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INVESTOR REACTION TO PREFERENTIAL TAXATION--
THE OIL INDUSTRY AND THE TAX REFORM ACT OF 1969

By

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ABSTRACT

INVESTOR REACTION TO PREFERENTIAL TAXATION--THE OIL INDUSTRY AND THE TAX REFORM ACT OF 1969

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On December 30, 1969, Richard M. Nixon signed into law the Tax Reform Act of 1969. This legislation had a significant impact on the oil and gas industry because it cut the percentage depletion rate from 27½ percent to 22 percent, altered the treatment of certain oil production payments, and changed some aspects of the foreign tax credit. Since these changes had economic consequences for the petroleum industry, spokesmen for the industry argued that these changes would make it more difficult for oil firms to attract needed capital because investors would perceive the industry to be "riskier" than it was before the tax changes. Indeed, the original tax preferences granted to the oil industry had been partially justified on the grounds that such preferences served as an offset to risk. Accordingly, this argument implied that investor-perceived risk of the oil industry would increase following the passage of the Tax Reform Act of 1969.

In order to test this hypothesis, however, a good theoretical definition of investor-perceived risk was needed. The capital asset pricing model and modern portfolio theory provided the necessary theoretical definition of risk. According to this theory, the risk to an investor

investing in security i is not the variability of stock i's returns, but rather how sensitive the price changes of stock i are to the price changes for the market as a whole.

To examine the effects of the Tax Reform Act of 1969 on the oil industry, a number of oil firms were divided into five portfolios or groups for testing purposes. These groups incorporated a classification scheme involving technical service firms, producing firms, and integrated firms. From a random selection of control firms, five control portfolios were also created. Estimates of the risk of each of these portfolios both before and after the Tax Reform Act of 1969 were obtained and statistically tested for shifts by using the market model and covariance analysis.

The results of the study indicated that the Tax Reform Act of 1969 did indeed have an impact upon the systematic risk of oil firms. In all test cases, an upward drift in risk was observed for oil portfolios during the critical time span of January 1969 through October 1970. No such uniformity was observed for control portfolios. The impact of the tax reform was somewhat modified, however, by crude oil price hikes occurring in November 1970. These hikes tended to re-establish former cash flows and thus offset the effects of the tax reform. Empirical results supported this conclusion in that a drop in risk was observed for all oil portfolios following these price hikes. No similar uniform pattern was seen for control portfolios during the same time span.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

AN INTRODUCTION TO THE STUDY

An Overview of Taxation

The study of U.S. income tax laws has always been a difficult and trying experience for most people. Many laws appear to be overly intricate and virtually incomprehensible. Even the redoubtable Judge Learned Hand once confessed to some feelings of frustration in the study of taxation when he wrote:

> In my own case the words of such an act as the Income Tax, for example, merely dance before my eyes in a meaningless procession: cross-reference to cross-reference, exception upon exception--couched in abstract terms that offer no handle to seize hold of--leave in my mind only a confused sense of some vitally important, but successfully concealed, purport, which it is my duty to extract, but which is within my power, if at all, only after the most inordinate expenditure of time. I know that these monsters are the result of fabulous industry and ingenuity, plugging up this hole and casting out that net, against all possible evasion; yet at times I cannot help recalling a saying of William James about certain passages of Hegel: that they were no doubt written with a passion of rationality; but that one cannot help wondering whether to the reader they have any significance save that the words are strung together with syntactical correctness.[1]

Justice Wilkey expressed similar sentiments regarding taxation:

> . . .if 200 years ago men revolted on the principle that "taxation without representation is tyranny," then today men

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[1] L. Hand, The Spirit of Liberty 213 (Dilliard ed. 1952), quoted in Readings in Federal Taxation, ed. Frank E. A. Sander and David Westfall (Mineola: The Foundation Press, Inc., 1970), p. 1.

> may rise in righteous wrath because taxation with representation but beyond human comprehension is even worse.[2]

The study of taxation has become complex because of the increasing number of special tax provisions enacted into law. These provisions, often spoken of as "loopholes" or "special tax privileges" have always given rise to much controversy. Of course, major arguments about these provisions have not centered on the complexity of law that they create, but rather on their alleged violation of some criterion such as equity or fairness. Simply stated, such a criterion would require that persons with equal incomes pay equal amounts of tax thereon. Under the equity concept, such items as capital gains taxation, percentage depletion, the exclusion of interest on state and local obligations, provisions for the blind and the aged, and numerous other measures would be unfair and undesirable "loopholes" in that they allow two taxpayers with equal incomes to pay different amounts of tax. In the words of Blum,

> Legislation is preferential to the extent it allows any taxpayer to accumulate wealth or enjoy personal consumption without paying the full tax. And the full tax is that which would be due if all of the taxpayer's economic enhancement were financed by cash received as ordinary income and if he did not qualify for any nonbusiness deductions or extraordinary exemptions or credits in the course of saving or spending his income.[3]

But, preferential taxation is also a matter of viewpoint. A tax loophole to one person is merely relief from special hardship or

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[2]Wilkey, "American United" Inc. v. Walters 477 F2b 1169 (CA-D.C., 1973), cited by Ray M. Sommerfeld, Hershel M. Anderson, and Horace R. Brock, An Introduction to Taxation (New York: Harcourt Brace Jovanovich, Inc., 1976), p. 1/1.

[3]Walter J. Blum, "Blum, The Effects of Special Provisions in the Income Tax on Taxpayer Morale," Readings in Federal Taxation, ed. Frank E. A. Sander and David Westfall (Mineola: The Foundation Press, Inc., 1970). p. 41.

intolerable rates to another person. Moreover, certain loopholes may be viewed as special incentives by others--rewards offered for undertaking some desired behavior. Indeed, special tax provisions are frequently created and defended on the grounds that they promote some desirable national policy or objective. Thus, since loopholes are a matter of viewpoint, it is not surprising to find a great deal of debate surrounding them. Numerous revenue acts creating, amending, and abolishing special tax provisions stand as stark testimony to their controversial nature.

Motivation for the Study

Only on rare occasions does the need for tax reform receive widespread attention in the public media. The financial press, of course, gives continuous coverage of tax developments, but the papers and periodicals in this class do not reach the masses. For some reason, however, the popular press mentioned certain aspects of federal tax law for much of 1968 and 1969. This coverage was, perhaps, part of the growing social awareness and unrest that was taking place during the 1960's. New government programs arising from the "War on Poverty" tended to focus attention on the nation's tax system as tax burdens and funding needs were studied. Additionally, tax specialists in the executive and legislative branches had been releasing information about inequities in the tax laws and stories of taxpayers with very high incomes paying little or no tax became commonplace. Pressure for reform began to mount.

In this environment, it is not surprising that the oil industry came under attack. Numerous tax preferences given to that industry have resulted in low federal income tax bills for many companies.[4] Table 1-1,

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[4]These tax preferences are described in detail in Chapter II.

TABLE 1-1

INCOME TAX RATES OF 18 MAJOR OIL COMPANIES, 1967-71

Company and year	Federal tax as percent of worldwide net income	Foreign and state income tax as percent of worldwide net income	Federal, state, and foreign income tax as percent of worldwide net income
Standard (New Jersey):			
1967	8.1	34.0	42.1
1968	10.1	34.0	44.1
1969	12.8	36.5	49.3
1970	10.8	36.2	47.0
1971	7.7	38.8	46.5
Texaco:			
1967	1.9	13.9	15.8
1968	2.3	16.1	18.4
1969	.7	18.4	19.1
1970	6.4	21.3	27.7
1971	2.3	29.2	31.5
Gulf:			
1967	7.8	31.8	39.6
1968	.8	35.1	35.9
1969	.4	38.0	38.4
1970	1.2	43.2	44.4
1971	2.3	55.3	57.6
Mobil:			
1967	4.5	32.3	36.8
1968	3.2	33.5	36.7
1969	5.7	35.3	41.0
1970	10.9	33.8	44.7
1971	7.4	45.6	53.0
Standard (California):			
1967	1.6	46.7	48.3
1968	2.9	17.7	20.6
1969	1.8	21.2	23.0
1970	4.7	26.4	31.1
1971	1.6	38.6	40.2
Standard (Indiana):			
1967	19.8	4.7	24.5
1968	18.6	3.8	22.4
1969	15.7	5.6	21.3
1970	14.2	6.2	20.4
1971	14.5	7.3	21.8

TABLE 1-1
(con't.)

Company and year	Federal tax as percent of worldwide net income	Foreign and state income tax as percent of worldwide net income	Federal, state, and foreign income tax as percent of worldwide net income
Shell:			
1967	13.1	3.6	16.7
1968	16.3	3.2	19.5
1969	1.7	3.8	5.5
1970	12.4	1.1	13.5
1971	14.9	1.3	16.2
Arco:			
1967	3.1	14.4	17.5
1968	9.3	15.9	25.2
1969	4.0	16.9	20.9
1970	4.0	16.4	20.4
1971	3.8	28.9	32.7
Phillips:			
1967	29.7	3.8	33.5
1968	29.9	6.5	36.4
1969	18.3	8.5	26.8
1970	18.9	9.0	27.9
1971	15.0	9.2	24.2
Sun:			
1967	20.7	7.3	28.0
1968	19.8	8.2	28.0
1969	21.7	11.2	32.9
1970	25.5	12.1	37.6
1971	17.4	18.4	35.8
Union (California):			
1967	6.3	5.2	11.5
1968	3.6	4.3	7.9
1969	5.1	5.4	10.5
1970	4.6	9.4	14.0
1971	7.9	14.2	22.1
Amerada Hess:			
1967	7.9	33.7	41.5
1968	7.0	36.2	43.2
1969	1.8	34.8	36.6
1970	3.6	34.1	37.7
1971	9.3	35.1	44.4

TABLE 1-1
(con't.)

Company and year	Federal tax as percent of worldwide net income	Foreign and state income tax as percent of worldwide net income	Federal, state, and foreign income tax as percent of worldwide net income
Getty:			
1967	8.2	8.2	16.4
1968	4.3	8.6	12.9
1969	13.0	6.6	19.6
1970	21.9	8.2	30.1
1971	15.1	22.4	37.5
Conoco:			
1967	12.5	26.1	38.6
1968	5.2	33.0	38.2
1969	1.4	35.8	37.2
1970	6.4	40.3	46.7
1971	2.1	60.4	62.5
Cities Service:			
1967	19.6	3.1	22.7
1968	9.1	3.3	12.4
1969	16.7	2.9	19.6
1970	17.9	3.8	21.7
1971	8.4	2.7	11.1
Marathon:			
1967	2.7	44.0	46.7
1968	2.8	43.6	46.4
1969	1.9	45.6	47.5
1970	4.2	51.8	56.0
1971	6.1	64.2	70.3
Standard (Ohio):			
1967	28.3	8.0	36.3
1968	33.7	4.8	38.5
1969	42.9	5.2	48.1
1970	10.5	6.5	17.0
1971	2.0	12.4	14.4
Ashland:			
1967	29.9	4.9	34.8
1968	31.3	5.8	37.1
1969	31.0	4.2	35.2
1970	40.9	5.0	45.9
1971	46.3	7.8	54.1

TABLE 1-1
(con't.)

Company and year	Federal tax as percent of worldwide net income	Foreign and state income tax as percent of worldwide net income	Federal, state, and foreign income tax as percent of worldwide net income
Total for 18 companies:			
1967	8.7	25.2	33.9
1968	8.0	24.2	32.2
1969	7.8	25.9	33.7
1970	9.1	28.4	37.5
1971	6.7	36.3	43.0

SOURCE: "U.S. Oil Week," in Congressional Record, Sept. 6, 1972.

for instance, reveals surprisingly low effective federal income tax rates for many major oil companies, and it appears that an average federal income tax bill exceeding 10 percent of net income for the industry as a whole would have been unusual in the sixties.

Arguments Leading to Tax Reform

Because oil tax preferences had resulted in low federal income tax bills, critics maintained that the oil industry was not paying its fair share of the tax burden. They further alleged that the tax incentives granted were leading to a misallocation of resources to the industry. Specifically, they asserted that too much capital had been procured by the oil firms at the expense of other non-favored firms. According to Menge:

> If tax policies alone increase the profit return in one industry relative to the returns in other industries, there will be a tendency for investment to be shifted to the industry receiving preferential tax treatment. If a dollar earns less than can be earned elsewhere, after allowing for differences in risk, the investor will shift his funds out of the industry; if it earns more, the investors in other industries will transfer their funds to the more profitable industry. If industry A, therefore, has a lower profit per dollar invested before tax than industry B, under normal circumstances resources would flow out of A and into B. But this corrective flow of resources will not occur if the investor in A is able to collect just as much or more on his dollar invested in industry A as in industry B, as is possible in the extractive industries. Because of duplicative counting of costs, taxes on income in A are less than in B, thus artificially increasing returns in A.[5]

Kahn reached similar conclusions:

> The greater the tax preferences and the higher the price of oil, the farther it pays explorers to look for it in marginal areas,

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[5]Menge, "Menge, The Role of Taxation in Providing for Depletion of Mineral Reserves, Readings in Federal Taxation, ed. Frank E. A. Sander and David Westfall (Mineola: The Foundation Press, Inc., 1970), pp. 354-355.

> develop it in marginal (high cost) reservoirs, and produce it from high cost, marginal wells. Higher royalties and bonuses can also be offered to leaseholders. All of these factors mean higher cost. Now if one can hold price far above the cost of efficient producers and raise after tax returns on investment in any industry above those of other industries, then so long as entry is free, capital will pour in. And if, when this produces excess capacity, profits are protected by cutting back production and maintaining price, then capital will keep coming in. The process continues until the cost burden of excess capacity is just sufficient to eliminate the artificial stimulus to investment that created it in the first place--until profits are reduced by the low levels of capacity utilization just enough so that new entrants no longer see the likelihood of earning supernormal profits.[6]

Mead further claimed that oil firms were developing resources at social costs of about $3.42 per barrel that had a social value of about $2.10 per barrel. Other studies showed that because of capital gains taxation and duplicative cost deductions in the industry, an oil firm would be willing to spend up to $1.95 to discover $1 worth of oil.[7]

Arguments in Defense of Tax Preferences

Industry spokesmen, of course, disputed the claims and allegations made by critics and advanced a number of arguments to defend their preferential taxation. Their defense roughly encompassed five key points: (1) the oil industry is inherently riskier than other industries, (2) incentives are necessary to encourage domestic production and assure adequate supplies of oil, (3) oil is essential to national defense and is therefore entitled to distinctive tax treatment, (4) the tax benefits

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[6] Alfred E. Kahn, "The Combined Effects of Prorationing, the Depletion Allowance, and Import Quotas on the Cost of Producing Crude Oil in the United States," National Petroleum Policy, ed. Albert E. Utton (Albuquerque: University of New Mexico Press, 1970), p. 63.

[7] See Walter J. Mead, "The System of Government Subsidies to the Oil Industry," National Petroleum Policy, ed. Albert E. Utton (Albuquerque: University of New Mexico Press, 1970), p. 128, and Menge, "Menge, The Role of Taxation in Providing for Depletion of Mineral Reserves," p. 353.

granted are merely an offset to the nonneutrality of the corporate income tax, and (5) when all taxes are considered, oil firms pay a fair share and do not earn abnormal profits.[8]

Risk--The Focal Point

Although critics of oil and gas taxation appeared to be well prepared to rebut most of the defenses cited above, it is the first argument that is of particular interest to this study--the concept of risk. Risk may have various meanings. To critics, risk often meant the probability of business failure. Under this concept, the petroleum industry does not appear to be excessively risky. Figures on business failures show that the industry had one of the lowest rates of failure in the years 1925 through 1954. In the mid-fifties, the failure rate per 10,000 businesses was 20 in food, 50 in apparel, 86 in construction, over 400 in retailing, but only 4 in oil, gas, and mining.[9]

Other questions were also raised by critics under the idea of risk. They argued that if tax incentives had been granted to compensate for risk, then the rewards were being misallocated since they were not channeled

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[8]Most of these items are discussed in Mid Continent Oil and Gas Association, Percentage Depletion: Economic Progress and National Security (Tulsa: Mid Continent Oil and Gas Association, 1968), and Robert G. Dunlop, "Statement of Robert G. Dunlop (President, Sun Oil Company)," Readings in Federal Taxation, ed. Frank E. A. Sander and David Westfall (Mineola: The Foundation Press, Inc., 1970), pp. 361-371. See also Shyam Sunder, "Oil Industry Profits," Report 7715, Graduate School of Business, University of Chicago, March 1977 for a discussion regarding the profitability of the oil industry compared to other firms in general. In brief, he found the profitability of the oil business to be no better than the profitability of other industrial firms when measured by accounting variables but above average when measured by market data.

[9]Philip M. Stern, The Rape of the Taxpayer (New York: Random House, Vintage Books, 1973), p. 246.

directly to the riskier phases of operation.[10] The incentives offered for low risk drilling in proven fields were just as generous as those offered for high risk discovery drilling. Incentives were also being offered to those who took no risk whatever, namely, the landowners who simply permitted drilling operations to take place on their land.

