)	11.03	10.46	10.46	9.16	10.09	9.15	8.16
WACC (pre-tax)	16.97	15.28	15.35	14.04	15.40	14.01	12.45
BBB (post-tax)	5.43	4.88	5.16	5.65	5.42	5.43	5.03
BBB (pre-tax)	7.84	7.13	7.58	8.66	8.27	8.31	7.68
Ratio (WACC/BBB)	2.04	2.14	2.03	1.62	1.86	1.69	1.62

As shown in Tables 9 and 10, this analysis suggests that estimates based on current data (the most recent Ibbotson data in October 2002) appear conservative relative to similar measures calculated for the last six years. The average estimated multiple for the six years from 1997 to 2002 is virtually identical for both SIC131 and SIC291, at about 1.9. The estimates based on October 2002 data are 2% less than the 5 year average for SIC131, and 15% below the 5 year average for SIC 291.

Summary

This study suggests strongly that the current allowance of the BBB bond rate does not offer a reasonable prospect of covering the capital cost associated with pipeline assets involved in the transportation of Federal royalty crude. The principal findings of the study are that:

1. Analysis of current data show that the estimated multiple required to cover capital cost associated with these pipelines would be between 1.6 and 1.8.
2. An independent analysis conducted by Ibbotson Associates for the FRS companies, a widely used sample of firms more representative of the universe of firms holding such pipeline assets, confirmed that it would require a multiple of *at least* 1.6 times the BBB rate to plausibly cover capital costs.
3. Examination of the pattern of costs from 1997 to 2002 reveals that in recent history the average multiple of the BBB rate required to cover capital cost was about 1.9.

As a consequence, the results of the study indicate an unambiguous failure of the current rule to cover capital costs. Such a rule impedes oil resource development in areas where pipeline transportation to market represents a significant portion of investment cost.

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APPENDIX A

Growth Rates of Standard and Poor's BBB Bond Index

Table A-1. Standard & Poor's Corporate and Government Bond Yield Index, BBB Industrial

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	6.99	7.1	7.7	7.95	8.08	8.21	8.11	7.87	8.07	7.72	7.39	7.5
1997	7.73	7.54	7.84	7.99	7.03	7.73	7.45	7.49	7.38	7.21	7.19	7.19
1998	7.18	7.09	7.13	7.13	7.12	6.99	7.05	7.03	6.96	7.16	7.46	7.26
1999	7.36	7.46	7.58	7.43	7.69	8.08	8.04	8.38	8.5	8.64	8.44	8.64
2000	8.81	8.58	8.66	8.75	9.31	8.95	8.83	8.71	8.84	8.7	8.63	8.44
2001	8.29	8.26	8.27	8.44	8.53	8.34	8.36	8.16	8.18	8.13	8.14	8.41
2002	8.26	8.13	8.31	8.19	8.11	7.69	7.98	7.71	7.41	7.68	#N/A	#N/A

Source: *Standard and Poor's Bond Guide*, various issues

APPENDIX B

Oil and Gas Firms Included in Ibbotson Sample, Capital Cost Yearbook

Table B-1. Ibbotson Sample, SIC 291

<u>Ticker</u>	<u>Company Name</u>
3AIPN	AMER INTL PETROLEUM CORP
3ARSD	ARABIAN AMERICAN DEVELOPMENT
CVX	CHEVRONTEXACO CORP
XOM	EXXON MOBIL CORP
FTO	FRONTIER OIL CORP
HOC	HOLLY CORP
MRO	MARATHON OIL CORP
MUR	MURPHY OIL CORP
SUN	SUNOCO INC
TSO	TESORO PETROLEUM CORP
VLO	VALERO ENERGY CORP

Table B-2. Ibbotson Sample, SIC 131

Ticker	Company Name	Ticker	Company Name
TTEN	3TEC ENERGY CORP	ISRL	ISRAMCO INC
ABP	ABRAXAS PETROLEUM CORP/NV	KCS	KCS ENERGY INC
3ALT	ALTEX INDUSTRIES INC	KEST	KESTREL ENERGY INC
APC	ANADARKO PETROLEUM CORP	KP	KEY PRODUCTION CO INC
APA	APACHE CORP	MPET	MAGELLAN PETROLEUM CORP
3ASPN	ASPEN EXPLORATION CORP	MHR	MAGNUM HUNTER RESOURCES INC
BRN	BARNWELL INDUSTRIES	MLRC	MALLON RESOURCES CORP
3BSIC	BASIC EARTH SCIENCE SYS INC	TMR	MERIDIAN RESOURCE CORP
BRY	BERRY PETROLEUM -CL A	MSSN	MISSION RESOURCES CORP
BDCO	BLUE DOLPHIN ENERGY	3NEGI	NATIONAL ENERGY GROUP
3BREY	BLUE RIDGE ENERGY INC	NFX	NEWFIELD EXPLORATION CO
BEXP	BRIGHAM EXPLORATION CO	NBL	NOBLE ENERGY INC
TBI	BROWN (TOM) INC	NCEB	NORTH COAST ENERGY INC
BR	BURLINGTON RESOURCES INC	NEV	NUEVO ENERGY CO
COG	CABOT OIL & GAS CORP	3OAKR	OAKRIDGE ENERGY INC
CPE	CALLON PETROLEUM CO/DE	OXY	OCCIDENTAL PETROLEUM CORP
CRZO	CARRIZO OIL & GAS INC	OEI	OCEAN ENERGY INC
CECX	CASTLE ENERGY CORP	PANRA	PANHANDLE RLTY CO -CL A
CXY	CHENIERE ENERGY INC	PLLL	PARALLEL PETROLEUM CORP
CHK	CHESAPEAKE ENERGY CORP	PEX	PETROCORP INC
CWEI	CLAYTON WILLIAMS ENERGY INC	3PTLD	PETROL INDUSTRIES INC
CRK	COMSTOCK RESOURCES INC	3PTRO	PETROMINERALS CORP
MCF	CONTANGO OIL & GAS CO INC	PQUE	PETROQUEST ENERGY INC
CRED	CREDO PETROLEUM CORP	PXD	PIONEER NATURAL RESOURCES CO
DPTR	DELTA PETROLEUM CORP	PLX	PLAINS RESOURCES INC
DNR	DENBURY RESOURCES INC	PPP	POGO PRODUCING CO
DVN	DEVON ENERGY CORP	PENG	PRIMA ENERGY CORP
DHULZ	DORCHESTER HUGOTON -LP	PNRG	PRIMEENERGY CORP
DBLE	DOUBLE EAGLE PETROLEUM CO3P	YOL	PYRAMID OIL CO
EPEX	EDGE PETROLEUM CORP	RRC	RANGE RESOURCES CORP
EEX	EEX CORP	REM	REMINGTON OIL&GAS CP -CL B
EOG	EOG RESOURCES INC	3RPRS	REPUBLIC RESOURCES INC
EQTY	EQUITY OIL CO	MARY	ST MARY LAND & EXPLOR CO
EVG	EVERGREEN RESOURCES	SGY	STONE ENERGY CORP
EXCO	EXCO RESOURCES INC	3STFA	STRATFORD AMERICAN CORP
TXCO	EXPLORATION CO	SFY	SWIFT ENERGY CO
3FORL	FORELAND CORP	TGC	TENGASCO INC
3FPXA	FORTUNE NATURAL RESOURCES CP	3TVOC	TEXAS VANGUARD OIL CO
GEOI	GEORESOURCES INC	TPY	TIPPERARY CORP
GDP	GOODRICH PETROLEUM CORP	TRGL	TOREADOR RESOURCES CORP
3GPOR	GULFPORT ENERGY CORP	3TRIL	TRI VALLEY CORP
3GULF	GULFWEST ENERGY INC	UXP	UNITED STATES EXPLORATION

APPENDIX C

Oil and Gas Firms Included in US Department of Energy Financial Reporting System (FRS)

Table C-1. The FRS Companies

Amerada Hess Corporation	Lyondell-CITGO Refining, L.P.
Anadarko Petroleum Corporation	Marathon Oil Company
Apache Corporation	Motiva Enterprises, L.L.C.
BP America, Inc.	Occidental Petroleum Corporation
Burlington Resources, Inc.	Phillips Petroleum Company
ChevronTexaco Corporation	Premcor, Inc.
CITGO Petroleum Corporation	Shell Oil Company
Conoco, Inc.	Sunoco, Inc.
Devon Energy Corporation	Tesoro Petroleum Corporation
Dominion Resources, Inc.	Tosco Corporation
El Paso Corporation	Total Fina Elf Holdings USA, Inc.
EOG Resources, Inc.	Ultramar Diamond Shamrock Corporation
Equilon Enterprises, L.L.C.	Unocal Corporation
Exxon Mobil Corporation	Valero Energy Corporation
Kerr-McGee Corporation	The Williams Companies, Inc.

Source:

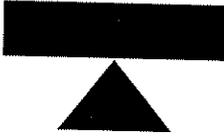
US Department of Energy, Energy Information Administration

Note: Several companies were not included, because they are not publicly traded, while others merged with other companies in the group. The set of current FRS companies included in the Ibbotson analysis is shown in Exhibit 5 of the attached study.

APPENDIX D

Ibbotson Study: "Cost of Capital Analysis for the Energy Production Industry"

ibbotsonAssociates



Cost of Capital Analysis
for
**The Energy Production
Industry**

Prepared by:
ibbotsonAssociates

25 November 2002

Overview

Ibbotson Associates has been contracted to form an after-tax and pre-tax weighted average cost of capital (WACC) estimate for the Energy Production industry. All assumptions and findings for each component of the WACC will also be presented, including the beta, capital structure, and tax rate of the industry. Using the basic capital asset pricing model (CAPM) for determining cost of equity in combination with a cost of debt and a cost of preferred stock computation, the after-tax weighted average cost of capital for the Energy Production industry is 8.56 percent. By applying the CAPM modified for size in deriving a cost of equity estimate, the after-tax WACC is 8.60 percent. These values were calculated with a valuation date as of month-end October 2002. A summary of both after-tax and pre-tax results is presented in Exhibit 1.

Peer Group Selection

For publicly traded companies, inputs to cost of capital models can be estimated from market data. To construct a cost of capital estimate for the Energy Production industry, we must first define the participants. Ibbotson Associates' *Cost of Capital Yearbook* provides cost of capital analysis at the industry level. In this case, our client felt that the industry groupings in our yearbook were not specific enough for their needs and requested analysis on a custom set of companies. This set of companies was delivered to Ibbotson Associates by our client, the American Petroleum Institute, and is presented in Exhibit 5.

Methodology

This methodology section will outline each of the cost of capital components before combining them into a composite weighted average cost of capital. Exhibit 1 presents each component and a summary of results.

Cost of Equity

The cost of equity is equal to the expected rate of return for a firm's equity, including dividends and capital gains or losses. There are several effective methods for computing a firm's cost of equity, including the buildup method, capital asset pricing model ("CAPM"), discounted cash flow ("DCF") method, arbitrage pricing theory, and the Fama-French three factor model. The two most popular methods are the buildup and CAPM models. For this case we will rely primarily on the capital asset pricing model. The CAPM provides an excellent framework for constructing an estimate based on readily available market data.

Capital Asset Pricing Model

We chose the CAPM for the following reasons:

- The CAPM uses only publicly-available data from the market, and a single formula so that the resulting cost of equity estimate is objective, impartial, and reproducible;
- The CAPM relates the return and risk of any stock to that of the market as a whole;
- The CAPM is intuitively appealing in that it says investors demand and receive a risk premium for holding stocks instead of riskless bills or bonds;
- The CAPM has been thoroughly researched and empirically tested, and shown to be effective in estimating the cost of equity; and
- It is a widely used method in the business community (such as in corporate finance and capital budgeting); and in the academic world, where advances in cost of capital theory originate, the CAPM is the prevailing method.

The CAPM cost of equity is computed using the following formula:

$$r_s = R_f + \beta_s \times RP$$

where:

r_s = expected return (or cost of equity) on the stock of company s;

R_f = expected return of the riskless asset;

β_s = the Beta of the stock of company s; and

RP = the expected equity risk premium.

Ibbotson Associates has done substantial work to demonstrate that the CAPM, while adequate in many aspects, fails to fully explain the returns of smaller companies. The adjustment to the CAPM that Ibbotson Associates advocates is in the form of a size premium. For the purpose of this analysis we will provide cost of equity estimates using both the original CAPM and the CAPM modified for size.

The modified CAPM is widely accepted and alters the CAPM formula as follows:

$$k_E = R_f + \beta_s \times RP + SP$$

where:

k_E = cost of equity on the stock of company s;

R_f = expected return of the riskless asset;

β_s = the Beta of the stock of company s;

RP = the expected equity risk premium; and

SP = the expected size premium for company s.

To apply the CAPM and the modified CAPM to our cost of equity estimate for this case, we must obtain each of the parameters from market data. The *SBBI Valuation Edition 2002 Yearbook* provides estimates for the riskless rate, equity risk premium, and size premium. Standard and Poor's Compustat database provides the market data necessary to form the industry beta estimate.

All of the parameters used in this section are stated as of month-end October 2002 so that the after-tax CAPM can be applied as follows:

Standard CAPM

$$k_E = 5.08 + (0.58 \times 7.42)$$

$$k_E = 9.38\%$$

Modified CAPM

$$k_E = 5.08 + (0.58 \times 7.42) + 0.044$$

$$k_E = 9.43\%$$

Riskless Rate and Equity Risk Premium

The riskless rate of 5.08 percent is the yield on a government bond with approximately 20 years to maturity. The equity risk premium of 7.42 percent is a long-horizon estimate computed as the annual arithmetic total return of stocks (S&P 500) minus the annual arithmetic income return on bonds (20-year government).

Size Premium

For size premium, Ibbotson Associates presents size adjustments for ten different size groupings of publicly-traded companies in the *Stocks, Bonds, Bills, and Inflation (SBBI) Valuation Edition Yearbook*. To find the appropriate size premium, you simply need to take the market capitalization of the firm in question and match it up with a size range presented in the Ibbotson Analysis. This adjustment complements the ability of beta to explain company returns.

To form the industry size premium figure presented in this analysis, we first assigned size premia for each company in the peer group. Then we market value weighted the size premia to form an industry composite size premium. Market value weighting the size premia will reduce the overall magnitude of the adjustment because larger companies are weighted more heavily, but it is our contention that larger companies should have larger impacts on the industry statistics. The size premium for the Energy Production industry is estimated to be 0.044 percent. Exhibit 2 presents individual company size premia data.

To apply the data presented herein to a very small company, it is recommended that the CAPM cost of equity without size adjustment be used as a base. To complete the model, then add the size premium appropriate for the particular subject company. In other words, it may be cleaner to construct the cost of equity from an industry perspective independent of size, and then add the size premium relative to the company being valued. However, in

the absence of a specific subject company, *the best measure for cost of equity of the industry is the CAPM modified for size.*

Beta

Beta is a direct input to the capital asset pricing model (CAPM) when forming a cost of equity estimate and is estimated to be 0.58 for the Energy Production industry. Beta is a measure of a security's sensitivity to the market, also known as its systematic risk. The systematic risk of a security is estimated by regressing the security's returns against the market portfolio's returns. The slope of the regression equation is the beta. The beta estimates calculated in this analysis are based on the capital asset pricing model as developed by Mossin [1966], Lintner [1965], and Sharpe [1964].

In order to calculate a beta for the Energy Production industry, we first constructed a 60-month total return stream for the industry. For each month, the total returns of the peer group companies were weighted by their market capitalization to create a single capitalization-weighted average return stream. Company monthly total returns were obtained from S&P Compustat. Next, we ran a CAPM regression between the monthly total returns of the industry, in excess of the risk-free asset, and the monthly total returns of the stock market in excess of the return on the risk-free asset. The series used as a proxy for the risk-free asset was the returns on the 30 day T-bill, while the proxy for the market was the returns on the Standard & Poor's 500 Index. Total returns for both individual stocks and the market proxy were determined by calculating price appreciation and dividend reinvestment. The regression was run over a 60-month time frame from November 1997 to October 2002.