Critics also contended that oil firms could spread the risk among themselves in their exploration and development activities even without tax incentives, especially in foreign operations. Foreign-owned wells are generally controlled by consortiums of several companies and it is the consortiums, not individual companies, that typically bid on exploration contracts. For such activities, the industry has traditionally received antitrust exemptions not granted to other industries.[11]

The industry concept of risk, however, also included financial considerations. The Mid Continent Oil and Gas Association, for example, asserted that preferential taxation was necessary to enable the oil industry to attract needed capital:

> Petroleum production is a mining venture with many characteristics of mining ventures in general and with some peculiarities of its own. Production inevitably depletes a wasting asset that occurs in natural form and that cannot be planted, grown and harvested; nor can it be manufactured. The search for most mineral deposits, particularly oil and gas, is characterized by great uncertainty. Even on successful ventures, there is a long time lag between outlay of funds and realization of earnings. Mineral production is also subject to the principle of diminishing returns and increasing costs. All of these circumstances justify differential treatment insofar

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[10] McDonald identifies four phases or functions in the industry. These are, in order of decreasing risk, pre-drilling activities, exploratory drilling, development drilling and equipping of productive wells, and production proper. See Stephen L. McDonald, Federal Tax Treatment of Income from Oil and Gas (Washington, D.C.: The Brookings Institution, 1973), pp. 32-49.

[11] "Spotlight on Big Oil," Newsweek 83 (February 11, 1974): 72-75.

> as taxes on income are concerned in order to enable the mining industry to compete effectively with other industries in attracting capital.[12]

Thus, the industry contended that preferential taxation served as an offset to "risk". An unfavorable change in effective tax rates, it was argued, would have an impact upon the industry's ability to raise capital presumably because investors would perceive the industry to be "riskier" following such a change.

It appears, then, that a large part of the controversy in oil and gas taxation has centered on its impact on capital market agents' decisions. Critics have argued that too much capital has been procured by oil firms while oil companies have maintained that incentives are necessary to offset excessive risk making it possible for them to compete for capital on an equitable basis.

Testable Implications and Models to be Used

With the passage of the Tax Reform Act of 1969, an opportunity arose to test the assertion that investors would perceive the industry to be "riskier" because of the adverse tax changes. In order to do so, however, a theoretical concept of investor-perceived risk was needed, and this concept was found in modern portfolio theory.

According to portfolio theory, an investor or decision maker buying or selling a stock must consider two factors simultaneously--a security's expected rate of return and the uncertainty or risk involved in the actual outcome. When a number of securities are held, however, the risk of a stock is not the variability of its return, but rather how sensitive the price changes of that stock are to the price changes for other

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[12]Mid Continent Oil and Gas Association, Percentage Depletion: Economic Progress and National Security, pp. 23-24.

securities. Black has shown that the theoretical relationship between the risk-return factors of a stock may be represented by the following general linear model:

$$E(\tilde{R}_i) = E(\tilde{R}_z) + [E(\tilde{R}_m) - E(\tilde{R}_z)]\,\beta_i \qquad (1\text{-}1)$$

where

$E(\tilde{R}_i)$ = expected return on asset i

$E(\tilde{R}_z)$ = expected return on an asset with zero covariance with the market

$E(\tilde{R}_m)$ = expected return on the market portfolio

$\beta_i = \dfrac{\text{Cov}\,(\tilde{R}_i, \tilde{R}_m)}{\text{Var}\,(\tilde{R}_m)}$ = measure of systematic risk of asset i[13]

Formal empirical tests by Black, Jensen, and Scholes and Fama and MacBeth suggest that the two-factor model for equilibrium expected returns involving the market factor and beta factor (β) provides an adequate representation of the unconditional expected return on assets.[14]

Black's model is in terms of expectations. Consequently, in order to derive estimates of the risk of stocks a stochastic generating process for stock price returns must be assumed. The market model, although not consistent with equation 1-1, has been widely used to estimate the risk of stocks. In this model, the return generating process is represented by

$$\tilde{r}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \tilde{\mu}_{it} \qquad (1\text{-}2)$$

where

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[13] F. Black, "Capital Market Equilibrium with Restricted Borrowing," Journal of Business (July 1972): 444-455.

[14] F. Black, Michael Jensen, and Myron Scholes, "The Capital Asset Pricing Model: Some Empirical Results," Studies in the Theory of Capital Markets ed. Michael Jensen (New York: Frederick A. Praeger, 1972), and Eugene F. Fama and James D. MacBeth, "Risk, Return and Equilibrium: Empirical Tests," Journal of Political Economy (July-August, 1973): 607-636.

$E(\tilde{\mu}_{it}) = 0$

$\sigma(\tilde{R}_{mt}, \tilde{\mu}_{it}) = 0$

$\sigma(\tilde{\mu}_{it}, \tilde{\mu}_{jt}) = 0$

$\tilde{r}_{it}$ = return on security i in period t

$\tilde{R}_{mt}$ = general market factor in period t

$\tilde{\mu}_{it}$ = stochastic portion of the individualistic factor representing the part of security i's return which is independent of $\tilde{R}_{mt}$

$$\beta_i = \frac{Cov(\tilde{r}_i, \tilde{R}_m)}{Var(\tilde{R}_m)} = \text{measure of risk}$$

Using the market model, estimates of the systematic risk of stocks can be made. By comparing the systematic risk of oil stocks before passage of the Tax Reform Act of 1969 to estimates of risk following the enactment, it is possible to see whether there has been a change in investor-perceived risk. Thus, empirical evidence can be gathered to support or refute oil industry claims. These models and the relationship of taxes to risk are discussed in greater detail in Chapter III.

Justification for the Study

As with most legislation, the Tax Reform Act of 1969 did not come forth in a completed manner overnight. Instead, it was the product of numerous studies, testimonials, arguments, proposals, counterproposals and compromise. In this respect, it appears that little progress has been made regarding the determination of fair tax policies for the petroleum industry since 1959, when Peter O. Steiner wrote:

> In any case, the fundamental issues of proper policy appear to depend upon a series of empirical questions in which no more than a dent has been made. We have had decades of arguments, theoretical and ideological, about percentage depletion. It is not further "views of interested persons" that

> are needed, but the formulation of the relevant questions and a factual determination of the answers to these questions.[15]

In this regard, this study offers a new approach to the question of the effects of taxation upon investor-perceived risk of the oil industry.

Furthermore, because of the nation's increasing energy problems and the concerns over developing new and traditional sources of energy, empirical research pertaining to taxation in the oil industry and its effects upon the risk-return potential for investors is more important than ever. Recent studies have indicated that firms involved in energy development may experience difficulty in raising needed capital:

> Much has been said and written about our country's needs for capital investment during the next few years, but this cannot be overemphasized. Over a year ago, a number of economists estimated U.S. needs for capital investment to be in excess of $100 billion per year for the foreseeable future. These estimates were made well before the current energy shortage reached its present level. A recent estimate of domestic and worldwide energy demands indicated a capital requirement of about $1.35 trillion by 1985. The economist who made this estimate expressed serious doubts (with which we concur) that industries involved in energy development could generate these funds internally.[16]

Thus, an important question facing the oil industry is whether firms can attract equity financing without certain tax incentives. If tax legislation does indeed influence the risk-return potential of an industry and the various firms therein, then such information would be an important consideration in future legislation dealing with energy development. Hence, this study seeks to examine the impact of the Tax Reform Act on investor-perceived risk in the oil industry.

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[15] Peter O. Steiner, 1959 Compendium, cited by Ray M. Sommerfeld, Hershel M. Anderson, and Horace R. Brock, An Introduction to Taxation (New York: Harcourt Brace Jovanovich, 1976), p. 18/1.

[16] Joel M. Forster, "Taxation," Journal of Accountancy 137 (April 1974): 85. See also "Putting the Heat on Big Oil," Newsweek 83 (February 4, 1974): 65.

The remainder of this paper is devoted to the steps used to examine the risk issue. Specifically, Chapter II gives an overview of oil and gas taxation before and after the Tax Reform Act of 1969 and discusses some of the anticipated effects of that Act on the oil industry. Chapter III describes in detail the theoretical foundations of the study and the concept of systematic or investor-perceived risk and the possible relationship between taxes and risk. Chapter IV describes the data and the statistical procedures used to test for shifts in risk, and Chapter V gives the results and conclusions of this study.

CHAPTER II

AN OVERVIEW OF OIL TAXATION

This chapter is divided into two main parts. The first part describes the major tax preferences that the oil industry enjoyed before the Tax Reform Act of 1969 and the changes in those preferences brought about by the Act. This section is presented for the benefit of those readers not acquainted with oil and gas taxation so that a better understanding of the potential impact of the tax reform may be obtained. The second half of this chapter is concerned with the alleged effects of the tax reform.

Taxation of Oil and Gas Properties

The petroleum industry has been granted numerous tax incentives to stimulate exploration, production, and maintenance of adequate domestic supplies and, as mentioned in Chapter I, these incentives have resulted in low federal income tax bills for many oil companies. The tax items most frequently criticized by critics as loopholes but vigorously defended by oil companies are percentage depletion, intangible drilling and development costs, the foreign tax credit, and capital gains taxation. Each of these preferences and changes made in them by the Tax Reform Act of 1969 are discussed below.

Percentage Depletion

Minerals, oil and gas, and other natural deposits are known as wasting assets. The appellation is easy to understand since the removal of a mineral from its natural reservoir diminishes the quantity remaining in the pool, and continued operations eventually exhaust the supply of the mineral resource. The decrease in supply available as operations continue has been termed physical depletion and the related decrease in the value of the mineral deposit itself has been called economic depletion.

The income tax allowance for depletion is aimed at compensating the taxpayer for capital consumed in severance and production of the mineral resource, the theory being that as the product of a well or mine is sold, a gradual sale is being made of the taxpayer's capital interest in the property.[1] Shortly before passage of the Tax Reform Act of 1969, the Internal Revenue Code provided two methods of computing the depletion allowance for oil and gas wells--cost depletion and percentage depletion. There was no election to use either method; the taxpayer was required to use that method which resulted in the greater allowance each year.

Cost depletion provided for a deduction for the taxpayer's basis in the mineral property in relation to the production and sale of minerals therefrom and was calculated by the following formula:

$$\text{Depletion} = \frac{\text{Cost of mineral (or other interest)}}{\text{Estimated recoverable reserves}} \times \text{no. of units sold.}$$

Percentage depletion, on the other hand, provided for a statutory deduction equal to 27½ percent of the gross income from the property but not to exceed 50 percent of the net income from the property computed without

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[1] 1974 Federal Tax Course (New York: Commerce Clearing House, Inc., 1973), p. 1403.

the depletion allowance. Gross income from the property was defined as the amount for which the taxpayer-operator sold the oil and gas in the immediate vicinity of the well. If the oil and gas was not sold on the premises but instead converted into a refined product before sale, gross income was computed by the use of a representative market or field price. Percentage depletion was in no way limited by the cost or other adjusted basis of the property, and thus the taxpayer could take deductions against income that exceeded the cost of the property.[2]

The Tax Reform Act of 1969 made several changes affecting the depletion allowance for oil and gas wells. The major revision was in the reduction of rates from 27½ percent to 22 percent. Except for this rate change, the deduction continued to be calculated and limited as it was prior to the passage of the Act. The Act also created the minimum tax and made percentage depletion a preference item to the extent that it exceeded the adjusted basis of each property. The minimum tax was a levy on the total of all tax preferences of individuals and corporations after the deduction of $30,000 and the regular income taxes paid. The Act also added provisions disallowing the use of excess foreign tax credits arising from percentage depletion to offset nonmineral income. Further reform affecting the depletion allowance occurred in the area of "carved-out" and "retained" production payments. Prior to the Act, these payments were generally treated as economic interests in a mineral property making it possible for firms or individuals to enhance depletion deductions. Following the Act, these payments lost their "economic interest" status.

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[2]This material was adapted from 1977 Federal Tax Course (Englewood Cliffs: Prentice-Hall, Inc., 1976), pp. 2103-2109.

Carved-out payments were treated as mortgage loans and retained payments as purchase money mortgages thereby curtailing many of the benefits that these payments had previously rendered. These payments are described in greater detail in the second half of this chapter.

Percentage depletion, as a preference item, was especially generous to the oil and gas industry. Roughly, 80 percent of all depletion deductions emanated from oil and gas wells before passage of the Tax Reduction Act of 1975, and 1966 figures showed that the depletion allowance permitted oil industry deductions amounting to nineteen times what other industries could deduct for their productive assets. Total depletion deductions by corporations quadrupled in the decade 1946-1956--from just under $800 million to over $3.2 billion--and then nearly doubled again, to just under $5.5 billion, by 1967.[3] A legislative history of the depletion allowance is given in Appendix D.

Intangible Drilling and Development Costs

The owner of operating rights in an oil or gas property has the burden of developing the property. The developmental process results in certain expenditures that may be divided into equipment costs and intangible drilling and development costs. The latter group includes the charges incurred for labor, fuel, repairs, hauling, supplies, core analysis, cement and mud, and other items of a non-salvagable nature.[4] These intangible costs typically account for two-thirds or more of the total cost of drilling a well and are incurred in (1) the drilling, shooting,

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[3] Stern, The Rape of the Taxpayer, pp. 232-243.

[4] Richard H. Stone, "Oil and Gas Investment," Viewpoint (New York: Main LaFrentz & Co., 1973), p. 58.

and cleaning of wells; (2) such clearing of ground, draining, road making, surveying, and geological works as are necessary in preparation for the drilling of wells; and (3) the construction of such derricks, tanks, pipelines, and other physical structures as are necessary for the drilling of wells and the preparation of wells for the production of oil or gas.[5]

Under generally accepted accounting principles, these intangible costs would represent part of the cost of developing an income producing property (the oil well) and would therefore be in the nature of a capital cost. However, the taxpayer need not capitalize them in his tax records. He has the option of either (1) capitalizing them and recovering them through depletion, or (2) writing them off as a current expense in the first year in which paid or incurred. If capitalization of such costs is elected, the taxpayer has the further option of (1) capitalizing dry hole costs and recovering them through depletion, or (2) expensing them as an ordinary loss as incurred.[6] Generally, little or no tax benefit results from capitalizing these costs if percentage depletion exceeds cost depletion, which is the usual case. On the other hand, expensing these costs has two advantages provided the taxpayer has sufficient taxable income to cover them. First, current expensing yields an imputed interest saving in comparison with capitalization and recovery over an extended period of time. Second, expensing of intangible development and dry hole costs enhances the value of percentage depletion. If capitalized, these costs are recoverable only through depletion, but if expensed, they are

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[5]Clark W. Breeding and A. Gordon Burton, Taxation of Oil and Gas Income (New York: Prentice-Hall, Inc., 1954), p. 158.

[6]1977 Federal Tax Course (Englewood Cliffs: Prentice-Hall, Inc., 1976), pp. 2104-2105.

recoverable in addition to depletion. Hence, the net benefit of percentage depletion (the allowable depletion in excess of cost depletion) is enlarged by the election to expense these costs.[7]

The magnitude of the benefits given by the tax provisions for intangible drilling and development costs in conjunction with the depletion allowance is sizable. For 1975, it was estimated that these two preferences alone would give the petroleum industry deductions of $3.4 billion--roughly 4 percent of the total deductions taken by all individuals and corporations in the land.[8] The example on page 23 illustrates the workings of these tax preferences.

The Tax Reform Act of 1969 did not alter any of the tax provisions governing the handling of the intangible drilling and development costs. A legislative history of these costs is given in Appendix D.

Royalties and the Foreign Tax Credit

Another tax preference encountered in the oil and gas industry arises in the area of non-domestic royalty payments and the foreign tax credit. Most of the oil-rich, foreign lands are owned by various national governments rather than private individuals and therefore royalties are paid to these governments for the privilege of extracting the mineral resource. Such royalties are normally a deductible expense. However, if they are paid to foreign governments in the form of "taxes," a tax credit results. Federal tax law provides that:

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[7]Stephen L. McDonald, "Distinctive Tax Treatment of Income from Oil and Gas Production," National Petroleum Policy, ed. Albert E. Utton (Albuquerque: University of New Mexico Press, 1970), pp. 107-108.

[8]"Spotlight on Big Oil," p. 76.

ILLUSTRATION I

INTANGIBLE DRILLING AND DEVELOPMENT COSTS

A Hypothetical Case

Wood has $50,000 of capital. In year 1, he invests his $50,000 in acquiring a one-fourth interest in an oil venture. Of the $50,000, $30,000 goes to intangible drilling and development costs. Very little oil is produced in this first year, and Wood receives only about $30,000 as his share of the sales proceeds. In year 2, production booms. Wood receives $200,000. But in year 2, he borrows against the security of his well an additional $200,000. He sinks $400,000 into a second well, of which $251,000 is intangible drilling and development costs. The second well comes in and produces $95,000 worth of oil that year. In two years, the following has occurred:

Year	Income	Deductions	Tax
1	$ 30,000	$ 30,000	-0-
2	295,000	295,000	-0-

The $295,000 of deductions in the second year consists of $251,000 intangible drilling and development costs plus $44,000 (22% of $200,000) percentage depletion on the first well. If the value of his interest in the first well is about $400,000 and the value of his interest in the second well is about $800,000, Wood has gone from a net worth of $50,000 to a net worth of $1,000,000 in two years without paying one cent in income taxes.

SOURCE: William L. Raby, The Income Tax and Business Decisions (Englewood Cliffs: Prentice-Hall, Inc., 1972), p. 228.