Cost of Debt

The cost of debt for the Energy Production industry as of month-end October 2002 is estimated to be 6.32 percent. This cost of debt is based on the publicly traded debt of the customized peer group companies. Each of the companies in the peer group that had debt outstanding, and whose debt had been rated by Standard and Poor's, was used in this analysis. The S&P Compustat database was used as the source for long-term debt ratings. Once a debt rating for each company was determined, we assigned the appropriate yield for similar quality corporate bonds presented by Lehman Brothers in their Fixed Income Research for the October update. These yields provide us with approximate cost of debt estimates for each company in the peer group based on the quality of their debt issues. By market value weighting these cost of debt figures we can estimate a cost of debt for the peer group as a whole, and one which we can assign to the Energy Production industry. Exhibit 3 provides individual company cost of debt data.

Cost of Preferred Stock

The cost of preferred stock as of month-end October 2002 is estimated to be 5.90 percent for the Energy Production Industry. The cost of preferred stock was calculated using the publicly traded preferred stock and preferred dividends of the peer group companies. Those companies with less than 10 million in preferred stock were excluded from the analysis, because they did not provide reliable inputs for estimating a cost of preferred stock. The preferred cash dividend amount paid by each firm was divided by the total

value of their preferred stock to arrive at an approximate cost of preferred stock estimate for each company. We market value weighted each estimate to determine a cost of preferred stock for the Energy Production Industry as a whole.

Weighted Average Cost of Capital

The various cost of capitals described throughout this analysis must be combined together to construct an estimate for the firm's overall cost of capital. The weights for each are referred to as the capital structure. In addition to inputs described so far, we also need a tax rate to adjust the cost of debt down to the same tax status as the other components. Since we are concerned with a market derived cost of capital, most of the inputs to this WACC estimate are taken from peer group data. A summary of after-tax and pre-tax weighted average cost of capital results is presented in Exhibit 1.

The weighted average cost of capital formula is:

$$WACC = w_E k_E + w_D k_D (1-t) + w_P k_P$$

where

k_E = the cost of equity;

k_D = is the cost of debt;

k_P = is the cost of preferred stock;

w_E = is the common equity weight in the target capital structure;

w_D = is the debt weight in the target capital structure;

w_P = is the preferred stock weight in the target capital structure; and

t = is the effective tax rate.

The after-tax weighted average cost of capital formula using the parameters explained throughout this analysis is:

$$\begin{aligned} WACC &= (0.8328)(0.0938) + (0.1661)(0.0632)(1-0.296) + (0.0011)(.0509) \\ &= 8.56 \% \end{aligned}$$

Capital Structure Weights

The most appropriate capital structure for a company is its target structure. This is the capital structure that the company aspires to attain in the future, and is the most appropriate weighting scheme to develop a prospective cost of capital estimate used for discounting future cash flows. Target capital structure can be determined in two ways. One way is to ask the subject company's management what they see as their optimal and therefore target capital structure going forward. This must be compared to their historical structure and adjusted for expected demands in financing to check for reasonableness. If this information is not available, the next best thing is to use the capital structure of the industry. It can be argued that the target capital structure for a given company will be similar to that of its peers.

In this case, as in most, access to management for each of the peer group companies is not realistic given the scope of the assignment. Accordingly, we are not able to attain target capital structure estimates directly from each company. The best alternative is to compute the capital structure for the industry.

The capital structure for the Energy Production industry was determined using the book value of debt, the book value of preferred stock, and the market value of equity of the peer group companies. While it is typically straightforward to measure the market value of equity capital, it is much more difficult to measure the market value of debt and of preferred stock because so little is publicly traded. In most cases, the market value of debt and of preferred stock can be approximated by using book values.

The book value of debt, the book value of preferred stock, and the market value of equity for each company was taken directly from S&P Compustat as of month-end October 2002. Both short- and long-term debt was combined to form the book value of debt. The book value of debt for the peer group of companies was arithmetically summed to arrive at an industry book value of debt. The same summation was used for determining the industry book value of preferred stock, the market value of equity, and total capital. In this case, the Energy Production industry has a capital structure of approximately 16.61 percent debt and 83.28 percent equity and 0.11 percent preferred stock. Exhibit 4 presents individual company book value of debt and market value of equity data.

Tax Rate

The effective tax rate for the Energy Production industry is determined to be 29.6 percent. This rate was derived from the peer group companies effective tax rates for 2001. Individual company tax rate data was obtained from Professor John Graham at Duke University. Traditionally, it has been common practice to use the top statutory marginal tax rate when calculating the WACC for a company. However, according to John Graham, there is substantial variation in tax rates across firms and through time, and it is inaccurate to assume that the majority of U.S. publicly traded firms are subject to the top marginal tax rate. In fact, the majority of U.S. firms can expect to pay less than the statutory rate. Research by Professor Graham provides a way for practitioners to determine more accurate estimates of forward looking tax rates. Using the Graham methodology, we constructed an industry tax rate by taking a market capitalization weighted average of the effective federal tax rate (2001) specific to each company in the industry. Company tax rate data is distributed to the public through Ibbotson Associates' Cost of Capital Center section of their www.ibbotson.com web site. A list of the peer group companies and their effective federal tax rates is presented in Exhibit 5. Note that only federal tax rates were used in this analysis and state taxes were ignored for the scope of this assignment.

Pre-Tax Adjustment

Standard WACC calculations are after-tax values and are used to value a stream of after-tax free cash flow. However, in some instances (usually for regulatory or legal statute reasons) it is necessary to derive a pre-tax estimate. The scope of this assignment

required that we also present our estimates of the WACC so that it can be used to discount before-tax cash flows.

Since there is no completely accurate method to calculate a pre-tax cost of capital rate, we used a simple conversion technique to derive a tax-adjusted WACC. The weighted average cost of capital estimate was divided by 1 minus the tax rate to arrive at a pre-tax WACC of 12.16. The formula is as follows:

$$\begin{aligned} \text{WACC} &= .0856 / (1 - 0.296) \\ &= 12.16\% \end{aligned}$$

In order to fully adjust for taxes, the underlying market data would need to be adjusted at the company level first. This is something that requires heavy analysis and, to our knowledge, has not been done to date by anyone. Therefore, the basic adjustment we make here is based on the best available method.

Summary

Using the standard CAPM to derive a cost of equity estimate, the after-tax weighted average cost of capital for the Energy Production industry as of month-end October 2002 is estimated to be 8.56 percent, while the pre-tax WACC is 12.16 percent. This combines the after-tax cost of equity estimate of 9.38 percent, the cost of debt of 6.32 percent, the cost of preferred stock of 0.11 percent, and the effective tax rate of 29.6 percent together according to a prospective capital structure of 83.28 percent equity, 16.61 percent debt, and 0.11 percent preferred stock.

By applying the modified CAPM method for calculating cost of equity, the weighted average cost of capital is estimated to be 8.60 percent on an after-tax basis and 12.22 percent on a pre-tax basis. This combines the after-tax cost of equity value of 9.43 percent, the cost of debt of 6.32 percent, the cost of preferred stock of 0.11 percent, and the effective tax rate of 29.6 percent together according to a prospective capital structure of 83.28 percent equity, 16.61 percent debt, and 0.11 percent preferred stock.

Cost of Capital Analysis for the Energy Production Industry
 - Prepared by Ibbotson Associates

Exhibit 1: Industry Weighted Average Cost of Capital - October 2002

<u>WACC</u>	<u>CAPM</u>	<u>CAPM + Size Premium</u>	<u>Source</u>
Post-Tax WACC	8.56%	8.60%	
Pre-Tax WACC	12.16%	12.22%	
<u>Cost of Equity</u>			
Post-Tax Cost of Equity	9.38%	9.43%	
Risk Free Rate	5.08%		Wall Street Journal, November 1, 2002 SBBi Valuation Edition 2002 Yearbook SBBi Valuation Edition 2002 Yearbook
Equity Risk Premium	7.42%		
Size Premium	0.044%		
Industry Beta	0.58		
<u>Cost of Debt</u>	6.32%		Standard & Poor Compustat
<u>Cost of Preferred Stock</u>	5.90%		Lehman Brothers Fixed Income Research October Update
<u>Tax Rate</u>	29.6%		Professor John Graham - 2001 Company Effective Tax Rates
<u>Capital Structure</u>			
Weight of Debt	16.61%		
Weight of Equity	83.28%		
Weight of Preferred Stock	0.11%		

Cost of Capital Analysis for the Energy Production Industry
 - Prepared by Ibbotson Associates

Exhibit 2: Industry Size Premium - October 2002

Industry Size Premium (%) 0.044

Company Name	Market Value October-02	Portfolio Decile	Size Premium (%)
EXXON MOBIL CORP	227,455,469,000	1	0
BP PLC -ADS	143,771,391,000	1	0
TOTAL FINA ELF S A -ADR	96,421,344,000	1	0
ROYAL DUTCH PETROLEUM -ADR	91,699,227,000	1	0
CHEVRONTEXACO CORP	72,233,773,000	1	0
CONOCOPHILLIPS	32,815,051,000	1	0
DOMINION RESOURCES INC	14,665,392,000	1	0
ANADARKO PETROLEUM CORP	11,068,814,000	2	0.33
OCCIDENTAL PETROLEUM CORP	10,758,663,000	2	0.33
BURLINGTON RESOURCES INC	8,293,560,000	2	0.33
DEVON ENERGY CORP	7,902,796,000	2	0.33
APACHE CORP	7,773,774,000	2	0.33
UNOCAL CORP	6,762,513,000	2	0.33
MARATHON OIL CORP	6,475,154,000	2	0.33
AMERADA HESS CORP	4,577,704,000	3	0.59
KERR-MCGEE CORP	4,366,313,000	3	0.59
EOG RESOURCES INC	4,265,856,000	3	0.59
VALERO ENERGY CORP	3,725,605,000	3	0.59
SUNOCO INC	2,288,104,000	4	0.83
WILLIAMS COS INC	971,044,000	6	1.36
TESORO PETROLEUM CORP	210,625,000	9	2.41
	758,502,172,000		

Cost of Capital Analysis for the Energy Production Industry
 - Prepared by IbbotsonAssociates

Exhibit 3: Cost of Debt - October 2002

Industry Cost of Debt (%) 6.32

Company Name	Domestic LT ICR/S&P	Ratings from Compustat	Lehman Brother's LT Bond Yield - October 2002
EXXON MOBIL CORP	2	AAA	5.84
BP PLC -ADS	4	AA+	6.11
CHEVRONTEXACO CORP	5	AA	6.11
TOTAL FINA ELF S A -ADR	5	AA	6.11
APACHE CORP	9	A-	6.61
CONOCOPHILLIPS	9	A-	6.61
ANADARKO PETROLEUM CORP	10	BBB+	8.14
BURLINGTON RESOURCES INC	10	BBB+	8.14
DOMINION RESOURCES INC	10	BBB+	8.14
EOG RESOURCES INC	10	BBB+	8.14
MARATHON OIL CORP	10	BBB+	8.14
UNOCAL CORP	10	BBB+	8.14
AMERADA HESS CORP	11	BBB	8.14
DEVON ENERGY CORP	11	BBB	8.14
KERR-MCGEE CORP	11	BBB	8.14
OCCIDENTAL PETROLEUM CORP	11	BBB	8.14
SUNOCO INC	11	BBB	8.14
VALERO ENERGY CORP	11	BBB	8.14
TESORO PETROLEUM CORP	15	BB-	11.08
WILLIAMS COS INC	16	B+	13.2

Cost of Capital Analysis for the Energy Production Industry
 - Prepared by Ibbotson Associates

Exhibit 4: Capital Structure Ratios - October 2002

Debt/Total Capital	16.61%
Equity/Total Capital	83.28%
Pref Stk/Total Capital	0.11%
Debt/Market Value of Equity	19.94%

Total MV of Equity	758,502.17
Total Book Debt	151,277.81
Total Preferred Stock	964.18
Total Capital	<u>\$ 910,744.16</u>

Company Name	Preferred Stock	Total Book Debt	Market Value- Monthly	Total Capital	Book Debt to Tot Capital
AMERADA HESS CORP	0	5,665.00	4,577.70	10,242.70	0.55
ANADARKO PETROLEUM CORP	103	5,050.00	11,068.81	16,221.81	0.31
APACHE CORP	306.594	2,244.36	7,773.77	10,324.73	0.22
BP PLC -ADS	21	21,417.00	143,771.39	165,209.39	0.13
BURLINGTON RESOURCES INC	0	4,337.00	8,293.56	12,630.56	0.34
CHEVRONTXACO CORP	0	17,418.00	72,233.77	89,651.77	0.19
CONOCOPHILLIPS	0	9,339.00	32,815.05	42,154.05	0.22
DEVON ENERGY CORP	1	6,589.00	7,902.80	14,492.80	0.45
DOMINION RESOURCES INC	384	16,464.00	14,665.39	31,513.39	0.52
EOG RESOURCES INC	147.582	855.97	4,265.86	5,269.41	0.16
EXXON MOBIL CORP	0	10,802.00	227,455.47	238,257.47	0.05
KERR-MCGEE CORP	0	4,574.00	4,366.31	8,940.31	0.51
MARATHON OIL CORP	0	3,647.00	6,475.15	10,122.15	0.36
OCCIDENTAL PETROLEUM CORP	0	4,608.00	10,758.66	15,366.66	0.30
ROYAL DUTCH PETROLEUM -ADR	1	3,492.00	91,699.23	95,192.23	0.04
SUNOCO INC	0	1,444.00	2,288.10	3,732.10	0.39
TESORO PETROLEUM CORP	0	1,146.90	210.625	1,357.53	0.84
TOTAL FINA ELF S A -ADR	0	13,111.17	96,421.34	109,532.52	0.12
UNOCAL CORP	0	3,428.00	6,762.51	10,190.51	0.34
VALERO ENERGY CORP	0	3,683.41	3,725.61	7,409.01	0.50
WILLIAMS COS INC	0	11,962.00	971.044	12,933.04	0.92

Exhibit 5: Peer Group Companies, Industry Tax Rate, Effective Company Tax Rates (2001)

Industry Weighted Average Effective Tax Rate **29.64%**

Company	Effective Tax Rates
AMERADA HESS CORP	6.79%
ANADARKO PETROLEUM CORP	35.00%
APACHE CORP	1.38%
BP PLC -ADS	35.04%
BURLINGTON RESOURCES INC	31.78%
CHEVRONTEXACO CORP	35.00%
CONOCOPHILLIPS	35.11%
DEVON ENERGY CORP	33.89%
DOMINION RESOURCES INC	21.26%
EOG RESOURCES INC	35.64%
EXXON MOBIL CORP	35.00%
KERR-MCGEE CORP	4.67%
MARATHON OIL CORP	35.07%
OCCIDENTAL PETROLEUM CORP	35.01%
ROYAL DUTCH PETROLEUM -ADR	1.62%
SUNOCO INC	16.20%
TESORO PETROLEUM CORP	32.63%
TOTAL FINA ELF S A -ADR	35.21%
UNOCAL CORP	3.95%
VALERO ENERGY CORP	34.69%
WILLIAMS COS INC	8.01%

APPENDIX E

Ibbotson Recommendation for Multi-Year Analysis

STATISTICS FOR SIC CODE 131

Crude Petroleum and Natural Gas

This Industry Comprises 99 Companies

Industry Description

Establishments primarily engaged in operating oil and gas field properties. This includes all activities in the preparation of oil and gas up to the point of shipment from the producing property.