> A taxpayer who pays taxes to a foreign country on his foreign source income may be entitled to a tax credit if his foreign source income is subject to U.S. income tax. . . .
>
> While this credit against the tax is intended to cover foreign income taxes, it is also permitted to cover taxes imposed in lieu of income taxes otherwise generally imposed by the particular country.[2] Thus, a foreign tax on gross income, gross sales or units of production may be the subject of a credit if it is in fact in lieu of an income tax.[9]

[2]Code Sec. 903, CCH par. 4310; Reg. subsecs. 1.903-1, CCH par. 4311.

Thus, expenditures that would normally be deductible expenses can be transformed into tax credits giving oil firms dollar for dollar offsets against their U.S. tax bills.

As with percentage depletion and the intangible drilling and development costs, the benefits arising from the foreign tax credit can be substantial. For example, in 1974, Mobil Oil disclosed that while the total price of oil in Saudia Arabia was $7.12 a barrel, actual production costs represented only 10 cents of that figure and $1.46 was the royalty payment. The balance, $5.56, was a "tax" paid to the Saudis which was credited dollar for dollar against the firm's U.S. income tax.[10]

The treatment of these payments also affects percentage depletion. When treated as taxes, the amounts are considered as part of the firm's gross income for the percentage depletion calculation thus giving rise to a larger income base and bigger deduction. If treated as royalties, however, the payments are excluded from income for purposes of percentage

[9]1974 Federal Tax Course (New York: Commerce Clearing House, Inc., 1973), p. 2403.

[10]"Putting the Heat on Big Oil," p. 65.

depletion thus preventing depletion deductions on the foreign governments' shares of income.[11]

Furthermore, there is also an indirect advantage to the foreign governments in treating these payments as taxes. Because of the tax credit, they can exact a higher total payment at no expense to and therefore with little or no complaint from the American oil companies.[12]

The Tax Reform Act of 1969 altered one aspect of the foreign tax credit. It provided that excess foreign tax credits arising from percentage depletion could no longer be used as credits against U.S. tax payable on other foreign income.[13]

Capital Gains Taxation

The capital gains tax is not a benefit conferred solely upon the oil and gas industry. The tax may, however, have greater actual and potential importance to that industry than to most others when viewed in conjunction with the tax provisions governing intangible drilling and development costs.[14] There is a well organized market in oil and gas properties reflecting, in large part, the great diversity of interests of those engaged in the industry. Buyers and sellers of properties include individuals or institutional investors seeking relatively stable

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[11] Leroy Dunn and Jane Gravelle, An Analysis of the Federal Tax Treatment of Oil and Gas and Some Policy Alternatives (Washington, D.C.: U.S. Government Printing Office, 1974), p. 28.

[12] Stern, The Rape of the Taxpayer, p. 239.

[13] 1977 Federal Tax Course (Englewood Cliffs: Prentice-Hall, Inc., 1976), p. 3702.

[14] Most of the information in this section is discussed in detail in McDonald, Federal Tax Treatment of Income from Oil and Gas, pp. 92-100.

and assured incomes from proven properties, integrated oil companies trying to assure themselves of appropriately located sources of refinery runs, "outsiders" who have made a find and developed it but who are not interested in managing a productive property, and wildcatters who want to "cash in" a discovery in order to finance new ventures.

Within this market setting, oil and gas deposits would not be considered capital assets; however, as with most depreciable and real property used in a trade or business, capital gains treatment is allowed in nearly all cases of sales of oil and gas property interests.[15] Thus, for the ordinary firm in the industry, regularly engaged in finding and producing oil and gas, the capital gains feature is potentially of value because it enhances the relative attractiveness of selling individual properties or liquidating the firm rather than continuing to produce oil and gas for sale. A firm that has been growing rapidly in the past, drilling increasing numbers of wells and charging off most of their costs as operating expense, may find further growth possibilities reduced and its prospective income tax liability sharply increased because of smaller prospective deductions for capital consumption. A catch-up of the deferred tax liability created by earlier expensing of finding and development costs may be avoided by selling out and taking capital gains on the proceeds. The possibility of finding a willing buyer is increased by the fact that the buyer may use the purchase price as the basis of cost depletion with resulting capital consumption deductions larger than those possible at the maximum rate of percentage depletion.

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[15] Inventory and depreciable and real property used in a trade or business are specifically excluded as capital assets by code definition. In practice, the sales of oil and gas interests are generally given Section 1231 treatment.

The ABC deal was used extensively prior to the 1969 Reform Act to enhance the value of the capital gains alternative by giving a buyer a somewhat better depletion position. The resultant financial advantage was then shared with the seller in the form of a higher purchase price. The ABC deal is discussed in greater detail in the second part of this chapter.

Similar benefits could also be achieved by individual investors. In 1971, for instance, the petroleum industry was one of the three main "tax sheltered" areas available to investors. In that year artificial losses generated by oil and gas tax shelters amounted to $906 million.[16] The high-income individual offset these deductions against his salary or other income in that year and would then cash in his investment later as a capital gain.

Thus, the expensing of capital outlays combined with the capital gains tax acts as a powerful attraction to capital and must be presumed to affect the allocation of capital among industries. The 1969 Tax Reform Act did make some changes in capital gains taxation, but these changes were not unique to the oil industry and will therefore not be discussed.[17]

The Effects of the Tax Reform Act of 1969 on the Oil Industry

The first part of this chapter has examined the changes in oil and gas taxation brought about by the Tax Reform Act of 1969. This section

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[16] "New Crackdown on Tax Shelters," U.S. News & World Report 75 (December 24, 1973):47.

[17] A brief synopsis of the changes is given in Sommerfeld, Anderson, and Brock, An Introduction to Taxation, p. 19/9.

examines some of the anticipated or hypothesized effects of these changes upon the financial and operating aspects of the oil business.

Percentage Depletion

Following passage of the Reform Act, the federal income taxes paid by most oil and gas companies were expected to rise because of the rate reduction in percentage depletion. On assessing the impact of the tax increase, Collie and Linden stated that

> Such tax increase can be either passed along to consumers or can be absorbed by the industry. It is likely that a combination of both of these factors will occur. To the extent that the higher taxes are passed along to consumers, all oil product prices, including the price of gasoline, will increase. Those tax increases absorbed by the industry will produce a primary and a secondary effect: oil and gas producers will have less money available for exploration and development which will, in time, cause a corresponding decrease in domestic petroleum reserves and a basic hazard to national security.[18]

Jenkins, however, has indicated that the change probably had little impact on foreign operations:

> In summary, then, we find that the depletion allowance has been of increasingly little value as an incentive to foreign affiliates of United States petroleum corporations. In particular, the depletion rate adjustment of 1969 from 27.5 percent to 22 percent probably had a negligible effect on the after-tax income of foreign producers and the further reduction to 15 percent suggested by Senator Proxmire would have been similarly unimportant to foreign producers.[76] Of course, such reductions may have affected domestic producers, but that is beyond the scope of this study.[19]

[76] U.S. Senate Congressional Record, Jan. 22, 1969, p. 1509.

[18] Marvin K. Collie and William M. Linden, "The Tax Reform Act of 1969 and Domestic Oil and Gas Producers," Twenty-First Annual Institute on Oil and Gas Law and Taxation, ed. Armine Carol Ernst (New York: Matthew Bender, 1970), p. 437.

[19] Glenn P. Jenkins, "United States Taxation and the Incentive to Develop Foreign Primary Energy Sources," Studies in Energy Tax Policy, ed. Gerard M. Brannon (Cambridge, Mass.: Ballinger Publishing Co., 1975), pp. 231-232.

Jenkins' conclusion stemmed from the fact that foreign tax credits were generally sufficient to eliminate U.S. tax on foreign source income even without the depletion provision.

McDonald, writing before the Reform Act, suggested the following possible effects if percentage depletion were reduced or eliminated because of capital gains taxation:

> The capital gains alternative is potentially of value also because of the possibility of changes in the distinctive tax provisions applying to the industry, particularly reduction of the rate, or elimination, of percentage depletion. In cases where selling for capital gains is nearly as attractive as operating with percentage depletion, a reduction in the rate, or elimination, of the latter would induce sales. The sellers would avoid some part of the higher income tax payments they would have had to make, and the buyers would also avoid income tax payments at higher rates by using the purchase price as the basis of cost depletion. The actual increase in long-run Treasury receipts in consequence of the change would depend on how closely substitutable capital gains advantages are for percentage depletion advantages.[120, 20]

[120] It may be noted incidentally that selling for capital gains as a reaction to reduction of the benefits of current distinctive tax provisions might lead to a significantly higher degree of concentration in the industry.

Mineral Production Payments

The Tax Reform Act of 1969 altered the treatment of most carved-out production payments and retained production payments in a sales transaction. Prior to the Act, numerous court decisions had developed and shaped the treatment of mineral production payments as an economic interest in the property thus giving these payments a right to depletion and the income-splitting characteristics that proved so advantageous in the sale of oil and gas properties.

[20] McDonald, Federal Tax Treatment of Income from Oil and Gas, p. 94.

Carved-Out Production Payments. A carved-out production payment is created whenever the owner of a mineral property sells--or carves out--a portion of his future production. Before the Tax Reform Act of 1969, the consideration received by the seller for a carved-out production payment was recognized as depletable income in the year of sale, and production income attributable to the production payment was excluded from the seller's gross income as it arose. The consideration given by the buyer was considered the purchase price of an economic interest, and production income attributable to the production payment was thus included in the buyer's gross income with a corresponding deduction for depletion.[21]

Because the expenses of producing income for the production payment were claimed in later years when the mineral was mined or produced, the seller was able to distort income and thereby circumvent various tax limitations--primarily the 50 percent limitation on taxable income for percentage depletion along with the foreign tax credit limitation, the 5-year net operating loss carryover limitation, and the investment credit carryover. The Johnson Administration gave the following example:

> . . . assume that a corporation derives all of its income from a lead mine which it operates at a profit of $1 million each year, having $10 million each year in gross income and $9 million of expenses. Before applying the 50 percent limitation, the percentage depletion deduction would be $2,300,000 (23 percent of $10 million) but the 50-percent limitation in the statute limits the percentage depletion deduction in this case to $500,000 (50 percent of the net profit of $1 million). Thus, if the company operates its mine in a normal manner, it would pay Federal income taxes of approximately $240,000 and the percentage depletion deduction would have reduced its taxable income each year to one-half of what it would otherwise be. But, by resort to carved-out production payments, the company can drastically alter its tax picture. If it sells an $8

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[21] Kenneth G. Miller, Oil and Gas Federal Income Taxation, 1971 Edition (New York: Commerce Clearing House, Inc., 1971), p. 210.

million production payment payable out of the following year's production, the percentage depletion allowance in the year of sale is increased from $500,000 to $4,140,000 (23 percent of $18 million). This result follows because the $8 million is treated not as a loan, but as income subject to the depletion allowance in the year of the sale. While the company will pay Federal income taxes in the year of sale of approximately $2.3 million, these are claimed as refunds in the following year when the company will claim a net operating loss carryback of $7 million. (This results from the fact that the $8 million production payment is excluded from income by the seller in the following year, leaving $2 million gross income and $9 million in expenses.) Thus, by the simple expedient of selling a production payment, the corporation has eliminated payment of Federal income taxes over the 2-year period of approximately $480,000. Yet for its book purposes it has continued to show a $1 million operating profit. Each year the corporation repeats this cycle, it can continue in a tax-free status.

The net result of the use of production payments in the manner described is to permit a mineral operator to obtain the benefit of the depletion allowance far in excess of 50 percent of the profit derived from a mineral property and to distort the purposes of the net operating loss carryback and carryforward provisions. This impact is even greater if, in the above example, the corporation had nondepletable income to absorb the unused portion of the 'loss' in the year of the payout of the production payment.[22]

The Tax Reform Act of 1969 stripped most carved-out production payments from their status as an economic interest in the property and treated them instead as mortgage loans. Under this rationale, the creator of a carve-out was deemed to have borrowed money rather than to have received gross income from the buyer. Hence, income was recognized by the creator as production runs were made to liquidate the production payment. Sums received by the buyer were treated as payments received in satisfaction of indebtedness, and taxable income resulted to the extent that the payments exceeded the basis of the production payment.

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[22] Johnson Administration Proposals, 257, quoted in Collie and Linden, "The Tax Reform Act of 1969 and Domestic Oil and Gas Producers," pp. 427-429.

The buyer, lacking an economic interest in the property, was no longer entitled to depletion.[23]

Retained Production Payments. A retained production payment is created when the owner of a mineral interest sells the working interest, but retains a production payment for himself. These payments were widely used before the Tax Reform Act of 1969 in "ABC deals" to enhance the value of the capital gains alternative by giving the buyer a somewhat better depletion position. This depletion advantage was then shared with the seller in the form of a higher purchase price. In an ABC transaction, A, the owner of an oil property sold it to B, an operator and developer, for a partial cash payment and a retained oil payment for the balance. The oil payment was then sold to C, an investor, by A. Capital gains were then taken by A on the cash transactions with B and C, the amount received being equal to the purchase price. The net result of the transaction was that B and C together could generally take more depletion than that which B could take alone had he purchased the property for cash. The deal was also advantageous to B in that the oil payment was treated as an economic interest in the property. Thus, the oil payments made by B to C were excludable from B's gross income and cost basis and this allowed him to accelerate deductions from his gross income for tax purposes.[24]

The Tax Reform Act of 1969 provided that a retained production payment upon the sale of a property would be treated as a purchase money

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[23]Miller, Oil and Gas Federal Income Taxation, 1971 Edition, p. 224.

[24]McDonald, Federal Tax Treatment of Income from Oil and Gas, pp. 98-99.

mortgage rather than as an economic interest in the property. Consequently, B, the purchaser of the property, could no longer exclude from his income the payments made to C. In essence, B could no longer use before-tax dollars to satisfy the purchase price.

Anticipated Effects from Changes in Production Payments. The change in the treatment of carved-out production payments brought about by the Tax Reform Act of 1969 was designed to prevent the distortion of income taking place in numerous circumstances. As such, the change would decrease percentage depletion deductions by making the limits more effective. The result, of course, would be a further increase in taxes with the same consequences mentioned by Collie and Linden previously. The same result would follow for the other tax limitations previously circumvented by these payments.

The change in retained production payments severely limited the use of ABC deals and probably affected the market value of many oil properties:

> Various bankers estimate that oil and gas properties will sell for 17 percent to 25 percent less than their price before the Act. Some major oil companies have placed the corresponding estimate as high as 35 percent. There can be no doubt that such a decrease in the price of producing properties will result in fewer sales. Specifically, fewer independent producers will find it attractive to sell properties to major companies; thus those independents will have less funds available for new exploration; and, as effect piles upon effect, the whole pattern of exploration and production in the domestic oil and gas industry may be changed.[25]

Other effects anticipated by Collie and Linden included earlier

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[25]Collie and Linden, "The Tax Reform Act of 1969 and Domestic Oil and Gas Producers," p. 437.

abandonment of marginal production, a possible hampering of unitization efforts, and a change in some partnership dissolution procedures.[26]

The Minimum Tax

The Tax Reform Act of 1969 created the minimum tax and made percentage depletion a tax preference item to the extent that it exceeded the adjusted basis of the property. Hence, this tax further affected the depletion allowance.

> The minimum tax in its final form is another reduction of the depletion allowance for many taxpayers. The extent of such reduction may effectively make the average percentage depletion in the order of 20 percent of gross income.
>
> Regular income taxes paid are deducted from the total tax preferences prior to the imposition of the minimum tax. Therefore, if significant taxable income is generated from non-preference sources, the income tax paid will offset the tax preferences and no minimum tax need be incurred. Diversification and merger are thus both encouraged. If an oil and gas corporation finds itself incurring a minimum tax, a merger with another corporation outside the petroleum industry may be attractive. To this end the demise of the independent oil and gas producer--the smaller operator--may be foretold.[27]

The Foreign Tax Credit

The Tax Reform Act of 1969 also affected the foreign tax credits of the extractive industries in that the amount of foreign tax eligible for credit under Section 901 was reduced by the excess of such foreign taxes over U.S. tax computed with respect to such income. Alternatively, the reduction imposed was the excess of the U.S. tax on such income, computed without percentage depletion, over the U.S. tax normally

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[26] Ibid., pp. 437-438.

[27] Ibid., pp. 439-440.

computed on such income. The alternative was utilized when the U.S. tax, without depletion, was less than the foreign tax.[28]

This change apparently had little impact on the oil industry. According to Jenkins,

> . . . Section 901(e) introduced by the Tax Reform Act of 1969 and specifically directed at foreign mineral income did not result in any significant increase in U.S. tax receipts from petroleum producers. Within the present tax environment, the depletion provisions are virtually irrelevent to foreign petroleum producers.[29]

The intent of this section was to prevent excess foreign tax credits from arising from percentage depletion.

To summarize, most oil spokesmen felt that the Tax Reform Act of 1969 would have a major impact upon the industry. Studies and commentaries suggested that the Act would affect, directly or indirectly, taxes, the market value of oil properties, capital available for exploration and development, prices of oil products, disposition of oil and gas properties, and mergers. The potential impact was not limited just to dollar magnitudes because the tax reform also signified to some oil representatives that the industry would be facing a changing tax environment in the future rather than the stable situation it had seen in the past.

Summary

The purpose of this chapter was to provide an overview of oil and gas taxation both before and after the 1969 tax reform in order to gain

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[28] David Alton, "Selected Current Issues in International Operations," Twenty-First Annual Institute on Oil and Gas Law and Taxation, ed. Armine Carol Ernst (New York: Matthew Bender, 1970), p. 412.

[29] Jenkins, "United States Taxation and the Incentive to Develop Foreign Primary Energy Sources," p. 232.

a better understanding of the possible effects of the tax reform on the industry. In general, it appears that the tax reform had its greatest impact on depletion and related deductions since the Act reduced the percentage depletion rate for oil and gas deposits, altered the treatment of production payments thereby eliminating various tax avoidance schemes, and made excess foreign tax credits attributable to the percentage depletion allowance on foreign mineral income ineligible for credit against U.S. tax payable on other foreign income.

Presumably, the changes brought about by the Reform Act could affect decisions of investors because of their economic consequences. Indeed, arguments surrounding oil and gas taxation have generally focused on two related topics: (1) the consequences of tax incentives on domestic reserves and supply, and (2) the consequences of tax incentives on capital allocation. While not directly addressing the issue of capital allocation, this study does seek to determine how investors reacted to the effects of the tax reform in terms of risk assessment.[30] This measure was chosen because of the industry's contention that tax incentives allow oil firms to compete for capital on an equitable basis by serving as an offset to risk. Consequently, market behavior and risk as perceived by the investor are discussed in the next chapter.

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[30]It should be noted, however, that investment decisions are made using estimated costs of capital which are related to equity risk and debt risk. Consequently, a change in these risk measures would affect the cost of capital and thus investment decisions (capital allocation). See Mark E. Rubinstein, "A Mean-Variance Synthesis of Corporate Financial Theory," Journal of Finance (March 1973): 167-181 for examples of using the capital asset pricing models in capital budgeting decisions.

CHAPTER III

THEORETICAL FOUNDATIONS OF THE STUDY

Chapter II developed some of the possible consequences that the Tax Reform Act of 1969 may have had upon the oil industry's operating and financial environment. This chapter, in turn, develops a testing methodology to examine whether these changes had an impact upon investor-perceived risk of the oil industry. To do so, a brief review is made of the intuitive arguments regarding tax incentives and risk, and then a more formal framework, based on portfolio theory and the capital asset pricing model is introduced.

Intuitive Arguments Regarding Risk

Various arguments have been advanced by the oil industry concerning the need for tax incentives to promote the exploration and development of oil and gas deposits. Most of these arguments were mentioned in Chapter I, and as indicated in that chapter, the argument of primary importance to this study relates to risk. Because the search for oil and gas is characterized by great uncertainty and because production depletes the oil supply, the industry viewed itself as being "riskier" than other industries. Thus, it was apparently felt that investors would also perceive the industry to be riskier than others, and that they would be reluctant to invest in oil ventures and oil securities if tax incentives were not present. This feeling is supported by the Mid Continent Oil and Gas Association's statement that ". . . these circumstances justify

differential treatment insofar as taxes on income are concerned in order to enable the mining industry to compete effectively with other industries in attracting capital."[1] Accordingly, this argument seems to imply that investor-perceived risk of the oil industry would increase if tax incentives were diminished (all other factors remaining constant) if, in fact, investors do relate tax incentives to risk.

Unfortunately, this argument does not provide a good theoretical definition of investor-perceived risk and is therefore not testable in this form. A valuation model is needed that provides a theoretically well defined measure of investor-perceived risk. This theoretical framework is found in modern portfolio theory and the two-parameter capital asset pricing model. Consequently, the next two sections of this chapter briefly review the development of investment and portfolio theory.

Classical Approaches to Investment Theory

The classical approach to microeconomic investment theory was largely developed within the context of perfect certainty. Within this world of certainty and perfect markets, a unique interest rate prevailed each period, and this rate represented the cost of capital for all investors in the economy. Because interest rates, future cash flows, replacement costs, and other pertinent data were assumed to be known in advance, an optimal investment strategy could be determined: Capital stock would be adjusted by investment or disinvestment until the marginal rate of return on further investments was equal to the interest rate (i.e.,

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[1] Mid Continent Oil and Gas Association, Percentage Depletion: Economic Progress and National Security, pp. 23-24.

the cost of capital).[2] In conjunction with this rule, it was also assumed than an investor in common stocks could arrive at an optimal investment strategy by using computational techniques such as net present value or internal rate of return. The major implication of this decision strategy was that investors would generally hold one-asset portfolios--a prediction that was inconsistent with observed behavior of portfolio diversification.

To cope with this inconsistency, other classical approaches were tried, but they too suffered from limitations. For example, models that used expected values as a substitute for certain outcomes arose, but these models still predicted single asset portfolios. They also failed to recognize that investors would consider, in addition to expected values, other characteristics of the probability distribution such as the standard deviation of returns (risk). Modigliani and Miller introduced the concept of risk-equivalent classes to partially account for the risk element, but this methodology offered only limited possibilities.[3] So long as an analysis of investment behavior was confined to a given risk class, one could effectively abstract from the risk element. Unfortunately, such was not the case for investment possibilities falling into different risk classes. Other writers suggested letting anticipated returns include an allowance for risk or else adjusting the interest or

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[2]Baruch Lev, Financial Statement Analysis: A New Approach (Englewood Cliffs: Prentice-Hall, Inc., 1974), p. 178.

[3]Franco Modigliani and Merton H. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," American Economic Review 47 (June 1958): 261-297.

discount rate to allow for risk differentials.[4] Again, however, these suggestions represented only a partial solution to a complex problem and the classical approaches to investment theory were thus not able to adequately describe investor behavior.

Portfolio Theory

Modern portfolio theory, largely pioneered by Harry Markowitz and James Tobin, extended the classical theory of investment under certainty to the real world of uncertainty.[5] The theory suggests that an investor's single period investment decision can be fully characterized in terms of the expected value and variance of his portfolio return, that is, the expected return and risk. The overall portfolio risk is determined mainly by the relationships between returns on the individual securities rather than by their individual riskiness (the extent to which the actual return may deviate from the predicted or expected return). The variance of returns for a n-security portfolio is given by

$$\sigma_p^2 = \sum_{i=1}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{\substack{j=1 \\ j \neq i}}^{n} w_i w_j r_{ij} \sigma_i \sigma_j \qquad (3\text{-}1)$$

where

w_i = proportion of funds invested in security i

σ_i = standard deviation of returns for security i

r_{ij} = correlation coefficient between returns of securities i and j

One can see that as the number of securities in the portfolio increases,

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[4] The first method is described in J. R. Hicks, Value and Capital (New York: Oxford University Press, 1939), p. 126.

[5] Harry Markowitz, "Portfolio Selection," Journal of Finance 7 (March 1952): 77-91, and James Tobin, "Liquidity Preference as Behavior toward Risk," Review of Economic Studies 25 (February 1958): 65-86.

the relative impact of a security's individual riskiness is far outweighed by its relationship with the other securities in the portfolio. Risk reduction through diversification is therefore affected by three factors: (1) the variance (risk) of each security, (2) the number of securities in the portfolio, and (3) the degree to which security returns are correlated.[6] For a large portfolio, the third factor is dominant. Practically speaking, then, the risk to an investor investing in security i is not the variability of stock i's returns, but rather how sensitive the price changes of stock i are to the price changes for the market as a whole. This sensitivity is frequently referred to as the "systematic risk" of a security, and it is this risk that presumably affects the manner in which investors allocate their capital to the market.

Theoretical Models

The early work of Markowitz and Tobin was extended by Sharpe and Lintner who developed a two parameter asset pricing model specifying the determination of equilibrium prices of capital assets, i.e., describing the process of security price adjustment to reflect risk differentials.[7] Variants of this model have been subsequently developed and one shown to have good descriptive ability is given by the following general linear equation:

$$E(\tilde{R}_{it}) = E(\tilde{R}_{zt}) + [E(\tilde{R}_{mt}) - E(\tilde{R}_{zt})]\beta_{it} \qquad (3\text{-}2)$$

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[6] Lev, Financial Statement Analysis: A New Approach, p. 187.

[7] William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," Journal of Finance 19 (September 1964): 425-552, and John Lintner, "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets," Review of Economics and Statistics 47 (February 1965): 13-37.

where

$E(\tilde{R}_{it})$ = expected return on asset i in period t

$E(\tilde{R}_{zt})$ = expected return on an asset with zero covariance with the market in period t

$E(\tilde{R}_{mt})$ = expected return on the market portfolio in period t

$\beta_i = \frac{Cov(\tilde{R}_i, \tilde{R}_m)}{Var(\tilde{R}_m)}$ = measure of systematic risk of asset i[8]

In words this model essentially states that the expected return on an asset is a function of the expected return on the market, the expected return on a zero beta portfolio, and the systematic risk of the security.

The two parameter asset pricing model is in terms of expectations and is neutral concerning the process that generates security prices. Consequently, to empirically test the model or use it to assess the effects of policy changes, a stochastic generating process for stock price returns must be assumed. The idea is to relate the expected values which are unobservable to assumed observable parameters of the probability distribution of returns.

Although not consistent with the theoretical model given in equation 3-2, the market model has been widely used as a stochastic return generating process thus enabling researchers to come up with estimates of systematic risk:[9]

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[8]This model was first proposed by Black. See Black, "Capital Market Equilibrium with Restricted Borrowing," pp. 444-455.

[9]The market model has been employed, among others, by Eugene F. Fama, Lawrence Fisher, Michael C. Jensen, and Richard Roll, "The Adjustment of Stock Prices to New Information," International Economic Review (February 1969: 1-21; Ray Ball and Philip Brown, "An Empirical Evaluation of Accounting Income Numbers," Journal of Accounting Research (Autumn 1968): 159-178; T. Ross Archibald, "Stock Market Reaction to the Depreciation Switch-Back," The Accounting Review 47 (January 1972): 22-30; and Shyam Sunder, "Relationships between Accounting Changes and Stock Prices: Problems of Measurement and Some Empirical Evidence," Empirical Research in Accounting: Selected Studies, 1973, supplement to Vol. 11, Journal of Accounting Research, pp. 1-59.

$$\tilde{r}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \tilde{\mu}_{it} \qquad (3\text{-}3)$$

where

$E(\tilde{\mu}_{it}) = 0$

$\sigma(\tilde{R}_{mt}, \tilde{\mu}_{it}) = 0$

$\sigma(\tilde{\mu}_{it}, \tilde{\mu}_{jt}) = 0$

$\tilde{r}_{it}$ = return on security i in period t

$\tilde{R}_{mt}$ = return on the market portfolio in period t

$\tilde{\mu}_{it}$ = stochastic portion of the individualistic factor representing the part of security i's return which is independent of $\tilde{R}_{mt}$

$\beta_i = \text{Cov}(\tilde{R}_i, \tilde{R}_m)/\sigma^2(\tilde{R}_m)$ = sensitivity of stock i to market return (risk)

The market model is a "one factor model" in that the term involving $\tilde{R}_{mt}$ is assumed to capture the effects of market-wide factors. Recent studies have indicated, however, that this model may not be an adequate representation of the stock price generating process in that $\tilde{R}_{mt}$ apparently does not capture all market factors.[10] But, this shortcoming would have its greatest bearing on studies attempting to isolate the individualistic portion of stock returns and at present, a more efficient risk estimation procedure has not been clearly demonstrated. In this study, model misspecification will make it more difficult to detect a shift in investor-perceived risk if one exists to the extent that the misspecification causes a larger variance in the residuals.

The Relationship of Taxes to Risk

The two parameter asset pricing model does not directly address the relationship of taxes to risk. Unfortunately, little is known as to

[10] See Fama and MacBeth, "Risk, Return and Equilibrium: Empirical Tests," pp. 607-636, and R. Richardsen Petit and Randolph Westerfield, "Using the Capital Asset Pricing Model and the Market Model to Predict Security Returns," Journal of Financial and Quantitative Analysis (September 1974): 579-605.

why a given stock has any particular "beta" or whether the stock's beta value tends to vary in response to economic conditions. Economic principles do specify, however, that the value of securities over time (and hence rates of return over time) depends upon expectations of future cash flows and the rate at which such cash flows will be discounted. These expected future cash flows and discount rates are influenced by changes in the economic environment. Thus economic changes will affect a security's expected rate of return and may affect the security's systematic risk.[11] Sunder has stated that a change in the market's assessment of the risk of a stock may occur because of (1) a change in the economic status of the firm with respect to its environment, or (2) changes in the information system relating the firm to investors.[12] The Tax Reform Act of 1969 certainly falls within the first category.

In spite of the limited knowledge pertaining to the behavioral aspects of risk, some insight into the possible effects of a specialized tax increase upon the risk of a security may be obtained by assuming a one-period planning horizon, a single tax rate, and firm liquidation at the end of the planning horizon. Under these conditions, the return to equity holders may be represented by

$$\tilde{R}_{j1} = [(\tilde{X}_{j1} - I_{j1})\alpha - \tilde{B}_{j1}]/P_{jo} \qquad (3\text{-}4)$$

where

$\tilde{R}_{j1}$ = return on stock j during time 1

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[11] For further discussion see Alexander A. Robichek and Richard A. Cohn, "The Economic Determinants of Systematic Risk," Journal of Finance 29 (May 1974): 439-447.

[12] Sunder, "Relationships between Accounting Changes and Stock Prices: Problems of Measurement and Some Empirical Evidence," p. 30.

$\tilde{X}_{j1}$ = EBIT (earnings before interest and taxes including funds realized from selling assets) at time 1

I_{j1} = interest paid at time 1

α = one minus the tax rate = $(1-\tau)$

$\tilde{B}_{j1}$ = debt repayment at time 1

P_{jo} = price of stock j at time 0 (beginning of period).

According to the capital asset pricing model, the price of stock j is determined by

$$P_{jo} = [E(\tilde{Y}_{j1}) - \lambda Cov(\tilde{Y}_{j1},\tilde{R}_{m1})]/R_{f1} \qquad (3\text{-}5)$$

where

$E(\tilde{Y}_{j1}) = E[(\tilde{X}_{j1} - I_{j1})\alpha - \tilde{B}_{j1}]$ = the expected after-tax cash flow to equity at time 1

$\lambda = [E(\tilde{R}_{m1}) - R_{f1}]/\sigma^2(\tilde{R}_{m1})$

R_{f1} = the risk-free interest rate during time 1

$\tilde{R}_{m1}$ = the return on the market during time 1

The risk of stock j is defined as

$$\beta_{j1} = [Cov(\tilde{R}_{j1},\tilde{R}_{m1})]/\sigma^2(\tilde{R}_{m1}) \qquad (3\text{-}6)$$

which by substitution for $\tilde{R}_{j1}$ $(\tilde{R}_{j1} = [(\tilde{X}_{j1}-I_{j1})\alpha-\tilde{B}_{j1}]/P_{jo} = \tilde{Y}_{j1}/P_{jo})$ becomes

$$\beta_{j1} = [Cov(\frac{\tilde{Y}_{j1}}{P_{jo}},\tilde{R}_{m1})]/\sigma^2(\tilde{R}_{m1}). \qquad (3\text{-}7)$$

By factoring out the constant P_{jo} (which is known at the start of the period), the equation reduces to

$$\beta_{j1} = [Cov(\tilde{Y}_{j1},\tilde{R}_{m1})]/P_{jo}\sigma^2(\tilde{R}_{m1}). \qquad (3\text{-}8)$$

With these basic definitions, the impact of a change in the tax rate on risk may be explored.

The Unlevered Case. Assume two firms, F_1 and F_2, having no debt in their capital structures (I=B=0). Also assume that the probability density function for $\tilde{X}_1$ (cash flows to equity holders of firm 1 before

tax) equals that of $\tilde{X}_2$ and that no taxes are currently in existence.[13] Then it follows that

$$\begin{aligned} E(\tilde{X}_2) &= \alpha E(\tilde{X}_1);\ \alpha = 1 \qquad \text{(a)} \\ \text{Cov}(\tilde{X}_2, \tilde{R}_m) &= \alpha \text{Cov}(\tilde{X}_1, \tilde{R}_m) \qquad \text{(b)} \end{aligned} \tag{3-9}$$

Next assume that Firm 2 is subjected to a specialized tax not affecting Firm 1 and having negligible impact upon $\tilde{R}_m$. In this situation, the relationships given in equation 3-9 ("a" and "b") still hold, but α is now less than one. By letting $\tilde{Y}_2$ refer to the after-tax cash flows to equity holders of Firm 2, equation 3-9 becomes

$$\begin{aligned} E(\tilde{Y}_2) &= \alpha E(\tilde{X}_1);\ \alpha = 1-\tau \qquad \text{(a)} \\ \text{Cov}(\tilde{Y}_2, \tilde{R}_m) &= \alpha \text{Cov}(\tilde{X}_1, \tilde{R}_m). \qquad \text{(b)} \end{aligned} \tag{3-10}$$

By definition, the values of Firms 1 and 2 are

$$\begin{aligned} P_1 &= \frac{E(\tilde{X}_1) - \lambda \text{Cov}(\tilde{X}_1, \tilde{R}_m)}{R_f} \qquad \text{(a)} \\ P_2 &= \frac{E(\tilde{Y}_2) - \lambda \text{Cov}(\tilde{Y}_2, \tilde{R}_m)}{R_f} \qquad \text{(b)} \end{aligned} \tag{3-11}$$

Since $E(\tilde{Y}_2) = \alpha E(\tilde{X}_1)$ and $\text{Cov}(\tilde{Y}_2, \tilde{R}_m) = \alpha \text{Cov}(\tilde{X}_1, \tilde{R}_m)$, equation 3-11(b) may be written as

$$P_2 = \frac{\alpha E(\tilde{X}_1) - \lambda \alpha \text{Cov}(\tilde{X}_1, \tilde{R}_m)}{R_f} \tag{3-12}$$

which can be simplified to

$$P_2 = \frac{\alpha[E(\tilde{X}_1) - \lambda \text{Cov}(\tilde{X}_1, \tilde{R}_m)]}{R_f} = \alpha P_1. \tag{3-13}$$

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[13] Subscripts used in the following analysis refer only to firms. Because of the one-period planning horizon, subscripts referring to time periods have been deleted for convenience.