Sales (million\$)

Total	53,864
Average	544.1

Three Largest Companies

OCCIDENTAL PETROLEUM CORP	13,985.0
ANADARKO PETROLEUM CORP	8,369.0
UNOCAL CORP	6,664.0

Three Smallest Companies

STRATFORD AMERICAN CORP	0.4
CONTANGO OIL & GAS CO INC	0.3
FORELAND CORP	0.3

Total Capital (million\$)

Total	129,711
Average	1,310.2

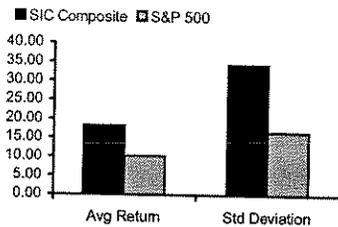
Three Largest Companies

ANADARKO PETROLEUM CORP	16,221.8
OCCIDENTAL PETROLEUM CORP	15,307.3
DEVON ENERGY CORP	14,319.7

Three Smallest Companies

PETROMINERALS CORP	0.7
FORELAND CORP	0.6
PETROL INDUSTRIES INC	0.4

SIC vs. S&P 500 for Last 10 Years (%)



Number of Companies & Total Capital (billion\$)

S&P Debt Rating	Large Cap	Mid Cap	Low Cap	Micro Cap	Totals
AAA, AA, A	1	0	0	0	1 (companies)
	11.1	0.0	0.0	0.0	11.1 (capital)
BBB	5	3	0	0	8
	69.0	12.8	0.0	0.0	81.8
BB, B, CCC, CC, D	0	4	8	8	20
	0.0	12.7	9.8	3.4	25.9
Not Rated	0	0	7	63	70
	0.0	0.0	5.5	5.4	10.9
Totals	6	7	15	71	99
	80.1	25.5	15.2	8.8	129.7

Annualized Statistics for Last 10 Years (%)

	Avg Return	Std Deviation
S&P 500	10.24	16.59
SIC Composite	18.22	34.34
Large Composite	15.01	32.70
Small Composite	39.84	75.09

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	3.06	9.09
Median	-8.36	4.00
25th Percentile	-24.14	-11.35
SIC Composite	10.72	12.31
Large Composite	6.55	10.81
Small Composite	45.66	-24.73

Sales, Income & Market Capitalization (billion\$)

	Operating Sales	Operating Income	Net Income	Equity Capital	Debt Capital
Current Yr.	53.9	21.1	5.2	85.7	44.0
Last Yr.	56.2	22.1	8.2	72.3	33.8
2 Yrs. Ago	31.0	10.2	1.7	83.1	32.2
3 Yrs. Ago	23.4	4.0	-4.3	54.9	31.3
4 Yrs. Ago	26.4	9.9	0.7	48.5	24.7

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
Median	19.46	23.45	24.39
SIC Composite	15.33	17.42	15.84
Large Composite	15.49	15.44	14.37
Small Composite	-20.10	15.21	2.03

Capital Structure Ratios (%)

Debt/Total Capital		Debt/MV Equity	
Latest	5-Year Avg	Latest	5-Year Avg
30.11	29.40	43.09	41.64
33.92	32.99	51.33	49.22
32.11	29.60	47.30	42.05
2.50	4.68	2.56	4.91

Distribution of Sales & Total Capital (million\$)

	Distribution of Sales		Total Capital	
	Latest	5-Year Avg	Latest	5-Year Avg
90th Percentile	896.7	736.4	2974.5	2,162.8
75th Percentile	207.0	135.7	689.2	540.5
Median	35.9	31.8	151.7	139.3
25th Percentile	6.1	4.2	25.7	26.7
10th Percentile	1.7	1.5	4.7	7.2

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Cap.		Return on Assets		Return on Equity	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	46.88	36.34	8.48	0.09	40.45	35.46	4.17	0.65	3.72	0.03	5.62	0.04
SIC Composite	39.12	35.17	9.71	6.06	49.14	49.00	5.31	3.42	4.77	2.97	6.10	3.43
Large Composite	34.13	35.22	8.80	9.44	52.43	50.58	5.34	5.66	4.61	4.77	5.95	5.30
Small Composite	-30.34	-34.88	-51.82	-65.22	19.76	24.20	-16.07	-25.42	-10.24	-15.78	-5.35	-11.27

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Dividend Yield (% of Price)	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	17.80	NMF	1.40	1.69	1.54	2.14	NMF	NMF	4.18	5.28	0.00	0.00
SIC Composite	16.38	12.89	1.57	1.95	1.59	1.77	NMF	NMF	4.07	5.02	1.15	1.25
Large Composite	16.80	13.39	1.56	1.93	1.48	1.78	NMF	NMF	4.33	5.05	1.46	1.57
Small Composite	NMF	NMF	3.25	2.54	9.68	5.78	NMF	NMF	NMF	NMF	0.00	0.00

Growth Rates (%)

	Cost of Equity Capital (%)					Weighted Average Cost of Capital (%)				Levered Betas		Unlevered Betas	
	Analysts' Estimate	CAPM	3-Factor	Discounted Cash Flow		CAPM	3-Factor	Discounted Cash Flow		Raw Beta	Adjusted Beta	Adjusted Beta	
Median	13.77	9.93	11.69	12.91	13.77	12.15	10.72	12.18	12.38	13.77	12.18	0.67	0.69
SIC Composite	13.77	10.48	11.20	12.26	13.87	9.50	10.41	10.91	11.64	12.75	9.74	0.69	0.76
Large Composite	12.97	10.35	10.35	11.59	13.94	12.40	9.58	9.58	10.44	12.05	10.99	0.68	0.75
Small Composite	13.77	10.27	13.57	8.14	13.77	6.50	10.28	13.54	8.18	13.75	6.56	0.39	0.74

Cost of Capital 2002 Yearbook, Data Through September 2002

IbbotsonAssociates

STATISTICS FOR SIC CODE 291

Petroleum Refining

This Industry Comprises 11 Companies

Industry Description

Establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes. Establishments of this industry also produce aliphatic and aromatic chemicals as byproducts.

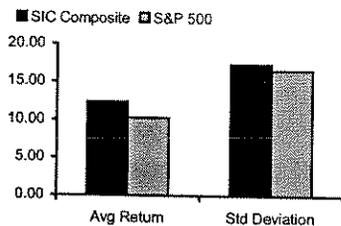
Sales (million\$)

Total	353,994
Average	32,181.3
Three Largest Companies	
EXXON MOBIL CORP	187,510.0
CHEVRONTXACO CORP	97,863.0
MARATHON OIL CORP	28,615.0
Three Smallest Companies	
HOLLY CORP	1,142.1
ARABIAN AMERICAN DEVELOPMENT	42.6
AMER INTL PETROLEUM CORP	18.3

Total Capital (million\$)

Total	345,192
Average	31,381.1
Three Largest Companies	
EXXON MOBIL CORP	226,364.4
CHEVRONTXACO CORP	91,382.1
MARATHON OIL CORP	10,673.6
Three Smallest Companies	
HOLLY CORP	307.4
AMER INTL PETROLEUM CORP	23.7
ARABIAN AMERICAN DEVELOPMENT	21.1

SIC vs. S&P 500 for Last 10 Years (%)



Number of Companies & Total Capital (billion\$)

S&P Debt Rating	Large Cap	Mid Cap	Low Cap	Micro Cap	Totals
AAA, AA, A	2	1	0	0	3 (companies) 317.7 (capital)
BBB	1	2	0	0	3 10.7 (capital)
BB, B, CCC, CC, D	0	0	1	1	2 0.0 (capital)
Not Rated	0	0	0	3	3 0.0 (capital)
Totals	3	3	1	4	11 328.4 (capital)

Annualized Statistics for Last 10 Years (%)

	Avg Return	Std Deviation
S&P 500	10.24	16.59
SIC Composite	12.36	17.38
Large Composite	12.29	17.41
Small Composite	21.15	61.83

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	5.84	10.41
Median	-3.06	6.07
25th Percentile	-18.83	0.64
SIC Composite	2.09	11.08
Large Composite	1.98	10.97
Small Composite	8.34	26.53

Sales, Income & Market Capitalization (billion\$)

	Operating Sales	Operating Income	Net Income	Equity Capital	Debt Capital
Current Yr.	354.0	53.2	21.9	306.2	39.0
Last Yr.	322.6	50.6	22.8	344.1	25.4
2 Yrs. Ago	235.1	27.6	10.9	383.1	34.4
3 Yrs. Ago	161.5	19.0	8.3	258.7	23.2
4 Yrs. Ago	187.1	26.8	12.7	244.2	21.7

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
Median	17.33	20.27	21.31
SIC Composite	13.67	16.65	15.19
Large Composite	13.34	16.17	13.54
Small Composite	11.19	18.06	25.34

Capital Structure Ratios (%)

	Debt/Total Capital	Debt/MV Equity
Latest	38.55	62.73
5-Year Avg	30.73	44.35
Latest	11.30	12.74
5-Year Avg	8.40	9.17
Latest	9.70	10.75
5-Year Avg	7.52	8.13
Latest	22.22	28.57
5-Year Avg	26.70	36.43

Distribution of Sales & Total Capital (million\$)

	Distribution of Sales		Total Capital	
	Latest	5-Year Avg	Latest	5-Year Avg
90th Percentile	97,863.0	47425.8	91382.1	71,635.8
75th Percentile	21,801.7	15899.0	8578.9	7,989.8
Median	5,136.8	3129.6	3745.8	3,181.2
25th Percentile	1,515.7	911.7	420.2	346.0
10th Percentile	42.6	28.7	23.7	71.8

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Cap.		Return on Assets		Return on Equity	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	10.05	7.21	4.02	2.97	164.70	159.10	10.94	9.01	7.01	5.66	17.29	8.59
SIC Composite	15.03	14.06	6.18	6.08	145.87	132.44	11.78	10.88	9.02	8.05	7.15	4.89
Large Composite	15.85	14.90	6.48	6.49	141.96	127.44	12.14	11.16	9.20	8.27	6.86	4.78
Small Composite	11.00	7.71	3.68	0.94	205.68	169.11	12.57	2.47	7.57	1.60	16.06	2.98

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Dividend Yield (% of Price)	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	5.78	11.64	1.40	1.64	0.23	0.34	15.46	29.24	2.41	3.41	1.08	1.10
SIC Composite	13.99	14.32	2.09	2.80	0.86	1.24	18.62	27.70	5.75	8.84	0.25	0.59
Large Composite	14.57	14.97	2.18	2.88	0.94	1.36	19.40	27.82	5.96	9.11	0.20	0.55
Small Composite	6.23	6.09	1.01	1.19	0.23	0.32	5.86	NMF	2.08	4.12	2.25	2.21

Growth Rates (%)

	Cost of Equity Capital (%)						Weighted Average Cost of Capital (%)						Levered Betas			Unlevered Betas		
	Analysts' Estimate	CAPM		3-Factor Fama-French	Discounted Cash Flow		CAPM		3-Factor Fama-French	Discounted Cash Flow		Raw Beta	Adjusted Beta	Adjusted Beta	Raw Beta	Adjusted Beta	Adjusted Beta	
Median	8.05	9.49	10.96	11.70	12.05	11.30	9.44	9.57	10.87	11.05	10.22	0.63	0.63	0.63	0.48	0.47	0.44	
SIC Composite	7.81	8.31	8.31	10.03	8.06	13.20	8.16	8.16	9.71	7.93	12.57	0.48	0.47	0.44	0.48	0.47	0.44	
Large Composite	7.70	8.27	8.27	9.99	8.14	13.10	8.13	8.13	9.70	8.01	12.53	0.47	0.47	0.44	0.48	0.47	0.44	
Small Composite	7.81	8.55	11.85	16.99	8.03	9.40	9.01	11.79	16.12	8.57	9.72	0.52	0.51	0.43	0.52	0.51	0.43	

STATISTICS FOR SIC CODE 131

Crude Petroleum and Natural Gas
This Industry Comprises 93 Companies

Industry Description

Establishments primarily engaged in operating oil and gas field properties. This includes all activities in the preparation of oil and gas up to the point of shipment from the producing property.

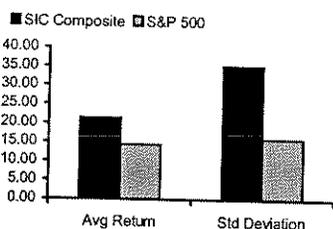
Sales (million\$)

Total	-52,333
Average	562.7
Three Largest Companies	
OCCIDENTAL PETROLEUM CORP	13,985.0
ANADARKO PETROLEUM CORP	8,369.0
UNOCAL CORP	6,664.0
Three Smallest Companies	
PETROMINERALS CORP	0.5
CONTANGO OIL & GAS CO INC	0.3
FORELAND CORP	0.3

Total Capital (million\$)

Total	131,853
Average	1,417.8
Three Largest Companies	
ANADARKO PETROLEUM CORP	19,193.0
OCCIDENTAL PETROLEUM CORP	15,530.5
DEVON ENERGY CORP	14,014.4
Three Smallest Companies	
ALTEX INDUSTRIES INC	1.1
FORELAND CORP	0.6
PETROL INDUSTRIES INC	0.4

SIC vs. S&P 500 for Last 10 Years (%)



Number of Companies & Total Capital (billion\$)

S&P Debt Rating	Large Cap	Mid Cap	Low Cap	Micro Cap	Totals
AAA, AA, A	1	0	0	0	1 (companies)
	10.3	0.0	0.0	0.0	10.3 (capital)
BBB	5	3	0	0	8
	74.1	12.9	0.0	0.0	87.0
BB, B, CCC, CC, D	0	5	6	6	17
	0.0	14.1	6.7	2.3	23.2
Not Rated	0	0	10	57	67
	0.0	0.0	6.8	4.5	11.4
Totals	6	8	16	63	93
	84.4	27.0	13.5	6.9	131.9

Annualized Statistics for Last 10 Years (%)

	Avg Return	Std Deviation
S&P 500	14.36	15.93
SIC Composite	21.30	35.15
Large Composite	18.18	33.74
Small Composite	42.34	78.28

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	10.44	15.94
Median	0.15	6.55
25th Percentile	-17.76	-7.51
SIC Composite	17.28	15.39
Large Composite	12.18	13.81
Small Composite	34.63	-3.59

Sales, Income & Market Capitalization (billion\$)

	Operating Sales	Net Income	Equity Capital	Debt Capital
Current Yr.	52.3	22.8	5.4	90.5
Last Yr.	47.1	20.3	6.9	89.5
2 Yrs. Ago	25.6	7.4	-0.9	57.4
3 Yrs. Ago	22.2	6.5	-1.4	43.6
4 Yrs. Ago	24.8	9.5	1.3	62.3

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
Median	23.10	25.43	28.89
SIC Composite	16.55	21.88	20.77
Large Composite	15.98	20.25	15.66
Small Composite	-2.64	-12.39	-14.97

Capital Structure Ratios (%)

Debt/Total Capital		Debt/MV Equity	
Latest	5-Year Avg	Latest	5-Year Avg
25.90	29.59	34.95	42.03
27.79	32.38	38.49	47.89
28.90	30.26	40.65	43.39
3.27	3.58	3.38	3.71

Distribution of Sales & Total Capital (million\$)

	Distribution of Sales		Total Capital	
	Latest	5-Year Avg	Latest	5-Year Avg
90th Percentile	872.3	644.2	3170.0	2,277.3
75th Percentile	211.3	127.1	717.4	493.4
Median	44.6	29.9	148.3	109.0
25th Percentile	6.4	3.8	28.3	24.4
10th Percentile	1.9	1.4	6.0	8.4

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Cap.		Return on Assets		Return on Equity	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	51.97	39.57	15.19	2.04	42.85	35.46	5.73	1.42	6.22	1.14	6.30	1.42
SIC Composite	43.53	38.66	10.32	6.50	49.76	46.15	4.83	3.49	5.14	3.00	5.99	3.56
Large Composite	40.09	36.83	8.86	9.32	52.52	50.53	4.95	5.61	4.65	4.71	5.54	5.51
Small Composite	-29.74	-41.07	-50.36	-69.41	16.84	21.45	1.17	-22.41	-8.48	-14.89	-9.35	-10.60

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Dividend Yield (% of Price)	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	15.87	70.39	1.83	1.65	1.78	2.40	NMF	NMF	4.29	5.33	0.00	0.00
SIC Composite	16.69	16.35	1.74	1.87	1.72	1.83	NMF	NMF	3.96	4.73	1.11	1.29
Large Composite	18.04	13.79	1.71	1.86	1.60	1.69	42.68	NMF	3.99	4.60	1.39	1.60
Small Composite	NMF	NMF	1.46	2.33	5.38	6.54	NMF	NMF	NMF	NMF	0.00	0.00

Growth Rates (%)

Cost of Equity Capital (%)

Weighted Average Cost of Capital (%)

	Analysts' Estimate	CAPM			Discounted Cash Flow			CAPM			Discounted Cash Flow			Levered Betas		Unlevered Betas	
		CAPM + Size Prem	Fama-French	1-Stage	3-Stage	CAPM + Size Prem	Fama-French	1-Stage	3-Stage	Raw Beta	Adjusted Beta	Adjusted Beta					
Median	16.13	10.71	12.78	14.05	16.13	12.60	11.29	13.13	13.86	15.76	12.69	0.58	0.64	0.39			
SIC Composite	16.13	11.60	12.32	13.65	16.23	10.00	11.44	11.95	12.89	14.72	10.30	0.68	0.75	0.58			
Large Composite	15.15	11.48	11.48	12.99	16.30	13.30	10.90	10.90	11.97	14.32	12.20	0.66	0.73	0.57			
Small Composite	16.13	11.71	15.01	11.64	16.13	6.50	11.72	14.99	11.65	16.10	6.54	0.54	0.76	0.76			

STATISTICS FOR SIC CODE 131

Crude Petroleum and Natural Gas
This Industry Comprises 95 Companies

Industry Description

Establishments primarily engaged in operating oil and gas field properties. This includes all activities in the preparation of oil and gas up to the point of shipment from the producing property.

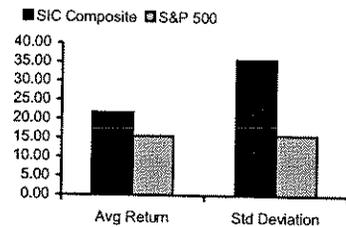
Sales (million\$)

Total	33,880
Average	356.6
Three Largest Companies	
UNOCAL CORP	8,914.0
ANADARKO PETROLEUM CORP	5,686.0
BURLINGTON RESOURCES INC	3,147.0
Three Smallest Companies	
OCEANIC EXPLORATION CO	0.4
PETROMINERALS CORP	0.4
DTVN HOLDINGS INC	0.2

Total Capital (million\$)

Total	108,578
Average	1,142.9
Three Largest Companies	
ANADARKO PETROLEUM CORP	19,974.4
BURLINGTON RESOURCES INC	11,743.5
UNOCAL CORP	11,318.1
Three Smallest Companies	
ALTEX INDUSTRIES INC	1.6
PETROMINERALS CORP	1.3
PETROL INDUSTRIES INC	0.4

SIC vs. S&P 500 for Last 10 Years (%)



Number of Companies & Total Capital (billion\$)

S&P Debt Rating	Large Cap	Mid Cap	Low Cap	Micro Cap	Totals	
AAA, AA, A	3	0	0	0	3	(companies)
	30.9	0.0	0.0	0.0	30.9	(capital)
BBB	3	3	0	0	6	
	37.1	8.9	0.0	0.0	46.0	
BB, B, CCC, CC, D	0	7	5	6	18	
	0.0	15.2	3.6	1.6	20.4	
Not Rated	0	1	9	58	68	
	0.0	1.3	5.1	4.8	11.3	
Totals	6	11	14	64	95	
	68.0	25.4	8.7	6.4	108.6	

Annualized Statistics for Last 10 Years (%)

	Avg Return	Std Deviation
S&P 500	15.50	15.86
SIC Composite	21.63	35.71
Large Composite	17.62	34.92
Small Composite	23.35	56.72

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	19.17	14.99
Median	4.41	5.31
25th Percentile	-9.91	-2.93
SIC Composite	108.44	15.32
Large Composite	13.17	12.97
Small Composite	64.26	25.92

Sales, Income & Market Capitalization (billion\$)

	Operating Sales	Net Income	Equity Capital	Debt Capital
Current Yr.	33.9	16.7	5.4	80.6
Last Yr.	18.4	5.7	-1.9	50.6
2 Yrs. Ago	15.8	5.3	-1.6	37.6
3 Yrs. Ago	17.0	8.0	0.9	52.3
4 Yrs. Ago	14.2	6.5	1.4	43.9

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
Median	19.62	24.07	35.75
SIC Composite	18.58	30.22	NMF
Large Composite	19.42	30.09	125.04
Small Composite	-23.96	NMF	-0.50

Capital Structure Ratios (%)

Debt/Total Capital		Debt/MV Equity	
Latest	5-Year Avg	Latest	5-Year Avg
26.19	30.72	35.48	44.35
20.86	29.57	26.35	41.99
22.75	27.33	29.44	37.61
0.00	3.53	0.00	3.66

Distribution of Sales & Total Capital (million\$)

	Distribution of Sales		Total Capital	
	Latest	5-Year Avg	Latest	5-Year Avg
90th Percentile	708.2	395.9	2728.4	1,396.6
75th Percentile	134.5	108.3	622.0	444.3
Median	26.6	21.3	152.2	96.0
25th Percentile	4.4	4.6	31.1	24.4
10th Percentile	1.3	1.5	6.5	9.7

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Cap.		Return on Assets		Return on Equity	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	41.37	29.82	9.12	-5.31	33.97	32.01	4.11	-1.05	3.27	-1.62	4.87	-1.93
SIC Composite	49.25	42.39	15.84	4.18	50.15	40.78	9.26	1.89	7.94	1.71	7.14	1.72
Large Composite	47.01	43.66	16.58	8.77	54.72	43.57	9.34	4.26	9.07	3.82	7.59	3.68
Small Composite	-114.90	-36.68	-137.54	-58.38	10.61	26.37	2.23	-21.79	-14.59	-15.39	-16.57	-14.00

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Dividend Yield (% of Price)	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	20.55	NMF	2.00	1.76	3.43	2.68	NMF	NMF	5.72	6.99	0.00	0.00
SIC Composite	14.01	10.17	2.21	2.13	2.22	2.43	66.34	NMF	4.51	5.73	0.65	0.87
Large Composite	13.17	8.03	1.99	2.07	2.18	2.38	31.60	NMF	4.65	5.46	0.79	1.05
Small Composite	NMF	NMF	0.92	1.65	8.30	4.17	NMF	NMF	NMF	NMF	0.00	0.28

Growth Rates (%)

Cost of Equity Capital (%)

Weighted Average Cost of Capital (%)

Levered Betas

Unlevered Betas

	Analysts' Estimate	CAPM + Size Prem	3-Factor Fama-French	Discounted Cash Flow 1-Stage	Discounted Cash Flow 3-Stage	CAPM + Size Prem	3-Factor Fama-French	Discounted Cash Flow 1-Stage	Discounted Cash Flow 3-Stage	Raw Beta	Adjusted Beta	Adjusted Beta	
Median	17.94	10.39	11.88	13.72	17.94	11.15	10.74	12.20	13.53	16.64	10.85	0.60	0.63
SIC Composite	17.94	12.16	12.74	30.83	18.02	8.10	11.65	12.09	25.89	16.12	8.55	3.59	0.85
Large Composite	16.26	11.12	11.12	11.74	18.05	10.90	10.52	10.52	11.00	15.88	10.35	0.63	0.71
Small Composite	17.94	12.22	14.84	15.26	17.94	6.50	12.17	14.71	15.12	17.72	6.62	1.05	0.86

STATISTICS FOR SIC CODE 131

Crude Petroleum and Natural Gas
This Industry Comprises 85 Companies

Industry Description

Establishments primarily engaged in operating oil and gas field properties. This includes all activities in the preparation of oil and gas up to the point of shipment from the producing property.

Sales (million\$)

Total	14,035
Average	165.1
Three Largest Companies	
BURLINGTON RESOURCES INC	2,065.0
VASTAR RESOURCES INC	1,895.1
APACHE CORP	1,297.9
Three Smallest Companies	
DELTA PETROLEUM CORP	0.6
PETROMINERALS CORP	0.5
GREKA ENERGY CORP	0.1

Total Capital (million\$)

Total	72,757
Average	856.0
Three Largest Companies	
BURLINGTON RESOURCES INC	10,810.9
VASTAR RESOURCES INC	8,231.2
APACHE CORP	7,866.0
Three Smallest Companies	
ENEX RESOURCES CORP	3.4
PEASE OIL & GAS CO	3.1
PETROMINERALS CORP	2.8

Annualized Statistics for Last 10 Years (%)

	Average	Standard
	Return	Deviation
S&P 500	19.92	16.17
SIC Composite	17.83	32.10
Large Composite	13.94	32.54
Small Composite	11.85	54.69

Distribution of Sales & Total Capital (million\$)

	Sales		Total Capital	
	Latest	5-Year Avg	Latest	5-Year Avg
90th Percentile	417.8	324.4	2,173.0	1,372.5
75th Percentile	129.5	116.9	553.0	518.5
Median	37.1	27.4	131.8	136.9
25th Percentile	7.5	6.7	37.0	27.7
10th Percentile	1.7	2.1	15.8	13.2

Number of Companies & Total Capital (billions\$)

Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A				
1	0	0	0	1
10.8	0.0	0.0	0.0	10.8
BBB				
3	4	0	0	7
22.7	12.4	0.0	0.0	35.1
BB, B, CCC, CC, D				
0	5	4	10	19
0.0	9.6	4.6	3.3	17.5
Not Rated				
0	1	6	51	58
0.0	1.7	3.1	4.6	9.4
Totals				
4	10	10	61	85
33.5	23.7	7.7	7.9	72.8

□ S&P Debt Rating

Industry Sales, Income & Market Capitalization (billion\$)

	Operating		Net	Equity	Debt
	Sales	Income	Income	Capital	Capital
Current Yr.	14.0	4.5	-2.1	50.1	22.7
Last Yr.	12.2	4.8	-1.6	33.6	19.7
2 Yrs. Ago	15.0	7.0	0.6	48.1	15.5
3 Yrs. Ago	13.3	5.5	1.2	38.2	10.9
4 Yrs. Ago	9.7	3.7	-0.1	31.7	9.1

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	12.89	8.42
Median	-1.41	3.10
25th Percentile	-16.40	-10.74
SIC Composite	14.24	11.08
Large Composite	9.70	8.15
Small Composite	38.67	35.89

Growth Over Last 5 Years (%)

	Operating		Net	Equity	Debt
	Sales	Income	Income	Capital	Capital
75th Percentile	31.77	45.55	95.04	0.65	0.35
Median	11.00	15.22	34.32	0.38	0.05
25th Percentile	1.35	5.08	0.67	0.10	-0.06
SIC Composite	10.04	4.69	NMF	0.72	0.26
Large Composite	9.76	13.65	11.50	0.75	0.30
Small Composite	-34.37	NMF	16.17	0.96	0.47

Unlevered Betas

	Adjusted	Sum
	Beta	Beta
75th Percentile	0.65	0.35
Median	0.38	0.05
25th Percentile	0.10	-0.06
SIC Composite	0.72	0.26
Large Composite	0.75	0.30
Small Composite	0.96	0.47

Levered Betas

	Raw	Adjusted	Sum
	Beta	Beta	Beta
75th Percentile	0.92	0.95	0.55
Median	0.66	0.70	0.11
25th Percentile	0.12	0.26	-0.19
SIC Composite	0.85	0.93	0.34
Large Composite	0.84	0.92	0.37
Small Composite	1.01	1.03	0.51

Capital Structure Ratios (%)

	Debt/Total Capital		Debt/MV Equity	
	Latest	5-Year Avg	Latest	5-Year Avg
75th Percentile	67.06	50.28	203.59	101.11
Median	34.62	30.02	52.96	42.91
25th Percentile	20.02	14.25	25.03	16.61
SIC Composite	23.83	28.78	31.28	46.40
Large Composite	26.01	25.86	35.15	34.87
Small Composite	0.99	9.03	1.00	9.92

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Capital		Return on Assets		Return on Equity	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
75th Percentile	50.83	49.67	7.36	4.85	35.70	39.11	3.19	1.61	2.44	1.45	2.26	1.48
Median	28.26	29.45	-15.56	-4.09	26.25	29.51	-6.24	-2.10	-5.35	-1.81	-8.02	-2.21
25th Percentile	-70.83	4.98	-174.11	-57.51	19.84	22.96	-27.65	-17.33	-27.61	-13.69	-81.54	-20.10
SIC Composite	32.18	39.62	-15.16	-3.30	31.14	36.68	3.27	-1.34	-4.72	-1.21	-4.59	-1.14
Large Composite	52.16	43.84	10.60	3.14	32.90	38.45	3.84	1.34	3.49	1.21	2.82	1.06
Small Composite	-419.96	-80.38	-714.47	-141.87	6.41	19.52	-4.49	-41.39	-45.77	-27.69	-37.02	-23.15

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Div. Yield (% of Price)	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
75th Percentile	NMF	NMF	2.75	2.39	5.22	4.67	NMF	NMF	NMF	81.87	0.00	0.44
Median	NMF	NMF	1.67	1.74	3.06	2.77	NMF	NMF	NMF	10.08	0.00	0.00
25th Percentile	44.31	67.35	0.81	1.21	1.10	1.90	NMF	NMF	5.02	4.24	0.00	0.00
SIC Composite	NMF	80.98	2.90	2.30	3.30	2.90	NMF	NMF	10.27	7.33	0.63	0.65
Large Composite	35.42	26.09	2.61	2.27	3.75	2.97	NMF	NMF	7.20	6.77	0.76	0.78
Small Composite	NMF	NMF	1.49	2.48	19.30	6.13	NMF	NMF	NMF	NMF	0.00	2.04

Growth Rates (%)

	Analysts' Estimate
	75th Percentile
Median	17.80
25th Percentile	17.80
SIC Composite	17.80
Large Composite	16.87
Small Composite	17.80

Cost of Equity Capital (%)

	CAPM		3-Factor	Discounted Cash Flow	
	CAPM	+ Size Prem	Fama-French	1-Stage	3-Stage
75th Percentile	13.86	14.97	26.36	17.80	17.20
Median	11.84	13.62	19.30	17.80	12.40
25th Percentile	8.31	10.37	14.19	17.80	11.50
SIC Composite	13.68	14.52	19.15	17.88	7.60
Large Composite	13.64	13.64	16.89	17.91	8.50
Small Composite	14.51	16.72	26.71	17.80	7.60

Weighted Average Cost of Capital (%)

	CAPM		3-Factor	Discounted Cash Flow	
	CAPM	+ Size Prem	Fama-French	1-Stage	3-Stage
75th Percentile	13.56	14.13	20.23	17.46	17.20
Median	11.62	12.58	15.98	15.71	12.40
25th Percentile	10.01	10.67	12.62	13.83	11.45
SIC Composite	12.59	13.22	16.69	15.74	8.03
Large Composite	12.32	12.32	14.78	15.55	8.43
Small Composite	14.26	16.31	25.56	17.30	7.85

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Cost of Capital Quarterly
2000 Yearbook

STATISTICS FOR SIC CODE 131

Crude Petroleum and Natural Gas
This Industry Comprises 101 Companies

Industry Description

Establishments primarily engaged in operating oil and gas field properties. This includes all activities in the preparation of oil and gas up to the point of shipment from the producing property.