The systematic risk of these two firms is given by

$$\beta_1 = \frac{\mathrm{Cov}(\tilde{X}_1, \tilde{R}_m)}{P_1\sigma^2(\tilde{R}_m)} \qquad \text{(a)}$$

$$\beta_2 = \frac{\mathrm{Cov}(\tilde{Y}_2, \tilde{R}_m)}{P_2\sigma^2(\tilde{R}_m)} \qquad \text{(b)} \qquad (3\text{-}14)$$

By substituting from equations 3-10(b) and 3-13, equation 3-14(b) can be written as

$$\beta_2 = \frac{\alpha\mathrm{Cov}(\tilde{X}_1, \tilde{R}_m)}{\alpha P_1\sigma^2(\tilde{R}_m)} = \frac{\mathrm{Cov}(\tilde{X}_1, \tilde{R}_m)}{P_1\sigma^2(\tilde{R}_m)} = \beta_1. \qquad (3\text{-}15)$$

As this model demonstrates, the risk of a security does not change because of a specialized tax increase levied against a firm in the unlevered case.

The Levered Case. The levered case presents some difficulty because of the non-deductibility of the debt repayment. In the absence of taxes and again assuming equal probability density functions of $\tilde{X}_j$, $E[(\tilde{X}_2 - I_2) - \tilde{B}_2] = E[(\tilde{X}_1 - I_1)\alpha - \tilde{B}_1]$ where $\alpha = 1$. However, with the introduction of a specialized tax levied against Firm 2, the relationship given above no longer holds. If $E(\tilde{X}_2)$ equals the expected after-tax cash flows of Firm 2 before any debt repayment, then $E(\tilde{X}_2) = \alpha E(\tilde{X}_1 - I_1)$. The problem arises in equating $E(\tilde{B}_1)$ with $E(\tilde{B}_2)$ since the expected repayment of principal to bondholders depends upon available after-tax cash flows. With Firm 2 facing a specialized tax, $E(\tilde{B}_2)$ does not necessarily equal $E(\tilde{B}_1)$ and thus $E(\tilde{Y}_2)$ does not necessarily equal $\alpha E(\tilde{X}_1 - I_1 - \tilde{B}_1)$ and $\mathrm{Cov}(\tilde{Y}_2, \tilde{R}_m)$ does not necessarily equal $\alpha\mathrm{Cov}[(\tilde{X}_1 - I_1 - \tilde{B}_1), \tilde{R}_m]$.

Because of the difficulty involved in specifying the relationship between $E(\tilde{B}_1)$ and $E(\tilde{B}_2)$, the potential impact of a tax change on risk may be seen by constructing a hypothetical example.[14] Assume that Firm j faces a 20 percent tax rate and that $\tilde{X}_j$ (cash flows before interest and taxes) will be either \$2500, \$5000, or \$7500. Also assume that the firm has \$2000 in debt with a 6% coupon rate. The possible cash flow outcomes from this uncertain situation are given below.

$\tilde{X}_j$	Interest	$\tilde{X}_j$-I	Taxes	Repayment of Bond Principal	Cash Flow to Equity-$\tilde{Y}_j$
2500	120	2380	476	1904	-0-
5000	120	4880	976	2000	1904
7500	120	7380	1476	2000	3904

The joint probability distribution of $\tilde{Y}_j$ (after-tax cash flow to equity) and $\tilde{R}_m$ (return on the market) is assumed to be

		$\tilde{Y}_j$		
		0	1904	3904
$\tilde{R}_m$	.95	.10	.00	.00
	1.00	.10	.10	.05
	1.10	.05	.30	.10
	1.25	.00	.10	.10

where

$E(\tilde{Y}_j) = 1928$

$Cov(\tilde{Y}_j, \tilde{R}_m) = 67.84$

$E(\tilde{R}_m) = 1.09$

$Var(\tilde{R}_m) = .00915$

$\lambda = 4.37$

$R_F = 1.05$ (assumed)[15]

Under these circumstances,

$$P_j = [1928 - 4.37(67.84)]/1.05 = 1,553.85$$

$$\beta_j = 67.84/(1553.85)(.00915) = 4.77$$

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[14] This example is adapted from a model of Haley and Schall. See Charles W. Haley and Lawrence D. Schall, The Theory of Financial Decisions (New York: McGraw-Hill Book Company, 1973), pp. 153-160.

[15] See Appendix B for calculations.

Now assume that taxes go up to 50%. In this situation, the possible cash flows to equity are as follows:

$\tilde{X}_j$	Interest	$\tilde{X}_j$-I	Taxes	Repayment of Bond Principal	Cash Flow to Equity-$\tilde{Y}_j$
2500	120	2380	1190	1190	-0-
5000	120	4880	2440	2000	440
7500	120	7380	3690	2000	1690

The after-tax cash flows to equity and joint probabilities with $\tilde{R}_m$ are thus

		$\tilde{Y}_j$		
		0	440	1690
$\tilde{R}_m$	.95	.10	.00	.00
	1.00	.10	.10	.05
	1.10	.05	.30	.10
	1.25	.00	.10	.10

where

$E(\tilde{Y}_j) = 642.50$

$Cov(\tilde{Y}_j, \tilde{R}_m) = 25.525$

Hence,

$$P_j = [642.50 - 4.37(25.5250)]/1.05 = 505.67$$

$$\beta_j = 25.525/(505.67)(.00915) = 5.52$$

This example thus suggests that the risk of a stock of a levered firm will rise following a specialized tax increase. Consequently, an upward drift in the risk of oil firms would be expected following passage of the Tax Reform Act of 1969 since virtually all firms have some debt in their capital structure.

Although the primary effect of the tax reform would be to reduce cash flows and increase risk as demonstrated above, secondary effects of the tax legislation could also enter the picture. Because of the oligopolistic nature of the petroleum industry, oil firms could conceivably try to recoup the tax increase by shifting the tax to the consumer in the form of higher prices or to owners of oil lands in the form of reduced

bonuses and royalties.[16] If the demand for oil is inelastic, then higher prices would generate greater revenues thus tending to restore former after-tax profits and former risk levels.[17]

Additionally, higher taxes and reduced cash flows might also lead to changes in capital structure. Firms with low amounts of debt could find increased debt levels more attractive because of the deductibility of interest. On the other hand, firms with higher debt levels could conceivably find it advantageous to curtail debt issues because of higher interest costs reflecting increased riskiness due to reduced cash flows. Such changes would also have a bearing upon the risk of a stock because of the Miller-Modigliani hypothesis that the systematic risk of a firm should vary with its leverage.

The Efficient Market Hypothesis

One other aspect concerning the theoretical environment in which the study is conducted should be mentioned, and that is how quickly

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[16]The nature of income taxes has been the subject of much debate in accounting theory, especially in regards to whether they represent a distribution of income to government or an expense of doing business. Under the "enterprise" definition of net income, taxes and interest are assumed to be distributions of income. Under the concepts of "net income to investors" and "net income to shareholders," income taxes are treated as expenses. Current practice generally adopts the viewpoint that taxes are an expense of doing business. The AICPA, as well as official bodies in other countries, has recognized income taxes as expenses. Managements generally make decisions on the basis of an after-tax expected net income and income taxes seem to be passed on much as other expenses. In this regard, they are apparently viewed by management as one of the costs of doing business to be recovered through the sales price. See Eldon S. Hendricksen, Accounting Theory (Homewood: Richard D. Irwin, Inc., 1970) pp. 151-153.

[17]Gramm indicates that a reasonably conservative estimate for the demand elasticity of oil is 0.5%. See W. Philip Gramm, "The Energy Crisis in Perspective," Wall Street Journal (November 30, 1973). It should be noted that the price of crude oil was raised in November, 1970, to offset part of the tax increase. See Chapter IV. The effects of higher prices on risk is explored in Appendix B.

investors react to new information. According to the Efficient Market Hypothesis, the total market is quite sophisticated in its ability to arrive at equilibrium security prices and new information is rapidly impounded into security prices. Empirical evidence strongly suggests that large capital markets are indeed efficient in the semi-strong form of this hypothesis which asserts that all publicly available information is impounded in security prices.[18] Consequently, this hypothesis suggests that if risk changed, the change would occur about the time the Act was passed or when the provisions of the new law could be known with relative certainty. Accordingly, a time span encompassing January 1969-October 1970 was selected as the period in which reaction to the Tax Reform Act of 1969 would take place. This period incorporates the months of hearings, passage of the Act, and terminates just before the crude oil price hikes of November, 1970.[19]

Hypotheses to be Tested

Because the Tax Reform Act of 1969 affected the economic environment in which oil firms operated, a change in risk may have occurred.

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[18] Two other forms of the Efficient Market Hypothesis exist, namely, the weak form and the strong form. The weak form asserts that current prices fully reflect the information implied by the historical sequence of prices. The strong form asserts that prices reflect all information. The semi-strong form of the hypothesis is of concern in this study because of the public nature of the Tax Reform Act of 1969. For a detailed discussion of the Efficient Market Hypothesis and evidence supporting it, see Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance 25 (May 1970): 383-417, and Thomas R. Dyckman, David H. Downes, and Robert P. Magee, Efficient Capital Markets and Accounting: A Critical Analysis (Englewood Cliffs: Prentice-Hall, Inc., 1975).

[19] The Tax Reform Act of 1969 was signed into law on December 30, 1969, by Richard M. Nixon. Hearings had started in the spring of 1969. A few months prior to the start of the hearings were included in the time span to reflect possible anticipatory feelings regarding tax hikes.

Thus, the first question to be addressed in this study is whether investor-assessed risk of the oil industry increased significantly following the passage of the Reform Act, i.e.:

$$H_o: \beta_{prechange} = \beta_{postchange}$$
$$H_1: \beta_{prechange} < \beta_{postchange}$$

However, because firms operating in the industry are engaged in various types of activities, the tax legislation could affect them in a differential manner.[20] For instance, the depletion cut would have little effect on firms engaged in technical consulting services or contract drilling not involving oil payments. The minimum tax would tend to have less of an effect on diversified companies with large sources of nonpreference income since taxes paid on this income would offset the tax preferences. Changes in the foreign tax credit would affect firms operating overseas--typically the large integrated companies. Consequently, rather than employ one overall test, companies will be classified as technical service firms, producing firms, and integrated firms and the hypothesis given above will be tested for each separate class of firms. Additional information regarding this class formation and relevant time spans is given in Chapter IV.

A second question to be examined in this research is whether the crude oil price hikes occurring in November, 1970, affected investor-perceived risk of the industry. The model presented in this chapter and in Appendix B suggests that price hikes would tend to reduce the systematic

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[20] McDonald identifies four phases of operation in the oil and gas industry. These are, in order of decreasing risk, (1) predrilling activities, (2) exploratory drilling, (3) development drilling, and (4) production of oil and gas. A fifth area, refining and marketing could be added. See McDonald, Federal Tax Treatment of Income from Oil and Gas, pp. 32-49.

risk of firms. Consequently, the second hypothesis to be tested is

$$H_o: \beta_{\text{pre price hike}} = \beta_{\text{post price hike}}$$

$$H_1: \beta_{\text{pre price hike}} > \beta_{\text{post price hike}}$$

Summary

This chapter has examined the theoretical foundations and models to be used in this study. Because preferential taxation has been defended on the grounds that the oil industry is riskier than other industries and needs special tax provisions to attract capital, this study focuses upon risk as seen by the investor. Portfolio theory provides a meaningful definition of investor-perceived risk and the market model may be used to estimate that risk.

Arguments advanced by the oil industry tended to suggest that investor-perceived risk of that industry would increase following passage of the Reform Act, and the model developed in this chapter supported such a conclusion. Price hikes, however, occurring toward the end of 1970 would tend to offset any increase in risk.

The testing procedure, data, and research methodology used in this study are discussed in the next chapter.

CHAPTER IV

DATA, RESEARCH DESIGN, AND TESTING METHODOLOGY

This chapter explains the research approach to be used to examine the hypotheses presented in Chapter III, namely, whether there were shifts in investor-perceived risk of the oil industry following the Tax Reform Act of 1969 and the price hikes of 1970.

Data

Oil Firms

Oil firms selected for inclusion in this study generally came from lists found in Moody's Industrial Manual, International Petroleum Encyclopedia, and the Oil and Gas International Yearbook. All firms selected had U.S. operations and price data generally available from 1961 through 1973. At least thirty months of price data on both sides of 1969 were necessary in order for a firm to be included. The majority of firms were traded on either the American or New York Stock Exchanges with a few companies being traded on an over-the-counter basis or on regional exchanges. Appendix A contains a list of oil companies used in the study.

Control Firms

A control group of non oil firms was selected randomly from firms traded on the New York and American Stock Exchanges. Such companies represent a control group only to the extent that the 1969 tax changes affecting them also affected the oil companies in a similar manner. As

Table 4-1 reveals, most of the corporate tax changes made by the Tax Reform Act of 1969 were of a general nature and thus affected all corporations.[1] However, some changes were of a specific nature affecting only particular businesses, namely real estate, natural resources (including oil), farming, financial institutions, and life insurance companies. With random selection, though, these specialized changes would be diluted and should not affect control groups significantly.

The Relative Impact of the Tax Reform Act of 1969 on Oil and Control Companies.

Because the control companies represent a control group only to the extent that the tax changes affecting them also affected oil companies in a similar manner, it is appropriate to examine the relative impact of the tax reform on both groups of companies. Thus, this section briefly discusses some of the major changes made by the Tax Reform Act of 1969 and its effects on oil companies and control companies.

The first change to be examined is the reduction of the percentage depletion rate. At first glance, the change from 27½ percent to 22 percent does not seem large, especially when the 50 percent net income limitation is considered. For instance, Brannon cites figures that show that the effective depletion rate in 1960 amounted to only 24½ percent because of this limitation.[2] A drop from 24½ percent to 22 percent would probably

[1]Despite the fact that these changes affected all corporations, there is, of course, no guarantee that they had an equal impact upon all firms. Certain changes, although general in nature, would affect some firms more than others. For example, the elimination of the investment credit would tend to affect capital intensive firms more than others. Some of these general changes are examined in greater detail in this chapter.

[2]Gerard M. Brannon, "Existing Tax Differentials and Subsidies Relating to the Energy Industries," Studies in Energy Tax Policy ed. Gerard M. Brannon (Cambridge Mass.: Ballinger Publishing Co., 1975), p. 23.

Table 4-1

Major Changes Made by the Tax Reform Act of 1969
On Corporations and Their Shareholders

General Changes

Section	Action*	Description
1201	A	Capital Gains Tax--raised from 25% to 28.7% (1970) to 30% (1971)
1212	A	Corporations granted 3-year carryback for net capital loss (5-year carryover retained)
1231	A	Casualty losses generally given more favorable treatment
1561 48 179 1564 1562	A A A N R	Multiple Corporations--Act gradually phases out multiple exemptions, permits new election of dividends-received deduction, gradually limits related corporations to one $100,000 exemption from the accumulated earnings tax
279	N	Corporate Acquisitions for Debt--conglomerate mergers lose some interest deduction if new tests met
453	A	Installment Reporting--marketable bonds don't qualify for installment method
1232 6049	A A	Original Issue Discount of Bonds--reporting of income speeded up
249	A	Premium on Repurchase of Convertible Bonds--Corps. lose extra deduction when they buy their own bonds, portion attributable to conversion feature not deductible
385	N	IRS to set guidelines on whether securities are debt or equity
305	A	Stock Dividends--Treasury Regulations on stock dividends become part of the law; disproportionate distribution is taxable
312(m)	N	Depreciation and Earnings and Profits--fast depreciation can no longer produce "tax-free" dividends
311	A	Gain to Corporation on Distribution of Property in Stock Redemption--corps. face tax on appreciated property used to redeem stock
537	A	Act provides 2 cases where earnings accumulation shall not be deemed unreasonable

Table 4-1
(con't.)

Major Changes Made by the Tax Reform Act of 1969
On Corporations and Their Shareholders

Section	Action*	Description
851	A	Mutual Fund Periodic Payment Plans--Tax on early withdrawal eliminated
954	A	Controlled Foreign Corps.-Subpart F--Act substitutes for the "effect" test governing items in foreign base company income a test of "purpose to effect."
333	A	One-Month Liquidations--rules eased in special cases
49 46, 47	N A	Investment Credit Repealed
184, 185 263(e)	N A	Amortization of Pollution Control Facilities--new 5-year write-off for pollution control equipment
		Changes Affecting Particular Businesses
Real Estate		
167, 1250	A	Real Estate Investment Advantages Cut
1039	N	Rollover for Low-Income Housing--tax-free replacement made available
Natural Resources		
613(b)(1)	A	Changes in Depletion Rates
636	N	Treatment of Production Payments Altered
615	A	Mine Exploration Expenses--limited deduction election repealed; unlimited deduction with recapture
901	A	Changes in Foreign Tax Credit
Farming		
1251	N	Farm loss deductions face new limits
1031, 1231 1245	A A	Livestock--Livestock owners lose some tax benefits
183 270	N R	Hobby Losses--Congress defines "engaged in for profit"
1252	N	Recapture of Gain on Sale of Farm Land--special farm allowances made subject to recapture
451	A	Crop Insurance Proceeds--can avoid income bunching
278	N	Citrus Groves--Capitalization of development expense; original cost of starting grove loses current deductibility

Table 4-1
(con't.)