Sales (million\$)

Total	14,847
Average	147.0
Three Largest Companies	
BURLINGTON RESOURCES INC	1,637.0
VASTAR RESOURCES INC	1,602.4
NOBLE AFFILIATES INC	893.6
Three Smallest Companies	
AMER INTL PETROLEUM CORP	0.3
XCL LTD	0.2
GREKA ENERGY CORP	0.2

Total Capital (million\$)

Total	61,199
Average	605.9
Three Largest Companies	
BURLINGTON RESOURCES INC	9,032.9
ANADARKO PETROLEUM CORP	6,146.8
VASTAR RESOURCES INC	5,939.6
Three Smallest Companies	
ZYDECO ENERGY INC	2.9
PETROMINERALS CORP	2.5
AMERICAN RIVERS OIL CO	1.0

Annualized Statistics for Last 10 Years (%)

	Average Return	Standard Deviation
S&P 500	20.00	15.83
Ind. Composite	10.33	27.53
Lg. Composite	8.33	27.82
Sm. Composite	14.35	51.71

Distribution of Sales & Total Capital (million\$)

	Sales		Total Capital	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
90th Percentile	426.2	384.2	1,270.3	1,308.3
75th Percentile	137.8	106.1	609.6	482.0
Median	36.0	21.2	108.9	100.5
25th Percentile	4.8	4.6	25.1	29.9
10th Percentile	1.4	1.7	5.6	13.5

Number of Companies & Total Capital (billion\$)

Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A				
1	1	0	0	2
9.0	3.3	0.0	0.0	12.3
BBB				
2	3	2	0	7
12.1	7.9	2.2	0.0	22.2
BB, B, CCC, CC, D				
0	0	10	15	25
0.0	0.0	12.5	5.2	17.7
Not Rated				
0	1	4	62	67
0.0	1.9	3.0	4.1	9.0
Totals				
3	5	16	77	101
21.1	13.1	17.7	9.3	61.2

□ S&P Debt Rating

Industry Sales, Income & Market Capitalization (billion\$)

	Operating		Net	Equity	Debt
	Sales	Income	Income	Capital	Capital
Current Yr.	14.8	5.2	-2.5	38.6	22.6
Last Yr.	16.9	8.0	2.2	55.7	14.7
2 Yrs. Ago	14.7	5.9	1.0	43.4	12.0
3 Yrs. Ago	10.8	4.0	0.0	35.5	10.1
4 Yrs. Ago	9.9	4.1	0.7	31.5	9.0

Compound Annual Equity Return (%)

	5 Yrs.	10 Yrs.
75th Percentile	3.75	11.74
Median	-6.85	2.03
25th Percentile	-20.64	-5.40
Ind. Composite	4.07	8.22
Lg. Composite	-0.13	4.35
Sm. Composite	35.62	36.13

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income	Adj OLS	Adj Sum
	75th Percentile	39.10	33.60	59.30	0.68
Median	13.60	10.29	29.54	0.46	0.50
25th Percentile	0.51	-2.02	5.43	0.24	0.23
Ind. Composite	9.92	6.01	NMF	0.64	0.38
Lg. Composite	9.43	4.81	NMF	0.64	0.43
Sm. Composite	11.90	15.07	-7.62	0.71	0.44

Unlevered Betas

Levered Betas

Capital Structure Ratios (%)

	Raw OLS		Adj OLS		Debt/Total Capital		Debt/MV Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	1.09	0.94	1.09	0.94	49.08	42.98	49.08	75.39
Median	0.75	0.83	0.92	0.92	30.10	27.46	30.10	37.86
25th Percentile	0.28	0.69	0.73	0.73	10.78	12.86	10.78	14.76
Ind. Composite	0.89	0.88	0.48	0.48	32.56	25.77	48.28	34.72
Lg. Composite	0.81	0.83	0.49	0.49	27.83	22.14	38.56	28.44
Sm. Composite	2.07	1.25	0.71	0.71	41.89	40.63	72.09	68.44

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Capital		Return on Assets		Return on Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	52.75	52.13	3.05	5.28	35.82	42.97	6.70	3.98	2.01	2.50	0.92	1.96
Median	34.44	36.77	-22.45	-3.47	27.88	31.73	0.70	-0.24	-4.47	-1.09	-9.32	-1.61
25th Percentile	-4.44	3.82	-78.53	-56.31	21.55	22.40	-12.84	-11.06	-14.33	-11.67	-35.01	-18.60
Ind. Composite	34.16	40.45	-29.73	-2.35	30.76	38.30	-5.33	0.27	-5.31	0.23	-10.90	-0.83
Lg. Composite	34.05	41.16	-15.51	2.67	32.80	40.70	-4.86	1.56	-3.67	1.26	-4.96	0.90
Sm. Composite	43.48	36.41	-7.44	-13.69	30.13	31.85	-1.98	-4.53	-2.24	-4.36	-2.38	-5.89

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Div. Yield (% of Price)	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	NMF	NMF	2.77	2.32	3.59	4.58	NMF	NMF	NMF	56.57	0.34	0.48
Median	NMF	NMF	1.85	1.73	1.80	2.73	NMF	NMF	9.42	9.01	0.00	0.00
25th Percentile	108.63	50.96	1.29	1.25	0.81	1.81	NMF	NMF	4.51	4.21	0.00	0.00
Ind. Composite	2.63	3.06	2.34	2.46	2.73	2.85	NMF	NMF	8.65	7.19	0.78	1.15
Lg. Composite	3.22	3.60	2.55	2.68	3.13	2.97	NMF	NMF	9.51	7.30	0.79	1.15
Sm. Composite	1.44	1.61	2.09	1.62	3.13	2.33	NMF	NMF	7.20	6.38	0.19	0.19

Growth Rates (%)

	Analysis
75th Percentile	24.65
Median	16.36
25th Percentile	14.84
Ind. Composite	15.25
Lg. Composite	14.41
Sm. Composite	15.00

Cost of Equity Capital (%)

	CAPM		3-Factor Fama-French		Discounted Cash Flow	
	Adj OLS	+ Sm Prem	Analysis	3 Stage	Analysis	3 Stage
75th Percentile	14.62	16.31	25.69	18.86	17.85	17.85
Median	11.91	13.51	20.01	16.19	13.30	13.30
25th Percentile	8.16	10.35	12.48	16.19	11.85	11.85
Ind. Composite	12.95	14.08	17.87	15.43	NMF	NMF
Lg. Composite	12.52	13.01	16.79	15.36	6.70	6.70
Sm. Composite	15.91	18.51	42.42	15.68	NMF	NMF

Weighted Average Cost of Capital (%)

	CAPM		3-Factor Fama-French		Discounted Cash Flow	
	Adj OLS	+ Sm Prem	Analysis	3 Stage	Analysis	3 Stage
75th Percentile	12.75	13.27	17.64	16.16	17.69	17.69
Median	10.49	11.61	13.32	13.69	13.10	13.10
25th Percentile	8.20	9.01	10.20	11.78	11.30	11.30
Ind. Composite	11.05	11.85	14.55	12.81	NMF	NMF
Lg. Composite	10.80	11.16	13.96	12.90	6.49	6.49
Sm. Composite	13.80	15.54	31.50	13.65	NMF	NMF

STATISTICS FOR SIC CODE 131

Crude Petroleum and Natural Gas

This Industry Comprises 90 Companies

Industry Description

Establishments primarily engaged in operating oil and gas field properties. This includes all activities in the preparation of oil and gas up to the point of shipment from the producing property.

Sales (million\$)

Total	28,042
Average	311.6
Three Largest Companies	
OCCIDENTAL PETROLEUM CORP	8,016.0
UNOCAL CORP	5,101.0
BURLINGTON RESOURCES INC	2,000.0
Three Smallest Companies	
VENUS EXPLORATION INC	0.6
ISRAMCO INC	0.5
CHAPARRAL RESOURCES INC	0.1

Total Capital (million\$)

Total	95,964
Average	1,066.3
Three Largest Companies	
OCCIDENTAL PETROLEUM CORP	16,334.5
UNOCAL CORP	13,117.4
BURLINGTON RESOURCES INC	10,218.9
Three Smallest Companies	
KESTREL ENERGY INC	5.1
PETROMINERALS CORP	4.0
AMERICAN RIVERS OIL CO	1.6

Annualized Statistics for Last 10 Years (%)

	Average Return	Standard Deviation
S&P 500	19.76	14.31
Ind. Composite	8.71	19.22
Lg. Composite	8.25	19.09
Sm. Composite	1.21	53.17

Distribution of Sales & Total Capital (million\$)

	Sales		Total Capital	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
90th Percentile	679.7	535.1	2,559.7	2,251.6
75th Percentile	195.8	112.3	847.8	624.7
Median	28.1	18.8	159.3	98.2
25th Percentile	7.4	4.3	38.6	28.9
10th Percentile	1.3	1.4	14.6	8.2

Number of Companies & Total Capital (billion\$)

Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A				
1	1	0	0	2
10.2	4.3	0.0	0.0	14.5
BBB				
3	5	1	0	9
34.5	16.3	1.3	0.0	52.2
BB, B, CCC, CC, D				
0	6	8	9	23
0.0	10.8	6.0	1.6	18.5
Not Rated				
0	2	6	48	56
0.0	3.4	3.8	3.6	10.8
Totals				
4	14	15	57	90
44.8	34.9	11.1	5.3	96.0

□ S&P Debt Rating

Industry Sales, Income & Market Capitalization (billion\$)

	Operating		Net	Equity	Debt
	Sales	Income	Income	Capital	Capital
Current Yr.	28.0	11.5	1.3	69.5	26.4
Last Yr.	29.9	10.5	2.8	58.9	22.2
2 Yrs. Ago	26.6	8.2	0.7	50.4	21.4
3 Yrs. Ago	25.3	7.1	0.8	44.1	21.2
4 Yrs. Ago	25.3	6.6	0.8	39.8	18.8

Compound Annual Equity Return (%)

	5 Yrs.	10 Yrs.
75th Percentile	15.85	13.02
Median	7.07	6.40
25th Percentile	-4.95	-4.01
Ind. Composite	6.18	7.04
Lg. Composite	5.62	6.60
Sm. Composite	-15.48	-10.34

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
	75th Percentile	32.32	36.75
Median	16.85	19.21	20.83
25th Percentile	4.74	6.66	-8.10
Ind. Composite	3.74	14.95	22.43
Lg. Composite	0.48	11.99	29.87
Sm. Composite	-21.12	-44.76	-16.33

Unlevered Betas

Adj OLS	Adj Sum
0.51	0.76
0.40	0.63
0.29	0.45
0.46	0.62
0.52	0.62
0.49	0.52

Levered Betas

Raw OLS	Adj OLS	Adj Sum
0.62	0.60	0.90
0.36	0.53	0.80
-0.02	0.43	0.67
0.60	0.60	0.80
0.69	0.67	0.79
0.50	0.57	0.60

Capital Structure Ratios (%)

Debt/Total Capital			Debt/MV Equity		
Latest	5 Yr. Avg.		Latest	5 Yr. Avg.	
35.59	31.78		55.26	46.59	
22.16	21.23		28.48	26.95	
9.80	10.29		10.86	11.47	
27.56	30.17		38.04	43.21	
27.34	32.07		37.62	47.20	
13.47	20.31		15.57	25.49	

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Capital		Return on Assets		Return on Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	61.69	53.47	20.06	11.73	45.69	44.35	7.54	4.47	6.78	4.40	5.54	3.62
Median	48.03	39.32	9.63	4.82	34.03	32.21	3.71	1.81	3.54	1.64	2.90	1.51
25th Percentile	24.28	12.10	-12.85	-15.44	24.31	24.06	-3.93	-3.96	-4.39	-4.16	-3.92	-3.05
Ind. Composite	41.10	32.52	4.57	4.74	42.14	46.67	2.31	2.68	1.92	2.21	1.98	2.52
Lg. Composite	38.27	29.32	9.11	5.72	47.02	52.00	5.70	3.82	4.28	2.97	4.81	3.75
Sm. Composite	-207.50	-170.63	-259.83	-259.96	5.48	8.54	-15.78	-24.74	-14.24	-22.19	-6.84	-18.04

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Div. Yield (% of Price)	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	NMF	NMF	2.60	2.59	4.89	5.69	NMF	NMF	18.53	51.99	0.38	0.40
Median	32.62	66.03	1.94	1.93	3.13	3.61	NMF	NMF	7.22	8.15	0.00	0.00
25th Percentile	17.43	27.61	1.54	1.41	2.15	2.26	NMF	NMF	4.58	5.12	0.00	0.00
Ind. Composite	54.29	39.70	2.40	1.97	2.48	1.88	NMF	NMF	5.61	5.79	1.16	1.74
Lg. Composite	22.87	26.68	2.56	1.96	2.08	1.53	NMF	NMF	4.95	5.20	1.63	2.36
Sm. Composite	NMF	NMF	3.85	2.11	39.65	14.41	NMF	NMF	NMF	NMF	0.00	0.00

Growth Rates (%)

Analysis	
75th Percentile	15.88
Median	15.01
25th Percentile	15.01
Ind. Composite	15.01
Lg. Composite	12.40
Sm. Composite	15.01

Cost of Equity Capital (%)

	CAPM		3-Factor	Discounted Cash Flow	
	Adj OLS	+ Sm Prem	Fama-French	Analysis	3 Stage
75th Percentile	10.66	13.47	25.37	18.09	17.67
Median	10.12	12.58	18.99	15.01	16.48
25th Percentile	9.31	11.72	9.54	15.01	11.48
Ind. Composite	10.67	11.37	20.01	16.45	NMF
Lg. Composite	11.21	11.55	20.15	14.38	NMF
Sm. Composite	10.42	13.72	NMF	15.01	NMF

Weighted Average Cost of Capital (%)

	CAPM		3-Factor	Discounted Cash Flow	
	Adj OLS	+ Sm Prem	Fama-French	Analysis	3 Stage
75th Percentile	10.38	12.49	20.79	15.12	16.98
Median	9.67	11.59	16.87	14.23	16.34
25th Percentile	9.04	10.78	10.67	12.75	11.48
Ind. Composite	9.58	10.09	16.35	13.77	NMF
Lg. Composite	9.71	9.95	16.20	12.01	NMF
Sm. Composite	10.26	13.12	NMF	14.24	NMF

STATISTICS FOR SIC CODE 131

Crude Petroleum and Natural Gas
This Industry Comprises 87 Companies

Industry Description

Establishments primarily engaged in operating oil and gas field properties. This includes all activities in the preparation of oil and gas up to the point of shipment from the producing property.

Sales (million\$)

Total	22,383
Average	257.3
Three Largest Companies	
OCCIDENTAL PETROLEUM CORP	10,557.0
BURLINGTON RESOURCES INC	2,293.0
ORIX ENERGY CO	1,014.0
Three Smallest Companies	
EXPLORATION CO	0.5
CHAPARRAL RESOURCES INC	0.3
AMERICAN RIVERS OIL CO	0.2

Total Capital (million\$)

Total	67,835
Average	779.7
Three Largest Companies	
OCCIDENTAL PETROLEUM CORP	14,233.2
BURLINGTON RESOURCES INC	6,687.3
APACHE CORP	4,086.1
Three Smallest Companies	
KESTREL ENERGY INC	4.3
DOUBLE EAGLE PETE & MNG CO	3.0
TYREX OIL CO	2.6

Annualized Statistics For Last 10 Years (%)

	Average	
	Return	Standard Deviation
S&P 500	14.53	16.07
Ind. Composite	5.84	20.16
Lg. Composite	7.29	21.55
Sm. Composite	-2.87	36.99

Distribution of Sales (million\$)

	Latest	\$ Yr. Avg.
90th Percentile	566.6	460.7
75th Percentile	141.8	88.9
Median	26.7	17.5
25th Percentile	5.4	3.7
10th Percentile	1.2	1.3

Distribution of Total Capital (million\$)

	Latest	\$ Yr. Avg.
90th Percentile	2,041.1	1,862.1
75th Percentile	621.3	411.8
Median	115.3	61.8
25th Percentile	33.2	25.4
10th Percentile	14.6	8.5

Industry Sales and Income (billion\$)

	Operating		Net
	Sales	Income	Income
Current Yr.	22.4	8.1	1.9
Last Yr.	20.2	6.7	0.0
2 Yrs. Ago	18.8	5.7	0.3
3 Yrs. Ago	17.7	5.4	0.7
4 Yrs. Ago	17.5	4.9	0.6

Industry Market Capitalization (billion\$)

	Equity	Debt
	Current Yr.	48.9
Last Yr.	44.8	19.4
2 Yrs. Ago	39.0	19.2
3 Yrs. Ago	35.3	16.2
4 Yrs. Ago	39.4	16.0

Number of Companies & Total Capital (billion\$)

Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A				
1	1	0	0	2
6.7	3.8	0.0	0.0	10.5
BBB				
2	6	0	0	8
18.3	13.4	0.0	0.0	31.7
BB, B, CCC, CC, D				
0	5	7	4	16
0.0	9.2	6.1	1.0	16.2
Not Rated				
0	2	6	53	61
0.0	3.4	2.3	3.7	9.4
Totals				
3	14	13	57	87
25.0	29.8	8.4	4.7	67.8

□ S&P Debt Rating

Growth Over Last 5 Years (%)

	Operating		Net
	Sales	Income	Income
75th Percentile	23.26	29.15	23.89
Median	10.09	13.67	7.21
25th Percentile	0.71	-1.52	-17.58
Ind. Composite	6.37	12.52	27.03
Lg. Composite	5.42	12.65	23.72
Sm. Composite	8.31	-12.25	-10.78

Compound Annual Equity Return (%)

	5 Yrs.	10 Yrs.	Betas	
	Latest	\$ Yr. Avg.	Unlevered Asset Beta	Levered Equity Beta
75th Percentile	26.57	9.88	0.78	1.08
Median	12.27	3.73	0.49	0.59
25th Percentile	2.62	-4.53	0.08	0.07
Ind. Composite	9.60	3.92	0.70	0.90
Lg. Composite	9.66	5.11	0.74	0.97
Sm. Composite	1.90	-9.23	0.09	0.08

Margins (%)

	Operating Margin		Net Margin		Return On Assets		Return On Equity	
	Latest	\$ Yr. Avg.	Latest	\$ Yr. Avg.	Latest	\$ Yr. Avg.	Latest	\$ Yr. Avg.
75th Percentile	56.30	47.74	17.74	9.35	5.77	3.41	4.55	3.33
Median	41.87	34.15	5.87	1.06	2.15	0.36	1.65	0.45
25th Percentile	20.37	15.75	-12.71	-13.36	-4.59	-4.47	-3.56	-4.01
Ind. Composite	36.38	31.96	8.48	3.56	3.70	1.41	3.73	1.71
Lg. Composite	33.38	29.12	9.16	4.47	4.49	1.93	5.13	2.64
Sm. Composite	-90.77	-77.31	-96.13	-103.00	-6.95	-12.73	-2.51	-4.65

Capital Structure Ratios (%)

	Debt/Total Capital		Debt/MV Equity	
	Latest	\$ Yr. Avg.	Latest	\$ Yr. Avg.
75th Percentile	31.02	31.40	44.96	45.78
Median	20.14	21.34	25.22	27.13
25th Percentile	7.72	10.33	8.37	11.52
Ind. Composite	27.97	30.78	38.83	44.47
Lg. Composite	29.84	33.01	42.54	49.27
Sm. Composite	6.45	3.72	6.89	3.86

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales	
	Latest	\$ Yr. Avg.	Latest	\$ Yr. Avg.	Latest	\$ Yr. Avg.
75th Percentile	NMF	NMF	3.12	2.66	6.54	5.95
Median	63.69	222.22	1.96	1.81	3.58	3.44
25th Percentile	23.09	30.08	1.51	1.29	2.48	2.03
Ind. Composite	25.77	58.48	2.10	1.86	2.18	2.09
Lg. Composite	18.66	37.88	1.97	1.76	1.71	1.69
Sm. Composite	NMF	NMF	3.07	3.01	40.99	22.17

Growth Rates (%)

	Analysts
75th Percentile	13.73
Median	13.73
25th Percentile	13.73
Ind. Composite	13.73
Lg. Composite	12.74
Sm. Composite	13.73

Yields (% of Price)

	Dividends		Cash Flow	
	Latest	\$ Yr. Avg.	Latest	\$ Yr. Avg.
75th Percentile	0.00	0.57	0.75	-2.04
Median	0.00	0.00	-4.21	-7.55
25th Percentile	0.00	0.00	-12.11	-15.44
Ind. Composite	1.37	1.94	-3.26	-3.74
Lg. Composite	1.64	1.95	-1.22	-3.16
Sm. Composite	0.00	0.00	-4.45	-6.54

Cost of Equity Capital (%)

	CAPM		3-Factor		Discounted Cash Flow	
	OLS	+ Sm Prem	Fama-French	Analysts	3 Stage	
75th Percentile	15.19	17.04	23.64	14.68	16.14	9.92
Median	11.58	14.60	16.67	13.73	13.90	8.39
25th Percentile	7.71	10.96	11.07	13.73	11.38	6.97
Ind. Composite	13.92	14.85	19.21	15.28	NMF	7.98
Lg. Composite	14.45	14.90	19.44	14.59	NMF	7.44
Sm. Composite	7.79	11.26	12.53	13.73	NMF	10.29

Cost of Debt (%)

	Analysts
75th Percentile	9.92
Median	8.39
25th Percentile	6.97
Ind. Composite	7.98
Lg. Composite	7.44
Sm. Composite	10.29

Weighted Average Cost of Capital (%)

	CAPM		3-Factor		Discounted Cash Flow	
	OLS	+ Sm Prem	Fama-French	Analysts	3 Stage	
75th Percentile	12.47	13.71	18.45	13.73	15.25	12.38
Median	9.94	11.25	14.12	11.99	12.38	9.30
25th Percentile	NMF	8.39	9.28	10.73	9.30	NMF
Ind. Composite	11.62	12.28	15.43	12.60	NMF	NMF
Lg. Composite	11.75	12.06	15.25	11.85	NMF	NMF
Sm. Composite	7.72	10.97	12.16	13.27	NMF	NMF

STATISTICS FOR SIC CODE 291

Petroleum Refining

This Industry Comprises 11 Companies

Industry Description

Establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes. Establishments of this industry also produce aliphatic and aromatic chemicals as byproducts

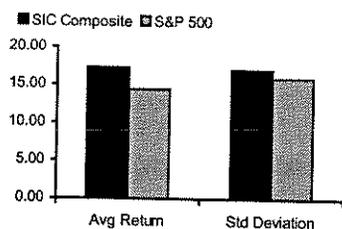
Sales (million\$)

Total	321,221
Average	29,201.9
Three Largest Companies	
EXXON MOBIL CORP	206,083.0
CHEVRONTXACO CORP	46,532.0
MARATHON OIL CORP	28,615.0
Three Smallest Companies	
HOLLY CORP	1,142.1
ARABIAN AMERICAN DEVELOPMENT	42.6
AMER INTL PETROLEUM CORP	3.1

Total Capital (million\$)

Total	449,833
Average	40,893.9
Three Largest Companies	
EXXON MOBIL CORP	313,261.4
CHEVRONTXACO CORP	102,576.9
MARATHON OIL CORP	12,561.5
Three Smallest Companies	
HOLLY CORP	331.9
AMER INTL PETROLEUM CORP	30.2
ARABIAN AMERICAN DEVELOPMENT	25.2

SIC vs. S&P 500 for Last 10 Years (%)



Number of Companies & Total Capital (billion\$)

S&P Debt Rating	Large Cap	Mid Cap	Low Cap	Micro Cap	Totals
AAA, AA, A	2	1	0	0	3 (companies)
	415.8	4.9	0.0	0.0	420.8 (capital)
BBB	1	2	0	0	3
	12.6	13.4	0.0	0.0	25.9
BB, B, CCC, CC, D	0	0	2	0	2
	0.0	0.0	2.8	0.0	2.8
Not Rated	0	0	1	2	3
	0.0	0.0	0.3	0.1	0.4
Totals	3	3	3	2	11
	428.4	18.3	3.1	0.1	449.8

Annualized Statistics for Last 10 Years (%)

	Avg Return	Std Deviation
S&P 500	14.36	15.93
SIC Composite	17.31	17.02
Large Composite	17.34	17.08
Small Composite	21.24	61.30

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	13.29	14.51
Median	8.56	8.30
25th Percentile	4.87	6.47
SIC Composite	12.68	16.14
Large Composite	12.32	16.13
Small Composite	55.72	26.88

Sales, Income & Market Capitalization (billion\$)

	Operating Sales	Operating Income	Net Income	Equity Capital	Debt Capital
Current Yr.	321.2	51.9	24.0	419.4	30.4
Last Yr.	262.4	30.2	11.6	353.2	33.6
2 Yrs. Ago	169.6	19.9	8.7	347.5	22.9
3 Yrs. Ago	189.9	26.5	12.2	245.2	22.9
4 Yrs. Ago	186.1	24.7	11.1	237.0	22.1

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
Median	16.10	19.43	30.73
SIC Composite	13.38	18.28	24.37
Large Composite	12.98	17.87	22.75
Small Composite	11.24	17.05	25.19

Capital Structure Ratios (%)

	Debt/Total Capital		Debt/MV Equity	
	Latest	5-Year Avg	Latest	5-Year Avg
Median	29.03	31.35	40.91	45.66
SIC Composite	2.50	7.17	2.56	7.72
Large Composite	0.89	6.18	0.90	6.58
Small Composite	12.12	24.81	13.80	33.00

Distribution of Sales & Total Capital (million\$)

	Distribution of Sales		Total Capital	
	Latest	5-Year Avg	Latest	5-Year Avg
90th Percentile	46,532.0	35,369.2	102,576.9	64,483.0
75th Percentile	21,801.7	15,899.0	107,202.2	8,034.5
Median	5,136.8	3,129.6	4478.8	3,009.6
25th Percentile	1,515.7	911.7	545.7	329.0
10th Percentile	42.6	28.7	30.2	76.7

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Cap.		Return on Assets		Return on Equity	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	10.05	7.21	4.61	2.97	160.43	159.10	13.33	9.82	8.41	5.66	10.19	8.54
SIC Composite	16.16	13.56	7.48	5.99	142.82	129.19	2.06	10.89	10.68	7.74	6.68	5.24
Large Composite	17.24	14.44	8.00	6.45	138.26	123.42	1.08	11.21	11.06	7.96	6.52	5.11
Small Composite	10.36	8.08	3.76	1.54	199.66	169.92	21.70	4.08	7.51	2.61	14.17	4.57

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Dividend Yield (% of Price)	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	9.81	11.71	1.80	1.64	0.31	0.34	17.44	25.15	4.56	3.32	1.24	1.09
SIC Composite	14.96	17.19	3.25	2.95	1.12	1.14	18.11	29.91	6.92	8.43	0.46	0.66
Large Composite	15.34	18.56	3.43	3.06	1.23	1.26	18.41	30.18	7.12	8.73	0.43	0.62
Small Composite	7.06	4.71	1.05	1.22	0.27	0.34	7.01	255.59	2.56	4.16	2.00	2.00

Growth Rates (%)

Cost of Equity Capital (%)

Weighted Average Cost of Capital (%)

	Analysts' Estimate	CAPM		3-Factor		Discounted Cash Flow		CAPM		3-Factor		Discounted Cash Flow		Levered Betas		Unlevered Betas	
		CAPM + Size Prem	Fama-French	1-Stage	3-Stage	CAPM + Size Prem	Fama-French	1-Stage	3-Stage	Raw Beta	Adjusted Beta	Raw Beta	Adjusted Beta				
Median	7.50	10.04	10.76	13.34	10.72	9.70	10.06	10.58	12.38	10.44	10.58	0.58	0.56	0.42			
SIC Composite	7.49	9.23	9.23	10.75	7.66	10.60	9.15	9.15	10.58	7.68	10.44	0.43	0.43	0.41			
Large Composite	7.31	9.17	9.17	10.67	7.73	10.50	9.10	9.10	10.53	7.74	10.37	0.42	0.42	0.41			
Small Composite	7.49	14.78	18.08	27.93	7.67	11.50	14.34	17.12	25.41	8.35	11.57	1.63	1.18	1.02			

STATISTICS FOR SIC CODE 291

Petroleum Refining

This Industry Comprises 10 Companies

Industry Description

Establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes. Establishments of this industry also produce aliphatic and aromatic chemicals as byproducts.

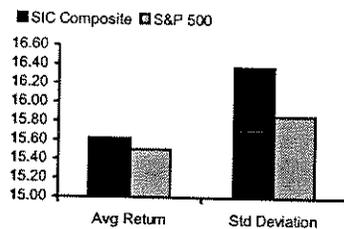
Sales (million\$)

Total	308,083
Average	30,808.3
Three Largest Companies	
EXXON MOBIL CORP	206,083.0
CHEVRON CORP	46,532.0
USX-MARATHON GROUP	30,143.0
Three Smallest Companies	
HOLLY CORP	965.9
ARABIAN AMERICAN DEVELOPMENT	27.8
AMER INTL PETROLEUM CORP	8.1

Total Capital (million\$)

Total	376,724
Average	37,672.4
Three Largest Companies	
EXXON MOBIL CORP	295,012.3
CHEVRON CORP	62,535.1
USX-MARATHON GROUP	10,481.3
Three Smallest Companies	
HOLLY CORP	233.0
AMER INTL PETROLEUM CORP	35.3
ARABIAN AMERICAN DEVELOPMENT	23.0

SIC vs. S&P 500 for Last 10 Years (%)



Number of Companies & Total Capital (billion\$)

S&P Debt Rating	Large Cap	Mid Cap	Low Cap	Micro Cap	Totals	
AAA, AA, A	2	1	0	0	3	(companies)
	357.5	3.6	0.0	0.0	361.1	(capital)
BBB	0	1	0	0	1	
	0.0	3.4	0.0	0.0	3.4	
BB, B, CCC, CC, D	0	0	2	0	2	
	0.0	0.0	1.4	0.0	1.4	
Not Rated	1	0	0	3	4	
	10.5	0.0	0.0	0.3	10.8	
Totals	3	2	2	3	10	
	368.0	7.0	1.4	0.3	376.7	

Annualized Statistics for Last 10 Years (%)

	Avg Return	Std Deviation
S&P 500	15.50	15.86
SIC Composite	15.62	16.38
Large Composite	15.61	16.40
Small Composite	19.27	56.92

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	12.68	9.61
Median	9.67	4.20
25th Percentile	4.08	-0.02
SIC Composite	17.30	14.70
Large Composite	17.14	14.66
Small Composite	47.94	26.05

Sales, Income & Market Capitalization (billion\$)

	Operating Sales	Net Income	Equity Capital	Debt Capital
Current Yr.	308.1	49.6	22.3	352.1
Last Yr.	225.3	27.2	10.8	345.0
2 Yrs. Ago	154.1	18.4	8.1	242.0
3 Yrs. Ago	178.2	26.1	12.5	234.1
4 Yrs. Ago	176.9	24.4	11.1	191.6

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
Median	20.58	17.66	9.47
SIC Composite	14.44	17.98	25.17
Large Composite	13.46	17.96	24.18
Small Composite	9.52	6.60	NMF

Capital Structure Ratios (%)

	Debt/Total Capital		Debt/MV Equity	
	Latest	5-Year Avg	Latest	5-Year Avg
Median	22.47	32.60	29.06	48.55
SIC Composite	6.37	8.67	6.80	9.49
Large Composite	5.93	8.20	6.31	8.94
Small Composite	21.83	27.10	27.93	37.18

Distribution of Sales & Total Capital (million\$)

	Distribution of Sales		Total Capital	
	Latest	5-Year Avg	Latest	5-Year Avg
90th Percentile	62,487.1	45,925.7	85,782.9	73,136.4
75th Percentile	26,275.0	16,199.4	87,514.4	9,243.7
Median	3,807.3	1,983.9	2187.5	1,561.4
25th Percentile	1,233.9	713.3	291.7	265.9
10th Percentile	25.8	22.0	34.1	72.1

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Cap.		Return on Assets		Return on Equity	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	8.65	8.11	2.07	2.57	180.13	138.85	8.40	5.78	6.11	4.15	8.65	6.86
SIC Composite	16.08	13.98	7.24	6.21	145.20	125.25	15.22	10.60	10.52	7.77	6.34	5.09
Large Composite	16.93	14.44	7.64	6.48	139.16	122.40	15.43	10.83	10.63	7.93	6.24	5.07
Small Composite	5.08	7.34	-0.07	0.92	184.61	163.42	3.93	2.30	-0.14	1.51	-0.26	2.58

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Dividend Yield (% of Price)	
	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg	Latest	5-Year Avg
Median	11.56	14.58	1.67	1.66	0.34	0.57	13.87	24.80	3.73	4.15	0.49	0.64
SIC Composite	15.78	11.38	2.87	2.59	1.14	1.22	16.15	26.39	7.11	8.72	0.57	0.75
Large Composite	16.02	11.55	2.93	2.64	1.22	1.28	16.24	25.88	7.23	8.85	0.56	0.73
Small Composite	NMF	105.90	0.86	1.35	0.29	0.36	NMF	NMF	5.64	4.88	3.08	1.88

Growth Rates (%)

	Cost of Equity Capital (%)					Weighted Average Cost of Capital (%)					Levered Betas		Unlevered Betas	
	Analysts' Estimate	CAPM	3-Factor	Discounted Cash Flow		CAPM	3-Factor	Discounted Cash Flow			Raw Beta	Adjusted Beta	Raw Beta	Adjusted Beta
		CAPM + Size Prem	Fama-French	1-Stage	3-Stage	CAPM + Size Prem	Fama-French	1-Stage	3-Stage					
Median	9.18	10.40	10.65	13.47	11.75	10.30	9.22	9.46	12.89	12.32	10.72	0.76	0.71	0.38
SIC Composite	9.18	8.85	8.85	10.68	9.41	12.30	8.78	8.78	10.49	9.30	12.01	0.42	0.42	0.40
Large Composite	9.08	8.80	8.80	10.62	9.45	12.20	8.73	8.73	10.44	9.35	11.93	0.42	0.42	0.40
Small Composite	9.18	14.49	17.11	32.00	9.48	9.80	13.51	15.40	26.15	9.90	10.13	1.63	1.15	0.89

STATISTICS FOR SIC CODE 291

Petroleum Refining
This Industry Comprises 10 Companies

Industry Description

Establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes. Establishments of this industry also produce aliphatic and aromatic chemicals as byproducts.