Major Changes Made by the Tax Reform Act of 1969
On Corporations and Their Shareholders

Section	Action*	Description
Financial Institutions		
585	N	Bad Debt Reserves of Commercial Banks--less generous reserve deduction
586	N	Small Business Investment Companies--bad debt reserve addition may be based on industry average for 1st 10 years for new companies
593	A	Bad Debt Reserves of Savings Institutions--less
596	N	generous reserve deduction
582	A	Gains & Losses on Bonds--bond gains become ordinary income
172	A	Net Operating Losses of Banks--10 year carryback to be allowed after 1975
Life Insurance Companies		
805, 810	A	Interest on Special Contingency Reserves under Group
810	A	Life, Health or Accident Insurance Deductible
815	A	Spin-Offs--Phase III Tax on life companies may be avoided in certain spin-offs
844	A	Loss Carryovers--may be retained if company changes status
Public Utilities		
167(b)	N	Depreciation Deductions Restricted--Act freezes current depreciation methods of utilities
Railroads		
184, 185	N	New write offs for rolling stock and right of way
263(e)	A	investments
Coal Mines		
187	N	5-year amortization for coal mine safety equipment

*Key
A = Section Amended
N = New Section Added
R = Section Repealed

Note: These changes are described in detail in the Tax Reform Act of 1969 (Englewood Cliffs: Prentice-Hall, Inc., 1970).

have little impact upon investor-assessed risk. Thus, the cash flow consequences of the tax legislation may have been so immaterial as to have had a negligible effect upon investors' valuation of the critical determinants of firm risk. However, there is evidence to suggest that the effective drop in percentage depletion rates was not just from 24½ percent to 22 percent. Brannon points out that rising oil prices would raise percentage depletion without changing cost and thus assure more net income and less of a net income limitation. Thus, the 1960 figures of 24½ percent may not hold for this study. Also, Brannon's figures suggest that the effective depletion rate following the Tax Reform Act of 1969 was approximately 18.2 percent, less than the 22 percent statutory rate because of the net income limitation and the effects of the minimum tax.[3] Moreover, as carve-outs became more popular, the 50 percent net income limitation could frequently be avoided by shifting income from one period to another. The Treasury Department estimated that the 1969 tax reform in this particular area alone would increase revenues by $200 million a year with half of this amount coming from oil and gas interests.[4]

Further insight into the impact of the Tax Reform Act of 1969 on oil and gas taxes is found in a study conducted by Price Waterhouse and Company. This study applied the new tax rules to 1968 figures of 38 oil companies (including essentially all majors) and concluded that the effective depletion rate fell from 26.16 percent to 18.51 percent. The study also found that oil taxes increased $658 million with depletion and production payment changes accounting for $341.6 million of the increase,

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[3]Ibid, pp. 7-8

[4]Ibid, p. 25.

the minimum tax for $153.3 million, and the investment credit repeal for $160.0 million.[5]

In regard to the other general and specialized changes made by the 1969 tax reform, it appears unlikely that control firms were affected more than oil companies. Evidence of this fact is given in Tables 4-2 and 4-3 which list the major changes made by the Act on corporations, individuals, and oil firms. Table 4-2 shows that of the tax reforms approved by conference, the change in percentage depletion was expected to be the third largest item increasing tax liabilities (1970, 1972). The new rules for production payments also added a substantial amount to oil company tax bills. The other reforms increasing corporate tax bills tended to be of a general nature and thus affected most corporations. For example, the change having the greatest impact upon taxes was the repeal of the investment credit. The brunt of this change would be felt by corporations having substantial amounts of Section 38 property, generally the capital intensive industries. However, it is unlikely that this change affected control companies more than oil firms because McDonald found the petroleum industry to be about three times as capital intensive as other manufacturing.[6] The Act also raised the capital gains tax for corporations. But, as pointed out in Chapter II, this tax probably has greater actual and potential importance to the oil industry than to most others because of the tax provisions governing intangible drilling and development costs. To illustrate, sales of depreciable assets generally result in "recapture"

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[5]"Tax Act Costs Oil $658 Million per Year," Oil and Gas Journal 68 (December 21, 1970): 18.

[6]Stephen L. McDonald, "Percentage Depletion, Expensing of Intangibles, and Petroleum Conservation," Extractive Resources and Taxation ed. Mason Gaffney (Madison: University of Wisconsin Press, 1967), pp. 269-288.

TABLE 4-2

Tax Reform Revenue Effects

IN $ MILLIONS, BY CALENDAR YEARS
Reforms Increasing Tax Liability

Provisions	As passed by House			As passed by Senate			As approved by Conference		
	1970	1972	1979	1970	1972	1979	1970	1972	1979
Corporate capital gains	175	175	175	140	175	175	105	175	175
Foundations	65	75	100	20	25	30	25	40	55
Unrelated business income	5	5	20	5	5	20	5	5	20
Cantributions	5	20	20	5	20	20	5	20	20
Farm losses *	*	10	25	25	25	25	*	10	25
Corporate mergers, etc.	10	25	70	*	*	*	5	15	40
Multiple corporations	45	105	235	30	120	235	25	100	235
Accumulation trusts	50	70	70	5	35	120	10	35	115
Deferred compensation:									
Restricted stock	*	*	*	*	*	*	*	*	*
Other deferred compensation	*	5	25	—	—	—	—	—	—
Stock dividends	*	*	*	*	*	*	*	*	*
Subchapter S	*	*	*	*	*	*	*	*	*
Tax-free dividends	—	—	80	—	—	80	—	—	80
Financial institutions:									
Commercial banks:									
Reserves	250	250	250	225	125	100	225	125	250
Capital gains	50	50	50	*	5	50	5	15	50
Mutual thrift reserves:									
Savings and loan associations	10	35	125	10	30	40	20	45	85
Mutual savings banks	*	10	35	20	30	35	25	30	35
Tax-exempt interest	*	*	*	—	—	—	—	—	—
Individual capital gains:									
Capital loss provisions	50	55	65	50	55	65	50	55	65
6-months-1 year holding period	100	150	150	—	—	—	—	—	—
Pension plans	*	10	70	—	—	—	*	10	60
Casualty loss	*	*	*	*	*	*	*	*	*
Sale of gaaders	*	*	*	*	*	*	*	*	*
Life estates	10	10	10	10	10	10	10	10	10
Franchises	*	*	*	*	*	*	*	*	*
Alternative rate provision	260	260	260	150	250	250	165	275	275
Natural resources:									
Production payment	100	125	200	100	125	200	100	125	200
Percentage depletion	400	400	400	150	150	150	235	235	235
Foreign depletion	35	*	*	—	—	—	—	—	—
Foreign income:			*						
Loss carryover	35	35	35	—	—	—	—	—	—
Restriction on mineral credits	30	30	30	—	—	—	—	—	—
Reduced exclusion	—	—	—	25	25	25	—	—	—
Individual interest deduction	20	20	20	—	—	—	—	20	20
Regulated utilities	60	185	310	60	185	310	60	185	310
Cooperatives	*	*	*	—	—	—	—	—	—
Limit on tax preferences	40	80	85	—	—	—	—	—	—
Allocation	205	425	470	—	—	—	—	—	—
Tax on preference income	—	—	—	630	845	880	590	800	825
Real estate:									
Used property	15	65	250	15	55	210	15	55	220
New construction	*	170	960	*	170	960	*	170	960
Capital gain, recapture	5	25	125	*	10	50	*	15	80
Depreciation of citrus grove expenses	—	—	—	5	10	10	5	10	10
Total Revenue Gain	2,120	2,960	4,820	1,840	2,285	3,860	1,595	2,380	4,265

Reforms Reducing Tax Liability

	As passed by House			As passed by Senate			As approved by Conference		
Moving expenses	—100	—100	—100	—110	—110	—110	—110	—110	—110
Farmland amortization	*	— 15	— 85	—125	—160	—105	—105	—140	— 85
Amortization of pollution facilities	— 40	—220	—400	— 15	— 70	—120	— 15	— 70	—120
Income averaging	—200	—200	—200	—110	—110	—110	—300	—200	—200
Housing rehabilitation	— 15	—100	—220	— 15	—100	—130	— 15	—100	—220
Medical expenses for aged	—	—	—	—225	—225	—225	—	—	—
Transportation deduction for disabled	—	—	—	— 90	— 90	— 90	—	—	—
Exemption for foster children	—	—	—	*	*	*	—	—	—
Revision of children's support test	—	—	—	— 75	— 75	— 75	—	—	—
Credit for education expense	—	—	—	—	—1,800	—1,800	—	—	—
Total Revenue Loss	—455	—745	—1,215	—765	—2,740	—2,965	—345	—720	—945

Net Tax Reform

Net Tax Reform	1,665	2,215	3,605	915	—455	895	1,150	1,660	3,320
Investment Credit Repeal	2,500	3,000	3,300	1,110	2,200	2,510	2,500	2,990	3,300
Total Reform Revenue	4,165	5,215	6,905	2,025	1,745	3,405	3,650	4,650	6,620

* Less than $25 million

SOURCE: Joint Committee on Internal Revenue Taxation

TABLE 4-3

ALTERNATIVE EFFECTIVE TAX RATES ON OIL AND GAS CORPORATIONS COMPARED TO ALL U.S. CORPORATIONS 1968 (CORPORATIONS WITH NET INCOME ONLY)

Account	All Corporations Actual 1968 ($bil.)	Corporations in Crude Petroleum & Natural Gas Actual 1968 ($mil.)	Adjusted to Present Law ($mil.)
Income subject to tax	81.4	4,651	5,222
plus excess depletion	4.9	2,990	2,421
plus excess of depreciation of intangibles over tax deduction	.6	420	420
less foreign tax in excess of foreign tax credit	.6	(500)	(317)
Equals economic income	86.3	7,561	7,747
Income Tax before credits	39.7	2,400	2,673
less investment credit	2.4	196	196
less foreign tax credit	3.7	1,609	1,792
Equals tax after credits	33.6	576	881
Tax after investment credit but before foreign tax credit, as percent of economic income	43%	29%	32%
Tax after all credits as a percent of economic income	39%	8%	11%

Sources: Statistics of Income, Corporations, 1968, U.S. Treasury Dept., Internal Revenue Service; The Tax Burden on the Oil and Gas Industry, Houston Petroleum Industry Research, Inc., 1972; The Petroleum Industry's Tax Burden, Taxation with Representation, Arlington, Va., 1973; as cited by Gerard M. Brannon, Energy Taxes and Subsidies (Cambridge, Mass.: Ballinger Publishing Co., 1974), p. 38.

of excess depreciation. With regard to equipment investments, tax law dictates that on sale, any gain to the extent of prior depreciation taken is to be treated as ordinary income. With regard to investment in buildings, the law requires that part of the gain on sale be taxed at ordinary income rates under a complex formula. But there is no corresponding penalty with regard to the sale of oil property for intangible drilling costs and percentage depletion deductions.[7] Another large increase in taxes arose from the new minimum tax on preference items. Most tax preferences were common to all corporations, for example, capital gains and the excess of accelerated depreciation over straight line depreciation. However, one of the preferences directly affected the oil industry, namely, the excess of percentage depletion over the basis of the property.

In conclusion, the evidence suggests that the Tax Reform Act of 1969 did have a greater impact upon oil firms than it did upon control companies. Consequently, the non-oil firms appear to serve as a reasonable control group since the general tax changes apparently affected oil firms at least as much as control firms and the non-oil specialized changes tended to be much smaller in magnitude than those changes made in oil and gas properties. Moreover, these non-oil specialized changes would be diluted by the random selection of control firms.

Research Design

The main question to be addressed in this study was whether the Tax Reform Act of 1969 altered investor-assessed risk (β) in the oil industry. To test this hypothesis, portfolios of companies were used rather than

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[7] Gerard M. Brannon, "Existing Tax Differentials and Subsidies Relating to the Energy Industries," p. 23.

individual firms because of the difficulties encountered in trying to estimate beta (systematic-risk). It has been shown that if the errors for equation 3-3 in beta estimates for individual firms are not perfectly positively correlated, then the calculated betas of portfolios will be more precise estimates of "actual" betas than computed betas for individual securities.[8]

Price-relative data was obtained from the CRSP tape (Center for Research in Security Prices) where possible. For those firms not traded on the New York Stock Exchange, price-relatives were calculated from data obtained in the Wall Street Journal, the ISL Daily Stock Price Index, and Bank and Quotation Record. Price-relatives were defined as

$$PR_{jt} = \frac{P_t + D_t}{P_{t-1}}$$

where

PR_{jt} = price-relative for firm j at time t
P_t = price at time t
D = dividends paid during t

Adjustments were made to account for stock splits and stock dividends.

Oil Companies

Portfolios of oil companies were formed by first classifying firms as (1) technical service firms, (2) producing firms, or (3) integrated firms. Classification was made from information gathered from Moody's Industrial Manual, 10-K's, and responses to questionnaires. Technical service firms were defined as those engaged in exploration services, seismic, geophysical and other consulting services, and contract drilling

[8] See Fama and MacBeth, "Risk, Return, and Equilibrium: Empirical Tests," pp. 614-615.

operations. Producing firms were defined as those engaged in the development and production phases of operations but having no significant refining and marketing operations. Integrated firms were defined as those engaged in all phases of petroleum operations including refining and marketing activities. These divisions were made since the Tax Reform Act of 1969 could conceivably affect these firms in different degrees because of their various areas of operations. (See Chapter III).

A questionnaire was sent to all oil firms in an attempt to check for systematic changes in accounting techniques affecting taxable income. Responses indicated that many firms switched to the LIFO inventory method in 1974. For this reason (and because of the energy crisis) 1974 was deleted from the study. Firms switching to LIFO in earlier years had data suppressed for the year of change and subsequent years. If these suppressions resulted in less than thirty months of post period data for a firm, that company was deleted from the study. No other accounting changes appeared to systematically affect taxable income.

Three initial portfolios of oil companies were formed based upon classification of firm, i.e., technical service firms, producing firms, and integrated firms. Using data from 1961-1964 and the market model, the systematic risk (β) of each company was estimated. The market index used was based upon equally weighted returns of New York Stock Exchange firms with reinvestment of dividends. Firms within each initial portfolio were then rank ordered based upon estimated betas. The producing portfolio and integrated portfolio were subsequently subdivided into high and low beta firms thus giving a total of five portfolios:

Class	Estimated β 1961-1964	β - Rank	Portfolio No.	No. of Firms
Tech. Service	1.610	-	1	17
Producers	1.486	High	2	17
	.577	Low	3	17
Integrated	1.142	High	4	16
	.511	Low	5	15

There was an insufficient number of technical service firms to subdivide this group into a high and low beta subgroup. The average beta for each portfolio was then calculated using a simple average of firm betas. The ranking procedure was used to gain additional information beyond class of firms, i.e., whether tax consequences might differ between high risk firms vis-a-vis low risk firms.

The years 1961-1964 were used to estimate betas for the ranking procedures rather than the prechange test years (1965-1968) in order to avoid a regression phenomenon that occurs when data are chosen on extreme values relative to the mean. Forming portfolios on the basis of ranked betas causes a bunching of positive and negative sampling errors within portfolios. The result is that a high $\hat{\beta}$ portfolio would tend to overstate the true beta while a low $\hat{\beta}$ portfolio would tend to understate the true beta. The regression phenomenon can be avoided to a large extent by forming portfolios from ranked $\hat{\beta}_i$ computed from data for one time period but then using a subsequent period for actual estimation of portfolio betas.[9]

[9] Ibid.

Control Companies

Portfolios of control firms were created to match the portfolios of oil companies based upon number of firms and average portfolio betas. Thus, from a random selection of 113 firms, individual firm betas were calculated using data from 1961-1964 and the market model. These firms were then arbitrarily assigned to portfolios in such a way that the average beta of control portfolio 1 equalled the average beta of oil portfolio 1, the average beta of control portfolio 2 equalled the average beta of oil portfolio 2, etc. In order to achieve this matching, two control firms appeared in more than one portfolio.