Sales (million\$)

Total	192,350
Average	19,235.0
Three Largest Companies	
EXXON MOBIL CORP	160,883.0
USX-MARATHON GROUP	20,239.0
VALERO ENERGY CORP	7,961.2
Three Smallest Companies	
ARABIAN SHIELD DEVELOPMENT	25.1
AMER INTL PETROLEUM CORP	11.4
FORELAND CORP	10.5

Total Capital (million\$)

Total	307,919
Average	30,791.8
Three Largest Companies	
EXXON MOBIL CORP	289,960.7
USX-MARATHON GROUP	11,493.4
MURPHY OIL CORP	2,986.2
Three Smallest Companies	
AMER INTL PETROLEUM CORP	84.6
ARABIAN SHIELD DEVELOPMENT	44.8
FORELAND CORP	13.2

Annualized Statistics for Last 10 Years (%)

	Average	Standard
	Return	Deviation
S&P 500	19.92	16.17
SIC Composite	18.21	16.88
Large Composite	18.34	17.01
Small Composite	44.28	147.70

Distribution of Sales & Total Capital (million\$)

	Latest	5-Year Avg	Total Capital Latest	5-Year Avg
90th Percentile	34,303.4	25,817.4	39,340.2	26,250.8
75th Percentile	6,480.1	4,568.2	2,866.2	2,346.2
Median	549.7	512.9	332.1	274.4
25th Percentile	39.7	22.1	104.8	77.1
10th Percentile	11.3	4.2	41.6	47.7

Number of Companies & Total Capital (billion\$)

	Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A					
1	1	0	0	2	
290.0	3.0	0.0	0.0	292.9	
BBB					
0	1	0	0	1	
0.0	2.5	0.0	0.0	2.5	
BB, B, CCC, CC, D					
0	0	0	1	1	
0.0	0.0	0.0	0.5	0.5	
Not Rated					
1	0	0	5	6	
11.5	0.0	0.0	0.5	12.0	
Totals					
2	2	0	6	10	
301.5	5.5	0.0	1.0	307.9	

□ S&P Debt Rating

Industry Sales, Income & Market Capitalization (billion\$)

	Sales	Operating Income	Net Income	Equity Capital	Debt Capital
Current Yr.	192.3	21.1	8.7	283.8	24.1
Last Yr.	127.0	14.4	6.7	183.4	14.1
2 Yrs. Ago	142.2	19.3	9.2	181.3	13.9
3 Yrs. Ago	138.4	18.1	8.4	146.0	14.2
4 Yrs. Ago	124.8	16.8	6.3	110.1	15.4

Compound Annual Equity Return (%)

	5 Years	10 Years
75th Percentile	12.40	5.67
Median	5.58	-3.25
25th Percentile	-11.84	-21.04
SIC Composite	22.06	17.29
Large Composite	22.08	17.37
Small Composite	44.36	26.84

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
75th Percentile	31.40	6.46	15.30
Median	12.55	3.25	6.24
25th Percentile	8.01	-8.35	-0.76
SIC Composite	10.95	8.70	9.33
Large Composite	11.09	8.90	9.51
Small Composite	19.43	-15.29	0.50

Unlevered Betas

	Adjusted Beta	Sum Beta
75th Percentile	0.56	0.52
Median	0.48	0.19
25th Percentile	0.14	0.04
SIC Composite	0.50	0.57
Large Composite	0.50	0.57
Small Composite	1.09	0.82

Levered Betas

	Raw Beta	Adjusted Beta	Sum Beta
75th Percentile	1.05	0.96	0.66
Median	0.93	0.69	0.46
25th Percentile	0.54	0.50	0.06
SIC Composite	0.53	0.53	0.60
Large Composite	0.53	0.53	0.60
Small Composite	3.40	1.30	0.97

Capital Structure Ratios (%)

	Debt/Total Capital Latest	5-Year Avg	Debt/MV Equity Latest	5-Year Avg
75th Percentile	50.79	42.37	104.90	74.34
Median	34.34	33.24	52.63	49.80
25th Percentile	17.20	12.79	21.74	14.67
SIC Composite	7.76	9.16	8.41	10.09
Large Composite	7.61	8.99	8.23	9.88
Small Composite	0.00	14.28	0.00	16.66

Margins (%)

	Operating Margin Latest	5-Year Avg	Net Margin Latest	5-Year Avg	Asset Turnover Latest	5-Year Avg	Return on Inv. Capital Latest	5-Year Avg	Return on Assets Latest	5-Year Avg	Return on Equity Latest	5-Year Avg
75th Percentile	12.23	12.54	4.52	2.62	140.83	149.29	7.88	4.41	5.34	3.24	7.19	5.39
Median	10.67	8.05	1.71	1.63	113.56	104.58	3.72	2.49	2.41	1.85	1.87	3.20
25th Percentile	1.29	4.75	-21.75	-15.91	63.12	43.51	-9.90	-4.66	-10.59	-5.17	-14.28	-12.27
SIC Composite	10.96	12.37	4.50	5.41	137.52	125.08	7.72	9.24	6.19	6.77	3.05	4.85
Large Composite	10.90	12.33	4.54	5.50	138.47	125.73	7.76	9.41	6.28	6.91	3.08	4.90
Small Composite	-13.80	-18.28	-41.54	-46.40	43.33	33.17	0.00	-17.64	-18.00	-15.39	-22.28	-11.01

Equity Valuation Ratios (Multiples)

	Price/Earnings Latest	5-Year Avg	Market/Book Latest	5-Year Avg	Price/Sales Latest	5-Year Avg	Price/Cash Flow Latest	5-Year Avg	Price/Operating Income Latest	5-Year Avg	Div. Yield (%) Latest	5-Year Avg
75th Percentile	NMF	NMF	2.66	2.35	1.24	1.65	NMF	NMF	26.90	14.22	2.35	2.29
Median	53.34	31.23	1.64	1.70	0.40	0.97	NMF	NMF	8.48	5.80	0.00	0.00
25th Percentile	13.91	18.55	0.88	1.49	0.20	0.34	29.16	33.77	3.53	4.69	0.00	0.00
SIC Composite	32.78	18.64	3.19	2.36	1.48	1.12	66.51	29.99	13.46	9.03	0.15	0.20
Large Composite	32.74	18.56	3.21	2.37	1.49	1.12	64.09	28.59	13.63	9.10	0.12	0.16
Small Composite	NMF	NMF	1.48	2.16	1.86	4.22	NMF	NMF	NMF	NMF	0.00	0.00

Growth Rates (%)

	Analysts' Estimate
75th Percentile	12.43
Median	10.01
25th Percentile	10.01
SIC Composite	10.01
Large Composite	9.90
Small Composite	10.01

Cost of Equity Capital (%)

	CAPM	3-Factor	Discounted Cash Flow		
	CAPM + Size Prem	Fama-French	1-Stage	3-Stage	
75th Percentile	13.55	14.50	23.57	15.76	14.10
Median	11.56	12.73	19.20	12.00	11.00
25th Percentile	8.69	10.26	13.80	10.01	9.73
SIC Composite	10.47	10.47	13.86	10.26	11.50
Large Composite	10.44	10.44	13.80	10.25	11.60
Small Composite	16.63	18.84	61.94	10.01	7.60

Weighted Average Cost of Capital (%)

	CAPM	3-Factor	Discounted Cash Flow		
	CAPM + Size Prem	Fama-French	1-Stage	3-Stage	
75th Percentile	12.69	13.13	17.12	13.95	12.89
Median	11.06	11.18	14.61	11.78	10.70
25th Percentile	9.57	10.10	12.08	10.56	9.42
SIC Composite	10.09	10.09	13.22	9.90	11.04
Large Composite	10.06	10.06	13.18	9.88	11.14
Small Composite	15.70	17.55	53.48	10.18	8.17

STATISTICS FOR SIC CODE 291

Petroleum Refining

This Industry Comprises 15 Companies

Industry Description

Establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes. Establishments of this industry also produce aliphatic and aromatic chemicals as byproducts.

Sales (million\$)

Total	298,251
Average	19,883.4
Three Largest Companies	
EXXON CORP	120,279.0
MOBIL CORP	58,399.0
CHEVRON CORP	35,009.0
Three Smallest Companies	
HOLLY CORP	589.6
FRONTIER OIL CORP	297.7
ARABIAN SHIELD DEVELOPMENT	26.2

Total Capital (million\$)

Total	386,548
Average	25,769.8
Three Largest Companies	
EXXON CORP	181,277.8
MOBIL CORP	75,591.9
CHEVRON CORP	63,969.1
Three Smallest Companies	
CROWN CENTRAL PETROL -CL B	203.3
HOLLY CORP	197.5
ARABIAN SHIELD DEVELOPMENT	37.5

Annualized Statistics for Last 10 Years (%)

	Average	Standard Deviation
S&P 500	20.00	15.83
Ind. Composite	12.80	17.86
Lg. Composite	12.45	18.62
Sm. Composite	11.34	29.53

Distribution of Sales & Total Capital (million\$)

	Sales		Total Capital	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
90th Percentile	49,043.0	52,283.8	70,942.8	51,219.0
75th Percentile	24,527.5	23,239.3	25,077.4	20,738.6
Median	5,539.3	4,226.7	2,373.8	2,263.4
25th Percentile	797.6	774.0	290.8	279.3
10th Percentile	414.4	381.5	199.8	248.3

Number of Companies & Total Capital (billion\$)

Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A				
4	1	0	0	5
358.9	2.2	0.0	0.0	361.1
BBB				
0	3	0	0	3
0.0	11.8	0.0	0.0	11.8
BB, B, CCC, CC, D				
0	0	1	3	
0.0	0.0	0.5	0.8	
Not Rated				
1	0	0	2	3
12.1	0.0	0.0	0.2	12.4
Totals				
5	4	1	5	15
371.0	14.0	0.5	1.0	386.5

Industry Sales, Income & Market Capitalization (billion\$)

	Sales	Operating Income	Net Income	Equity Capital	Debt Capital
Current Yr.	298.3	37.2	16.3	346.4	40.2
Last Yr.	313.8	37.1	16.7	335.6	38.6
2 Yrs. Ago	283.0	33.3	12.8	278.7	37.6
3 Yrs. Ago	252.8	28.9	9.3	218.7	42.4
4 Yrs. Ago	242.4	28.9	10.3	178.8	42.7

Compound Annual Equity Return (%)

	5 Yrs.	10 Yrs.
75th Percentile	5.13	9.35
Median	1.42	5.72
25th Percentile	-1.23	-3.91
Ind. Composite	9.23	11.29
Lg. Composite	8.43	10.80
Sm. Composite	7.44	7.81

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
75th Percentile	14.74	17.82	16.04
Median	3.12	7.87	5.68
25th Percentile	-0.50	-1.14	-2.09
Ind. Composite	3.10	4.93	9.32
Lg. Composite	1.63	5.98	10.83
Sm. Composite	-1.95	0.28	11.45

Unlevered Betas

	Adj OLS	Adj Sum
75th Percentile	0.60	0.66
Median	0.39	0.55
25th Percentile	0.28	0.33
Ind. Composite	0.43	0.33
Lg. Composite	0.35	0.37
Sm. Composite	0.51	0.39

Levered Betas

	Raw OLS	Adj OLS	Adj Sum
75th Percentile	0.88	0.71	0.85
Median	0.74	0.67	0.79
25th Percentile	0.56	0.48	0.61
Ind. Composite	0.47	0.47	0.35
Lg. Composite	0.37	0.38	0.38
Sm. Composite	0.73	0.65	0.52

Capital Structure Ratios (%)

	Debt/Total Capital		Debt/MV Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	39.14	44.83	39.14	81.82
Median	25.57	32.94	25.57	49.11
25th Percentile	17.84	21.53	17.84	27.74
Ind. Composite	10.85	15.46	12.17	18.29
Lg. Composite	8.79	13.13	9.63	15.12
Sm. Composite	36.49	36.95	57.46	58.59

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Capital		Return on Assets		Return on Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	12.27	11.70	4.15	3.82	190.41	188.06	8.56	9.19	6.17	5.41	3.71	6.87
Median	8.43	8.66	1.71	2.54	152.97	145.66	6.53	4.86	3.56	3.17	2.31	5.67
25th Percentile	6.06	5.72	-0.78	1.17	115.92	120.97	5.01	3.17	2.27	1.87	-2.89	3.05
Ind. Composite	11.98	11.79	3.88	4.70	127.27	128.12	11.43	9.89	6.96	6.02	2.99	5.26
Lg. Composite	12.82	11.72	4.66	5.08	123.39	130.66	12.48	11.14	7.26	6.56	3.24	5.49
Sm. Composite	10.20	8.31	4.10	1.48	159.03	170.51	9.02	3.65	6.06	2.36	13.79	3.97

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Div. Yield (% of Price)	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	NMF	32.84	2.74	2.24	1.04	0.78	NMF	NMF	9.10	5.98	2.58	3.18
Median	43.24	17.65	1.97	1.71	0.47	0.31	46.07	64.94	5.54	4.07	1.33	1.87
25th Percentile	26.98	14.57	1.55	1.39	0.21	0.25	15.34	27.08	2.81	3.41	0.00	0.00
Ind. Composite	31.19	9.92	3.22	2.40	1.30	0.89	35.10	31.82	9.59	6.84	1.17	2.29
Lg. Composite	42.55	12.65	3.45	2.47	1.44	0.93	35.67	29.75	9.51	6.91	0.87	2.04
Sm. Composite	1.93	1.94	1.46	2.35	0.30	0.37	29.16	44.40	3.29	4.51	1.02	1.03

Growth Rates (%)

	Analysts
75th Percentile	12.46
Median	10.00
25th Percentile	8.16
Ind. Composite	8.23
Lg. Composite	8.14
Sm. Composite	12.00

Cost of Equity Capital (%)

	CAPM		3-Factor		Discounted Cash Flow	
	Adj OLS	+ Sm Prem	Fama-French	Analysts	3 Stage	
75th Percentile	12.95	14.75	25.09	16.86	10.70	
Median	11.81	13.05	16.91	13.75	10.40	
25th Percentile	10.34	11.75	12.93	10.87	9.90	
Ind. Composite	9.64	9.64	10.96	8.47	9.60	
Lg. Composite	8.96	8.96	10.95	8.48	9.60	
Sm. Composite	11.10	13.70	19.99	8.53	10.80	

Weighted Average Cost of Capital (%)

	CAPM		3-Factor		Discounted Cash Flow	
	Adj OLS	+ Sm Prem	Fama-French	Analysts	3 Stage	
75th Percentile	11.81	12.95	17.47	13.10	10.17	
Median	11.10	11.10	13.04	11.74	9.56	
25th Percentile	9.20	9.51	11.12	9.98	9.38	
Ind. Composite	9.16	9.16	10.36	8.11	9.13	
Lg. Composite	8.61	8.61	10.44	8.17	9.20	
Sm. Composite	10.51	12.09	15.93	8.94	10.32	

STATISTICS FOR SIC CODE 291

Petroleum Refining
This Industry Comprises 18 Companies

Industry Description

Establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes.