Testing Methodology

Statistical testing for shifts in betas for each of the portfolios was done by using the market model and covariance analysis.[10] In essence, the test is conducted by examing whether the residual sum of squares is significantly less using separate regressions for each time period than the residual sum of squares associated with a common regression covering the two periods. In the latter case, beta is constrained to be equal for the two periods but the intercepts are allowed to vary. Thus, the parameters of interest are estimated in the prechange and postchange periods by the following regression models:

Test 1

Subperiod 1 (Sept. 1965-Dec. 1968, n = 40 observations)

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[10] Covariance Analysis is described in detail in J. Johnston, Econometric Methods 2d ed. (New York: McGraw-Hill Book Company, 1972), pp. 192-207. See also Jacob Cohen, "Multiple Regression as a General Data-Analytic System," Psychological Bulletin (December 1968): 426-443, and Damodar Gujarati, "Use of Dummy Variables in Testing for Equality Between Sets of Coefficients in Linear Regressions: A Generalization," The American Statistician 24 (December 1970): 18-22.

$$R_{p1} = \hat{\alpha}_{p1} + \hat{\beta}_{p1} R_{m1} + e_{p1} \qquad (4\text{-}1)$$

Subperiod 2 (Jan. 1969-Oct. 1970, n = 22 observations)

$$R_{p2} = \hat{\alpha}_{p2} + \hat{\beta}_{p2} R_{m2} + e_{p2} \qquad (4\text{-}2)$$

Test 2

Subperiod 1 (Jan. 1969-Oct. 1970, n = 22 observations)

$$R_{p1} = \hat{\alpha}_{p1} + \hat{\beta}_{p1} R_{m1} + e_{p1} \qquad (4\text{-}3)$$

Subperiod 2 (Nov. 1970-Sept. 1973, n = 35 observations)

$$R_{p2} = \hat{\alpha}_{p2} + \hat{\beta}_{p2} R_{m2} + e_{p2} \qquad (4\text{-}4)$$

where

R_p = return on portfolio p
R_m = return on the market
$\hat{\alpha}_p$ = estimated intercept
$\hat{\beta}_p$ = estimated systematic risk

A common regression for each test is then fitted to the two subperiods where beta is constrained to be equal by the following model:

$$R_p = \hat{\alpha}_p + d\hat{\alpha}'_p + \hat{\beta}_p R_m + e_p \qquad (4\text{-}5)$$

where d = dummy variable = 0 for subperiod 1 and 1 for subperiod 2. More specifically, for test 1 a common regression using equation 4-5 would be made using the months from Sept. 1965 through Oct. 1970. For test two, the common regression would employ the months from Jan. 1969 through Sept. 1973. Under the null hypothesis H_o: $\hat{\beta}_{p2} = \hat{\beta}_{p1}$, $\hat{\alpha}_{p1}$ and $\hat{\alpha}_{p2}$ unrestricted, the statistic for each test

$$F_p = \frac{\left[e'_p e_p - (e'_{p1} e_{p1} + e'_{p2} e_{p2})\right]}{(e'_{p1} e_{p1} + e'_{p2} e_{p2}) \,/\, (n_1 + n_2 - 4)}$$

has a central F distribution with 1 and n-4 degrees of freedom where $n = n_1 + n_2$. Thus, the test shows whether a significant increase in the

explained sum of squares is achieved by allowing the intercept and slope to vary between the time periods. In this regard, the use of portfolios enhances the power of the test (the ability to detect a shift in β if one exists) because the error sums of squares is smaller at the portfolio level than at the individual security level.[11] A general model expressing the relationships above is given by

$$R_{pt} = \hat{\alpha}_p + \hat{\alpha}'_p D_t + \hat{\beta}_p R_{mt} + \hat{\beta}'_p R_{mt} D_t + e_{pt}$$

where

R_{pt} = return on portfolio p in period t
R_{mt} = return on a market index in t
$\hat{\alpha}_p$ = estimated prechange intercept
$\hat{\beta}_p$ = estimated prechange systematic risk
$\hat{\alpha}'_p$ = estimated postchange shift in intercept
$\hat{\beta}'_p$ = estimated postchange shift in systematic risk
D_t = dummy variable = 0 for subperiod 1
= 1 for subperiod 2

The next chapter gives the results of the testing procedures described in this chapter.

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[11] See Daniel W. Collins and Richard R. Simonds, "SEC Line of Business Disclosure and Market Risk Adjustments," Department of Accounting and Financial Administration, Graduate School of Business, Michigan State University, January 1977.

CHAPTER V

RESULTS OF THE STUDY

The conclusions and limitations of this study as well as suggestions for future research are given in this chapter.

Results

Initial Tests

The first hypothesis to be tested in this study was whether there was a significant increase in beta following the Tax Reform Act of 1969. Initial test runs on portfolios were based on data from September 1965 through October 1970. As mentioned in Chapter IV, portfolios of companies were used because the unsystematic risk (disturbance variance) is substantially reduced when individual securities are combined into groups. This reduction of variance, in turn, increases the ability of the ANCOVA procedure to detect a shift in the level of beta.

The results of the regressions for each of the five oil and control portfolios are given in Table 5-1. As the data indicate, the estimated change in beta was positive for all five oil portfolios with three out of five being statistically significant ($\alpha = .10$). The evidence thus indicates that the risk of oil firms did indeed increase because of the Tax Reform Act of 1969. Producers showed the largest absolute changes in risk followed by integrated firms and lastly the technical service firms. This result seems reasonable since intuitively it would seem that depletion

TABLE 5-1

ESTIMATES OF PORTFOLIO RISK

Oil Firms

Portfolio No.	Class	Estimated Risk At 12/68[1] (A)	Estimated Risk At 10/70[2] (B)	Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
1	Tech. Service	1.115	1.254	+.139	.198	.658	.313
2	Producers-High β	1.135	1.606	+.471	3.185	.080	.264
3	Producers-Low β	.973	1.461	+.488	3.541	.065	.259
4	Integrated-High β	.773	.928	+.155	1.143	.289	.145
5	Integrated-Low β	.534	.926	+.392	5.618	.021	.165

Control Firms

Portfolio No.	Estimated Risk At 12/68[1] (A)	Estimated Risk At 10/70[2] (B)	Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
1	1.372	.999	-.373	8.934	.004	.125
2	1.252	1.083	-.169	2.286	.136	.112
3	.709	.710	+.001	.000	.994	.135
4	1.345	1.136	-.209	1.366	.247	.179
5	.611	.762	+.151	1.626	.207	.118

[1] Based on 40 observations

[2] Based on 22 observations

deductions as a percent of overall operations would be higher for producers than for integrated firms which are more diversified. The small change in risk for technical service firms also seems reasonable since these firms would have minimal depletion deductions compared to producers and integrated firms.

The regressions for control portfolios show both increases and decreases for the estimated changes in beta thus revealing no apparent trend in the direction of beta shifts for these companies. Only one portfolio had a statistically significant change--control portfolio 1. However, this change apparently did not stem from the tax reform since the downward shift in beta is opposite from that which would be expected from the model presented in Chapter III.

The second hypothesis to be tested in this study was whether the crude oil price hikes of November 1970 tended to restore former risk levels, i.e., to determine whether systematic risk fell with the advent of these new revenues. This test was conducted using data from January 1969 through September 1973 and the results are presented in Table 5-2.[1] Once again, the results are consistent with that predicted by the model given in Chapter III and Appendix B in that a downward shift in beta was seen for all five oil portfolios. Two of the changes were statistically significant (Portfolios 2 and 4, $\alpha = .10$) with oil portfolio 3 also approaching significance. The results seem to correspond with a statement made by the Petroleum Industry Research Foundation that the price boosts would benefit producers more than integrated firms since once

[1]The last quarter of 1973 was deleted because of the disrupting events of the oil embargo.

TABLE 5-2

ESTIMATES OF PORTFOLIO RISK

Oil Firms

Portfolio No.	Class	Estimated Risk At 10/70[1] (A)	Estimated Risk At 9/73[2] (B)	Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
1	Tech. Service	1.254	.987	-.267	.675	.415	.325
2	Producers-High β	1.606	1.119	-.487	3.077	.085	.278
3	Producers-Low β	1.460	1.083	-.377	2.550	.116	.236
4	Integrated-High β	.928	.589	-.339	4.406	.041	.162
5	Integrated-Low β	.926	.806	-.120	.349	.557	.203

Control Firms

Portfolio No.	Estimated Risk At 10/70[1] (A)	Estimated Risk At 9/73[2] (B)	Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
1	.999	1.147	+.148	2.329	.133	.097
2	1.083	1.088	+.005	.003	.958	.093
3	.710	.623	-.087	.482	.490	.125
4	1.136	1.079	-.057	.158	.692	.143
5	.762	.563	-.199	2.725	.105	.121

[1]Based on 22 observations

[2]Based on 35 observations

again the largest absolute changes in risk occurred among the producing firms.[2]

The results for control firms are again mixed with some portfolios showing increases in risk and others showing decreases. None of the changes were statistically significant ($\alpha = .10$) although portfolio 5 is on the borderline of significance.

To gain a better understanding of the changes occurring during the time span of this study, a moving average beta was calculated for each portfolio using 40 months of data for each estimate. These estimates are presented graphically in Figures 5-1 through 5-10. Month 40 on the horizontal axis corresponds to April 1968 while month 108 represents December 1973. These graphs show the distinct upward and downward movement for most oil portfolios and the lack of similar changes in control portfolios.

Subsequent Tests

This section represents an extension and refinement of the work done under the initial testing procedures. Its purpose is to examine some potential confounding events that could conceivably affect the systematic risk of oil stocks.

Expropriations. One possible confounding event that immediately comes to mind is that of expropriations. Expropriations occurred both during the pre- and post tax change periods; however, a check of the Funk and Scott Index International revealed that expropriations occurred more frequently in the postchange period. If these nationalizations

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[2]"Tax Costs Seen Triggering Price Hikes," Oil and Gas Journal 68 (December 28, 1970): 74.

FIGURE 5-1

OIL PORTFOLIO 1
TECHNICAL SERVICE FIRMS

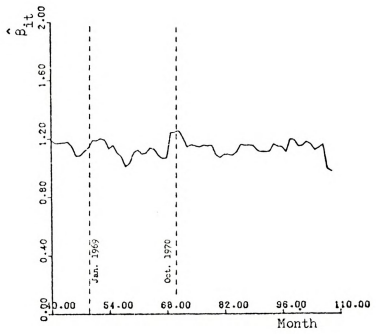


FIGURE 5-2

OIL PORTFOLIO 2
PRODUCERS-HIGH BETA

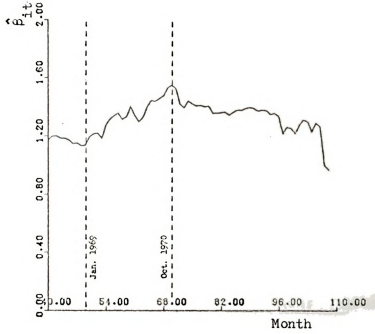


FIGURE 5-3

OIL PORTFOLIO 3
PRODUCERS-LOW BETA

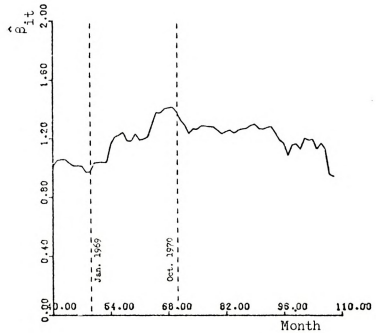


FIGURE 5-4

OIL PORTFOLIO 4
INTEGRATED-HIGH BETA

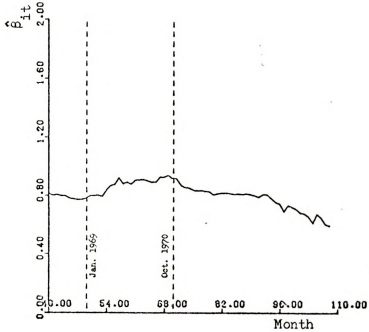


FIGURE 5-5

OIL PORTFOLIO 5
INTEGRATED-LOW BETA

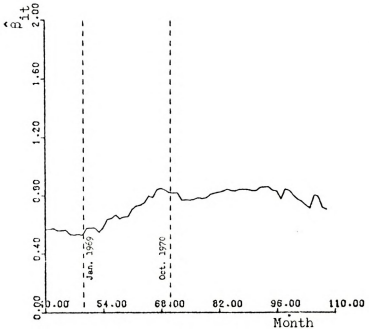


FIGURE 5-6

CONTROL PORTFOLIO 1

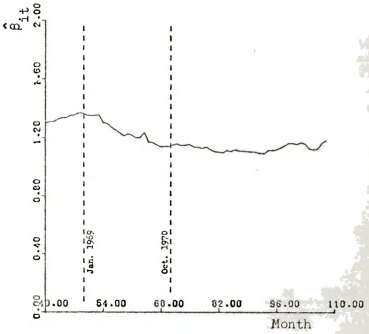


FIGURE 5-7

CONTROL PORTFOLIO 2

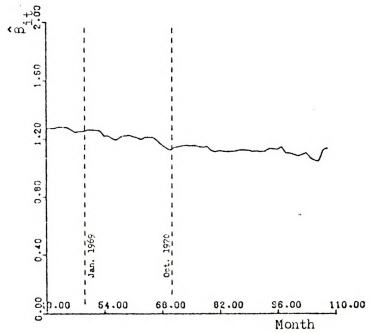


FIGURE 5-8

CONTROL PORTFOLIO 3

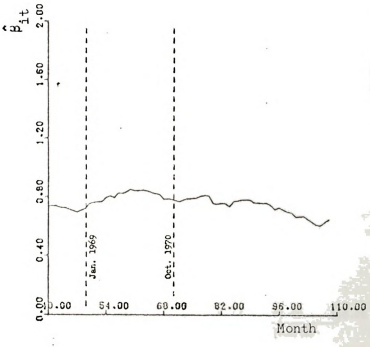


FIGURE 5-9

CONTROL PORTFOLIO 4

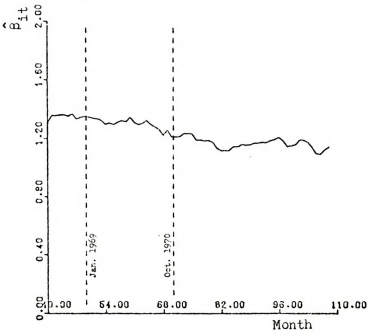
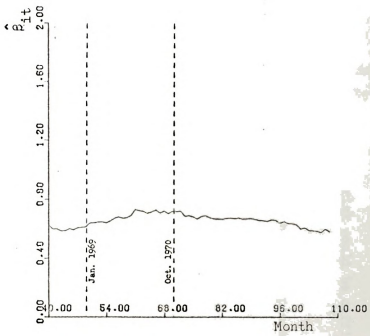


FIGURE 5-10

CONTROL PORTFOLIO 5



affected systematic risk, then the tax effects on risk would be difficult to isolate.

To examine this problem, producing and integrated oil companies were reclassified into (1) domestic, (2) limited foreign and (3) international portfolios using data found in the Oil and Gas International Yearbook and Moody's Industrial Manuals. The domestic classification, of course, allows examination of the impact of the Tax Reform Act of 1969 on a group of firms not subject to expropriations.[3]

Tables 5-3 and 5-4 contain the results of regressions run on these three portfolios. Table 5-3, showing reaction to the Tax Reform Act, indicates that all three groups experienced an increase in risk during the time span January 1969-October 1970. The estimated change for the limited foreign group was statistically significant; however, the absolute estimated change for domestic firms was almost as large as limited foreign firms. The larger standard error of the Δ Beta estimate probably accounts for the non significance of the change in the domestic group. Both of these groups included a large number of producing firms. The estimated change for the international group (which included a number of integrated firms) tended to be smaller than that of the other two portfolios. This smaller change could possibly stem from expropriations; however, as

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[3]Some concern may arise because the Tax Reform Act of 1969 may not have affected domestic companies the same as firms with foreign operations. However, the changes having a differential impact such as the foreign tax credit tended to be minor in nature. See Jenkins, "United States Taxation and the Incentive to Develop Foreign Primary Energy Sources," pp. 231-232. It should also be noted that petroleum profits are largely concentrated in the production stage of operations where the major part of the tax reform fell--there is a very low rate of profit in refining operations. See Dunn and Gravelle, An Analysis of the Federal Tax Treatment of Oil and Gas and Some Policy Alternatives, pp. 35-36.

TABLE 5-3

ESTIMATES OF PORTFOLIO RISK

Oil Firms

Portfolio No.	Class	Estimated Risk At 12/68[1] (A)	Estimated Risk At 10/70[2] (B)	Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
6	Domestic	1.117	1.486	+.369	1.936	.169	.265
7	Limited Foreign	.881	1.258	+.377	4.677	.035	.174
8	International	.576	.775	+.199	1.473	.230	.164

[1]Based on 40 observations

[2]Based on 22 observations

TABLE 5-4

ESTIMATES OF PORTFOLIO RISK

Oil Firms

Portfolio No.	Class	Estimated Risk At 10/70[1] (A)	9/73[2] (B)	Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
6	Domestic	1.485	1.262	-.223	.765	.386	.255
7	Limited Foreign	1.259	.919	-.340	2.435	.125	.218
8	International	.775	.551	-.224	1.360	.249	.192

[1]Based on 22 observations

[2]Based on 35 observations

mentioned in the previous section of this paper, percentage depletion deductions for this group would be smaller relative to total operations because of the diversification of the integrated firms. Consequently, no definite conclusions can be drawn.

Table 5-4 shows that all three portfolios experienced a decline in risk following the crude oil price hikes of November, 1970--the same result observed in the original five oil portfolios. The graphs of moving average betas for these portfolios are shown in Figures 5-11 through 5-13.

Financial Structure. Another possible event that could have influenced the risk of stocks during this time span is that of changes in financial structure. A relationship between a firm's financial risk, as measured by its capital structure (leverage) and common stock systematic risk (β-value) is implied by the Modigliani and Miller hypothesis that the systematic risk of levered firms in a given risk class should vary with their leverage. Hamada has provided evidence that this hypothesis holds.[4] Thus, changes in financial structure (possibly brought about by tax changes) would interact with the direct effects of the tax reform on systematic risk.