Sales (million\$)

Total	346,614
Average	19,256.3
Three Largest Companies	
EXXON CORP	120,279.0
MOBIL CORP	58,399.0
TEXACO INC	45,187.0
Three Smallest Companies	
GIANT INDUSTRIES INC	499.2
WAINOCO OIL CORP	374.1
ARABIAN SHIELD DEVELOPMENT	22.0

Total Capital (million\$)

Total	426,248
Average	23,680.4
Three Largest Companies	
EXXON CORP	176,106.6
MOBIL CORP	67,025.3
CHEVRON CORP	58,747.1
Three Smallest Companies	
HOLLY CORP	310.2
WAINOCO OIL CORP	282.8
ARABIAN SHIELD DEVELOPMENT	72.4

Annualized Statistics for Last 10 Years (%)

	Average	Standard
	Return	Deviation
S&P 500	19.76	14.31
Ind. Composite	17.04	13.66
Lg. Composite	18.31	13.89
Sm. Composite	6.74	31.94

Distribution of Sales & Total Capital (million\$)

	Sales		Total Capital	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
90th Percentile	49,130.6	45,343.7	61,230.6	45,440.9
75th Percentile	27,165.5	24,272.0	33,034.5	23,606.1
Median	7,328.6	4,354.5	3,462.0	2,324.5
25th Percentile	1,031.6	900.9	396.0	337.4
10th Percentile	461.7	363.2	302.0	257.6

Number of Companies & Total Capital (billion\$)

Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A				
5	1	0	0	6
388.7	2.5	0.0	0.0	391.2
BBB				
1	3	1	0	5
6.4	11.8	1.1	0.0	19.3
BB, B, CCC, CC, D				
0	0	1	3	4
0.0	0.0	0.6	0.9	1.5
Not Rated				
1	0	0	2	3
13.9	0.0	0.0	0.4	14.2
Totals				
7	4	2	5	18
409.0	14.3	1.6	1.3	426.2

☐ S&P Debt Rating

Industry Sales, Income & Market Capitalization (billion\$)

	Operating		Net	Equity	Debt
	Sales	Income	Income	Capital	Capital
Current Yr.	346.6	45.4	21.8	381.7	44.5
Last Yr.	352.4	43.3	18.3	323.8	44.8
2 Yrs. Ago	304.2	37.1	12.8	257.1	45.9
3 Yrs. Ago	279.3	33.3	12.0	213.8	49.2
4 Yrs. Ago	274.1	33.1	12.2	191.7	49.0

Compound Annual Equity Return (%)

	5 Yrs.	10 Yrs.
75th Percentile	19.63	17.58
Median	14.59	10.60
25th Percentile	8.66	2.84
Ind. Composite	18.67	16.26
Lg. Composite	20.20	17.51
Sm. Composite	14.29	2.43

Growth Over Last 5 Years (%)

	Net Sales	Operating Income	Net Income
75th Percentile	11.62	23.04	30.79
Median	6.44	12.63	15.53
25th Percentile	4.09	7.75	-0.77
Ind. Composite	7.00	9.00	16.52
Lg. Composite	5.45	8.96	15.31
Sm. Composite	6.74	5.12	65.14

Unlevered Betas

	Adj. OLS	Adj. Sum
75th Percentile	0.59	-0.59
Median	0.51	0.54
25th Percentile	0.46	0.41
Ind. Composite	0.60	0.60
Lg. Composite	0.62	0.65
Sm. Composite	0.47	0.47

Levered Betas

	Raw OLS	Adj. OLS	Adj. Sum
75th Percentile	0.86	0.74	0.79
Median	0.64	0.65	0.63
25th Percentile	0.55	0.58	0.56
Ind. Composite	0.65	0.65	0.64
Lg. Composite	0.66	0.66	0.69
Sm. Composite	0.59	0.63	0.63

Capital Structure Ratios (%)

Debt/Total Capital			Debt/MV Equity		
Latest	5 Yr. Avg.		Latest	5 Yr. Avg.	
32.17	41.16		47.61	70.03	
21.94	28.11		28.10	39.11	
12.64	18.59		14.49	23.03	
10.44	15.54		11.66	18.39	
8.39	13.37		9.16	15.43	
28.91	48.06		40.67	92.53	

Margins (%)

	Operating Margin		Net Margin		Asset Turnover		Return on Inv. Capital		Return on Assets		Return on Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	12.90	12.22	6.18	3.76	199.34	179.49	11.08	8.33	8.14	5.76	6.40	6.28
Median	8.20	8.07	3.19	2.12	156.82	137.76	6.83	3.92	5.26	2.51	5.95	4.58
25th Percentile	5.76	6.31	1.56	1.25	125.03	111.45	5.70	2.75	3.74	2.16	4.78	2.89
Ind. Composite	13.10	12.35	6.28	4.95	129.61	123.79	11.40	8.67	8.14	6.13	6.10	6.08
Lg. Composite	12.83	11.72	6.43	5.07	132.42	131.42	12.23	9.64	8.52	6.67	6.07	6.39
Sm. Composite	9.64	9.03	2.73	0.08	155.49	126.18	5.79	0.12	4.25	0.10	6.13	0.19

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales		Price/Cash Flow		Price/Operating Income		Div. Yield (% of Price)	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	26.24	34.60	2.62	2.01	1.10	0.88	56.86	NMF	7.49	6.81	2.93	3.63
Median	18.10	21.83	2.21	1.91	0.56	0.46	30.50	65.97	6.35	5.68	2.22	2.90
25th Percentile	15.54	15.92	1.67	1.47	0.36	0.33	15.29	29.55	4.45	4.44	0.75	1.09
Ind. Composite	17.54	16.46	2.61	1.93	1.10	0.82	27.25	28.00	7.86	6.60	2.72	3.66
Lg. Composite	17.98	15.66	2.75	1.97	1.16	0.79	28.24	24.61	8.25	6.78	2.62	3.74
Sm. Composite	20.21	533.90	2.23	1.56	0.55	0.41	9.51	21.42	4.63	4.54	0.45	0.50

Growth Rates (%)

	Cost of Equity Capital (%)				
	CAPM		3-Factor		Discounted Cash Flow
	Adj. OLS	+ Sm Prem	Fama-French		Analysts
75th Percentile	10.86	11.81	13.95	26.29	13.26
Median	9.10	11.08	12.44	17.64	12.09
25th Percentile	7.88	10.53	10.87	13.50	9.42
Ind. Composite	7.86	11.07	11.11	13.02	10.72
Lg. Composite	7.32	11.16	11.16	11.95	10.09
Sm. Composite	25.00	10.89	14.19	31.29	25.57

Weighted Average Cost of Capital (%)

	CAPM		3-Factor		Discounted Cash Flow
	Adj. OLS	+ Sm Prem	Fama-French		Analysts
75th Percentile	11.15	12.72	21.90	12.04	11.37
Median	10.10	10.95	15.38	11.06	11.06
25th Percentile	9.55	9.91	11.39	9.38	10.01
Ind. Composite	10.43	10.46	12.17	10.11	10.65
Lg. Composite	10.63	10.63	11.34	9.64	10.78
Sm. Composite	10.50	12.85	25.01	20.94	7.59

STATISTICS FOR SIC CODE 291

Petroleum Refining

This Industry Comprises 17 Companies

Industry Description

Establishments primarily engaged in producing gaso-line, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes.

Sales (million\$)

Total	299,540
Average	17,620.0
Three Largest Companies	
EXXON CORP	116,728.0
MOBIL CORP	71,129.0
TEXACO INC	35,551.0
Three Smallest Companies	
GIANT INDUSTRIES INC	332.9
CASTLE ENERGY CORP	68.7
ARABIAN SHIELD DEVELOPMENT	18.4

Total Capital (million\$)

Total	319,468
Average	18,792.2
Three Largest Companies	
EXXON CORP	143,571.5
MOBIL CORP	59,635.3
CHEVRON CORP	53,751.9
Three Smallest Companies	
WAINOCO OIL CORP	233.7
CASTLE ENERGY CORP	87.6
ARABIAN SHIELD DEVELOPMENT	56.1

Annualized Statistics For Last 10 Years (%)

	Average	
	Return	Standard Deviation
S&P 500	14.53	16.07
Ind. Composite	15.15	15.56
Lg. Composite	16.46	15.52
Sm. Composite	8.12	53.81

Distribution of Sales (million\$)

	Latest	5 Yr. Avg.
90th Percentile	49,782.2	45,717.8
75th Percentile	13,564.0	11,220.8
Median	1,691.2	1,659.7
25th Percentile	676.3	596.2
10th Percentile	227.2	342.6

Distribution of Total Capital (million\$)

	Latest	5 Yr. Avg.
90th Percentile	56,105.3	40,718.6
75th Percentile	10,979.8	9,388.2
Median	2,313.3	2,055.8
25th Percentile	284.8	271.8
10th Percentile	175.3	238.0

Industry Sales and Income (billion\$)

	Operating		Net Income
	Sales	Income	
Current Yr.	299.5	34.6	12.7
Last Yr.	273.4	32.7	12.2
2 Yrs. Ago	259.1	29.4	10.3
3 Yrs. Ago	260.1	28.6	11.1
4 Yrs. Ago	266.8	26.8	8.5

Industry Market Capitalization (billion\$)

	Equity	Debt
	Current Yr.	278.7
Last Yr.	221.7	40.3
2 Yrs. Ago	182.4	44.4
3 Yrs. Ago	165.5	44.0
4 Yrs. Ago	167.2	44.7

Number of Companies & Total Capital (billions)

Large Cap	Mid Cap	Low Cap	Micro Cap	Total Cap
AAA, AA, A				
4	1	0	0	5
292.5	2.3	0.0	0.0	294.8
BBB				
2	2	1	0	5
15.7	6.7	0.7	0.0	23.1
BB, B, CCC, CC, D				
0	0	1	3	4
0.0	0.0	0.4	0.8	1.1
Not Rated				
0	0	0	3	3
0.0	0.0	0.0	0.4	0.4
Totals				
6	3	2	6	17
308.2	9.1	1.0	1.2	319.5

□ S&P Debt Rating

Growth Over Last 5 Years (%)

	Operating		Net
	Sales	Income	
75th Percentile	5.35	15.67	27.34
Median	3.51	8.29	16.94
25th Percentile	1.23	2.74	-11.05
Ind. Composite	2.90	6.49	8.85
Lg. Composite	-3.28	6.58	10.05
Sm. Composite	-12.94	18.24	25.92

Compound Annual Equity Return (%)

	5 Yrs.		10 Yrs.	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	19.50	14.86	11.09	6.34
Median	4.50	-1.74	19.47	14.10
25th Percentile	20.00	15.43	18.08	-3.28

Betas

	Unlevered		Levered	
	Asset Beta	Equity Beta	Asset Beta	Equity Beta
75th Percentile	0.62	0.96	0.55	0.67
Median	0.41	0.49	0.56	0.63
25th Percentile	0.52	0.57	0.40	0.73

Margins (%)

	Operating Margin		Net Margin		Return On Assets		Return On Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	13.18	10.91	4.17	3.01	6.62	5.02	6.73	6.65
Median	8.53	8.36	2.32	1.80	2.89	3.15	4.73	4.76
25th Percentile	5.95	6.11	-1.72	0.63	-0.90	0.69	-0.81	1.35
Ind. Composite	11.56	11.19	4.25	4.03	5.70	5.08	5.31	5.85
Lg. Composite	11.73	11.14	5.01	4.45	6.88	5.77	6.14	6.35
Sm. Composite	14.29	8.74	7.72	1.43	7.13	1.78	11.70	4.46

Capital Structure Ratios (%)

	Debt/Total Capital		Debt/MV Equity	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	42.74	40.96	74.64	69.38
Median	24.36	32.47	32.20	48.08
25th Percentile	15.99	20.30	19.03	25.47
Ind. Composite	12.75	18.61	14.62	22.86
Lg. Composite	10.28	16.04	11.46	19.10
Sm. Composite	41.26	56.08	70.25	128.00

Equity Valuation Ratios (Multiples)

	Price/Earnings		Market/Book		Price/Sales	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	NMF	74.07	2.76	2.27	1.07	0.57
Median	25.51	21.01	2.03	1.77	0.53	0.43
25th Percentile	14.51	15.04	1.67	1.47	0.28	0.28
Ind. Composite	21.88	17.09	2.42	1.76	0.93	0.69
Lg. Composite	19.12	15.75	2.41	1.76	0.96	0.70
Sm. Composite	7.76	22.42	1.19	1.54	0.60	0.32

Growth Rates (%)

	Analysts
75th Percentile	11.00
Median	8.16
25th Percentile	8.16
Ind. Composite	8.16
Lg. Composite	7.85
Sm. Composite	8.16

Yields (% of Price)

	Dividends		Cash Flow	
	Latest	5 Yr. Avg.	Latest	5 Yr. Avg.
75th Percentile	3.10	4.01	8.95	1.83
Median	2.60	3.03	1.95	0.42
25th Percentile	0.00	0.26	-3.71	-8.54
Ind. Composite	3.01	4.15	2.83	2.74
Lg. Composite	3.03	4.23	3.62	3.57
Sm. Composite	0.89	0.43	19.52	-3.17

Cost of Equity Capital (%)

	CAPM		3-Factor		Discounted Cash Flow	
	OLS	+ Sm Prem	Fama-French	Analysts	3 Stage	
75th Percentile	14.38	17.35	23.36	13.64	12.94	8.96
Median	12.21	13.50	15.90	11.34	11.53	7.96
25th Percentile	10.90	12.46	11.33	8.40	10.88	6.85
Ind. Composite	11.92	11.96	11.67	11.36	12.05	7.20
Lg. Composite	11.51	11.51	10.01	11.08	12.53	7.14
Sm. Composite	12.69	16.16	29.00	9.13	NMF	9.13

Cost of Debt (%)

75th Percentile	8.96
Median	7.96
25th Percentile	6.85
Ind. Composite	7.20
Lg. Composite	7.14
Sm. Composite	9.13

Weighted Average Cost of Capital (%)

	CAPM		3-Factor		Discounted Cash Flow	
	OLS	+ Sm Prem	Fama-French	Analysts	3 Stage	
75th Percentile	12.00	12.25	16.89	12.14	11.20	10.65
Median	10.65	10.95	13.51	9.55	10.34	9.09
25th Percentile	9.09	10.23	9.17	7.78	9.84	11.04
Ind. Composite	11.04	11.07	10.82	10.55	11.15	10.85
Lg. Composite	10.85	10.85	9.50	10.46	11.76	9.90
Sm. Composite	9.90	11.94	19.48	7.81	NMF	9.90

Historical Industry Tax Rates - Prepared by IbbotsonAssociates

Industry Tax Rates for Month-End March 1997 - 2002

	2002	2001	2000	1999	1998	1997
Industry 131	21.21%	15.55%	6.45%	26.44%	23.90%	35.00%
Industry 291	34.68%	34.46%	34.77%	31.87%	31.53%	35.00%