In general, the oil industry has relied upon internal financing to meet most of its operating needs. For instance, the Department of the Interior provided data to a Senate Interior Committee in March 1973 showing that cash earnings provided 71 percent of the required working capital. Also, Dun & Bradstreet's key business ratios reveal low amounts

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[4] R. S. Hamada, "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks," The Journal of Finance 27 (May 1972): 435-452.

FIGURE 5-11

OIL PORTFOLIO 6
DOMESTIC

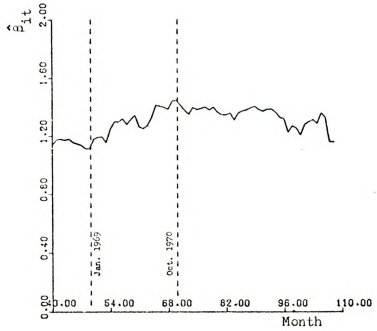


FIGURE 5-12

OIL PORTFOLIO 7
LIMITED FOREIGN

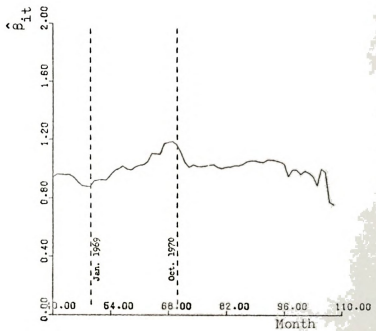
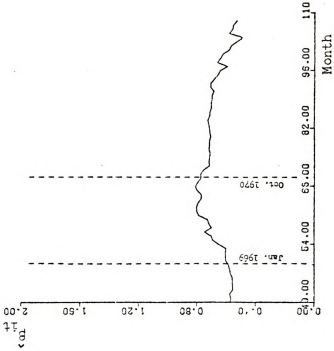


FIGURE 5-13

OIL PORTFOLIO 8
INTERNATIONAL



of debt for oil companies relative to other industries.[5] Consequently, it is possible that the tax reform of 1969 could have altered the industry's financial structure. For example, firms with low amounts of debt could find debt more attractive in the face of higher taxes because of the deductibility of interest. On the other hand, firms with high debt levels could conceivably reduce their indebtedness because new debt issues would presumably cost more since reduced cash flows would increase the probability of default on the debt.

To examine changes in debt, ratios comparing the average long-term debt to the average common shareholders' equity were calculated for the original oil and control portfolios using firms that were listed on the Compustat Tapes for the years 1965-1968 and 1970-1973. Table 5-5 shows the average ratios for the pre- and postchange periods as well as the absolute and percentage changes occurring during this time. In general, there were large percentage increases for oil portfolios 1, 3, and 5 and control portfolios 3, 4, and 5 while oil portfolio 2 had a large decline. Because large changes occurred in both groups of firms, it is difficult to ascribe the capital changes in the oil industry strictly to the tax reform itself. It generally appears that most firms were finding it relatively advantageous to increase their debt relative to their equity in the postchange period.

To further explore the effect of financial structure changes and tax changes on risk, oil firms were reclassified into three new portfolios depending upon the change in their average debt/equity ratios. Portfolio 9 consisted of firms experiencing an increase in this ratio of +.10 or

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[5]Dunn and Gravelle, An Analysis of the Federal Tax Treatment of Oil and Gas and Some Policy Alternatives, p. 22.

TABLE 5-5

DEBT/EQUITY RATIOS

Oil Portfolios

Portfolio No.	No. of Firms	D/E Pre Change	D/E Post Change	Absolute Change	Percentage Change
1	13	.930	1.218	+.288	+30.97
2	11	.623	.499	-.124	-19.90
3	11	.426	.528	+.102	+23.94
4	14	.787	.784	-.003	-00.38
5	15	.418	.583	+.165	+39.47

Control Portfolios

Portfolio No.	No. of Firms	D/E Pre Change	D/E Post Change	Absolute Change	Percentage Change
1	15	.444	.469	+.025	+ 5.63
2	16	.518	.482	-.036	- 6.95
3	17	.419	.542	+.123	+29.36
4	15	.955	1.204	+.249	+26.09
5	12	.455	.614	+.159	+34.95

more. Portfolio 11 consisted of firms having a decrease in their debt/equity ratio of -.10 or more. Portfolio 10 consisted of firms falling in between +.10 and -.10. Summary statistics for these portfolios are given in Tables 5-6 and 5-7. Table 5-6, showing reaction to the tax reform, reveals that all three groups experienced an increase in their risk during the time span under consideration. Portfolio 10 (with a relatively stable debt/equity ratio) had a statistically significant change (α = .10), presumably stemming solely from the tax changes. A larger increase would have been expected for portfolio 9 relative to portfolio 10 since both the tax and debt level changes would theoretically increase risk thus giving a "double dose" effect. However, this change was not observed in that $\Delta\beta$ for portfolio 9 was less than that for portfolio 10. On the other hand, the observed smaller change (or perhaps a negative change) was expected for portfolio 11 relative to portfolio 10 in that the debt changes and tax changes would tend to have counteracting effects.

Table 5-7 again shows the familiar decrease in beta following the crude oil price hikes for all three portfolios. Graphs of moving betas for these groups are presented in Figures 5-14 through 5-16. A list of firms in these portfolios is contained in Appendix A.

Summary of the Research Results

In general, the empirical results of this research strongly suggest that the Tax Reform Act of 1969 did indeed have an impact upon the systematic risk of oil firms. In all test cases, an upward drift in risk was observed for oil portfolios during the critical time span of January 1969 through October 1970. No such uniformity was observed for control portfolios.

TABLE 5-6

ESTIMATES OF PORTFOLIO RISK

Oil Firms

Portfolio No.	Class	Estimated Risk At 12/68[1] (A)	Estimated Risk At 10/70[2] (B)	Estimated Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
9	D/E Up	1.038	1.263	+.225	1.655	.203	.175
10	D/E Stable	.669	.974	+.305	3.358	.072	.167
11	D/E Down	1.206	1.367	+.161	.408	.525	.252

[1]Based on 40 observations

[2]Based on 22 observations

TABLE 5-7

ESTIMATES OF PORTFOLIO RISK

Oil Firms

Portfolio No.	Portfolio Class	Estimated Risk At 10/70[1] (A)	Estimated Risk At 9/73[2] (B)	Estimated Δ Beta (B-A)	F Value	Significance Probability	Standard Error of Δ Beta
9	D/E Up	1.264	.998	-.266	2.165	.147	.181
10	D/E Stable	.974	.592	-.382	3.774	.057	.197
11	D/E Down	1.367	1.008	-.359	1.971	.166	.255

[1]Based on 22 observations

[2]Based on 35 observations

FIGURE 5-14

OIL PORTFOLIO 9
D/E UP

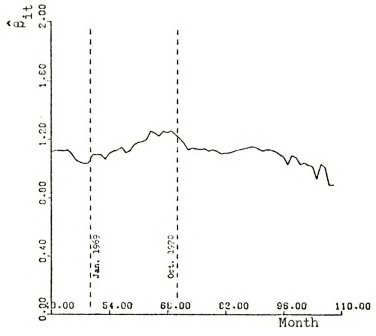


FIGURE 5-15

OIL PORTFOLIO 10
D/E STABLE

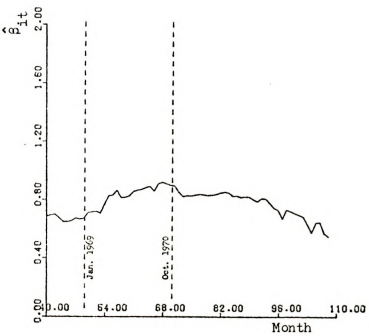
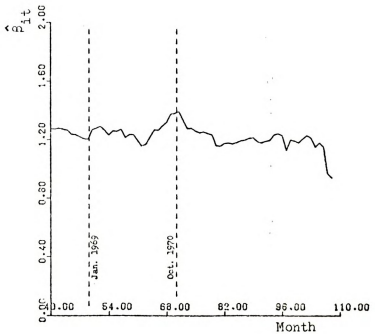


FIGURE 5-16

OIL PORTFOLIO 11
D/E DOWN



The impact of the tax reform was somewhat modified, however, by the crude oil price hikes occurring in November 1970. These hikes, of course, tended to re-establish former cash flows and thus offset the effects of the tax reform. Empirical results supported this conclusion in that a drop in risk was observed for all oil portfolios following these price hikes. No similar uniform pattern was seen for control portfolios during the same time span. Thus, the results predicted by the model in Chapter III were observed in the tests conducted.

Limitations of the Study

As with most research, this study faced a number of problems that could not be overcome. A major limitation arises from the fact that the control group did not consist of oil firms and therefore probably differs from the treatment group in a non-random manner. Ideally, a study of this type would have randomly selected oil firms, paired them on some appropriate basis or bases, and then randomly assigned one paired firm to a treatment group and the other to a control group. The treatment group would then be subjected to the specialized oil and gas law changes made in 1969 while the control group would not, and tests would then be run to check for changes in systematic risk of various treatment and control portfolios.

Because it was not possible to construct such a clean research design, the control group in this study is, in reality, only a "psuedo" control group. Confounding events could have occurred that affected only oil firms but not control firms and vice versa. Additionally, events could have affected both groups, but not in the same manner or equally. Some attempt was made to control these extraneous events by randomizing

control firms, but the problem still exists. Examples of such events include expropriations, tax changes occurring before and after 1969, the energy crisis, mergers, etc.

The study is further limited in that it focuses only upon investors in common stock. It thus overlooks the risk consequences faced by those investing in the oil industry via other means such as participation in drilling funds, acquisition of bonds, etc.

Another limitation is the inability to precisely establish the impact date. It is possible, though not likely, that investors could have anticipated the outcome of the tax reform prior to the actual passage of the Act. If so, the impact date (assumed here to fall somewhere between January 1969 and October 1970) would be misspecified. However, because of the nature of the legislative process it is difficult to predict the outcome of tax reform before it is finalized. For instance, at one point during the 1969 proceedings, the Senate Finance Committee came within one vote of approving a continuation of the 27½ percent depletion rate.[6] Tax reform for the oil industry had also been suggested previously, but never passed. Finally, even if the impact date is misspecified, simulation work done by Collins and Simonds suggests that the testing methodology used in this research is robust and powerful up to one year away from the true impact date.[7]

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[6]Collie and Linden, "The Tax Reform Act of 1969 and Domestic Oil and Gas Producers," p. 424.

[7]See Collins and Simonds, "SEC Line of Business Disclosure and Market Risk Adjustments," Department of Accounting and Financial Administration, Graduate School of Business, Michigan State University, January 1977.

Suggestions for Future Research

A major possibility for future research pertaining to preferential taxation and risk changes would be to examine the effect of the Tax Reduction Act of 1975 on investor-perceived risk of the oil industry. This Act generally repealed percentage depletion for oil and gas wells but provided exemptions for (1) certain production from domestic wells, and (2) independent producers and royalty owners.[8] However, for these qualified independents and royalty owners, the depletion allowance is limited to a certain maximum quantity of average daily production (which gradually declines through 1980) and the depletion rate itself gradually declines to 15 percent by 1984. Consequently, this Act had a much larger impact upon the petroleum industry than the Tax Reform Act of 1969 by denying percentage depletion for all but the smallest independent producers. Hence, a test run on this Act would provide another opportunity to examine the effects of preferential taxation on investor-perceived risk. However, such a study would still face many of the problems encountered in this research, i.e., the presence of confounding events and factors.

Since the risk of a stock is only one of the factors of interest to an investor, another possibility for future research would be to focus

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[8]Domestic production exempted from the new law includes (1) natural gas sold before July 1, 1976, which is subject to price regulation of the U.S. Government, (2) natural gas sold under a "fixed" price contract provided the contract was in effect on February 1, 1975, and (3) geothermal wells in the United States provided the courts finally determine that emissions from such wells are gas for the purposes of the tax law. For item (2) above, where the contract provides provisions for periodic price adjustments, the law presumes that any upward price adjustments are intended to compensate the producer for increased taxes and thus an increase in the price will disqualify the gas for depletion unless the taxpayer can rebut the presumption.

on the returns of selected oil portfolios both before and after the Tax Reduction Act of 1975. Such a study would provide insight as to whether this tax legislation negatively affected the expected returns of oil stocks.[9]

Concluding Comments

Because of increasing social awareness and the increasing concern for equity in the nation's tax system, research in taxation will become more and more important. Increasingly, the accountant will be asked to make recommendations and help solve social problems. In the tax area, CPA's are now being asked to help simplify the nation's tax system and review proposed tax reform. The AICPA's Tax Division is currently involved in formulating and submitting to Congress technical and policy recommendations for the improvement of the federal tax process. It is hoped that this research is a step toward a better understanding of the effects of tax legislation on those affected by the revenue generating processes of government and a step toward addressing the problem mentioned by Peter O. Steiner in Chapter I (See pages 14 and 15), i.e., the formulation of relevant questions and a factual determination of the answers to these questions.

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[9]Sunder has made a study dealing with the returns of oil stocks for the years 1961-1975. In general, he found that oil firms had an average small positive abnormal return over the 15 years. See Sunder, "Oil Industry Profits," Report 7715, Graduate School of Business, University of Chicago, March 1977.

APPENDICES

APPENDIX A

A Listing of Firms in Portfolios 1-11

Portfolio 1 - Oil

Barnwell Industries, Inc.
Basin Petroleum Corp.
Diversa, Inc.
Dixilyn Corp.
Dresser Industries, Inc.
Falcon Seaboard
Global Marine
Halliburton
Helmerich and Payne, Inc.
Ocean Drilling and Exploration Co.
Reading and Bates Offshore Drilling
Santa Fe International Corp.
Schlumberger
Scope Industries
Sedco
Siboney Corp.
Zapata Corp.

Portfolio 1 - Control

Alleghany Corp.
Basic, Inc.
Briggs-Stratton
Easco Corp.
Ferro Corp.
Firestone Tire and Rubber
General Plywood
Hazeltine Corp.
J. W. Mays, Inc.
Lafeyette Radio Electronics
Miles Labs, Inc.
Napco Industries
Perkin Elmer Corp.
Sperry Rand Corp.
UMC Industries, Inc.
Western Union
Xerox Corp.

Portfolio 2 - Oil

Apache Corp.
Baruch Foster Corp.
Buttes Gas and Oil
Canadian Superior Oil
Consolidated Oil and Gas
Crestmont Oil and Gas
Eason Oil
Empire State Oil
Equity Oil Company
Felmont Oil Corp.
General Exploration Co. of Cal.
Great Basins Petroleum
Home Oil Company
Kin-Ark Corp.
Livingston Oil
Pubco Petroleum Corp.
Texas American Oil

Portfolio 2 - Control

Akzona, Inc.
American Broadcasting Cos., Inc.
Barry-Wright
Carrier Corp.
Delta Airlines
Edison Bros. Stores, Inc.
Florida Power and Light
Foxboro Company
General Builders
Harris Corp.
Lafeyette Radio Electronics
New Mexico-Arizona Land
Perkin Elmer Corp.
Republic Steel
Rohm Haas Company
United Park City Mines
Walt Disney Productions

Portfolio 3 - Oil

Aberdeen Petroleum
Asamera Oil Corp.
Aztec Oil and Gas
Belco Petroleum Corp.
Dome Petroleum
Energy Resources
General American Oil Co. of Texas
General Crude Oil
Kewanee Oil
Louisiana Land and Exploration
McCulloch Oil Corp.
North American Royalties
Webb Resources
Westates Petroleum
Western Decalta Petroleum
Wichita Industries
Wilshire Oil

Portfolio 3 - Control

Campbell Red Lake Mines
Cone Mills Corp.
Connelly Containers
Ero Industries
Fairmont Foods
Federal Mogul Corp.
General Motors
Hercules, Inc.
Iowa Electric Light and Power
Marquette Company
Minnesota Power and Light
Pepsico, Inc.
O'Sulliven Rubber
Puget Sound Power and Light
Reliable Stores Corp.
Universal Leaf Tobacco
Vulcan Corp.

Portfolio 4 - Oil

American Petrofina
Ashland Oil, Inc.
Apco Oil Corp.
Creole Petroleum
Getty Oil
Gulf Oil
Husky Oil
Kerr-McGee
Murphy Oil Corp.
Occidental Petroleum
Phillips Petroleum
Signal Companies
Standard Oil of Indiana
Tenneco Corp.
Texaco, Inc.
Union Oil

Portfolio 4 - Control

Aeronca
Ampex Corp.
Aristar, Inc.
Colgate-Palmolive Co.
Compudyne Corp.
Deere Co.
Holly Sugar Corp.
International Rectifier Corp.
Kroehler Manufacturing Co.
McDonnell Douglas Corp.
Saxon Industries
Sybron Corp.
Tenney Engineering
United Merchants Manufacturers
Valspar
Work and Wear

Portfolio 5 - Oil

Cities Service
Continental Oil
Crown Central Petroleum
Crystal Oil
Exxon
Marathon Oil
Mobil Oil
Pacific Petroleums
Pennzoil
Quaker State Oil
Shell Oil
Skelly Oil
Standard Oil of California
Standard Oil of Ohio
Sun Oil

Portfolio 5 - Control

Allied Products Corp.
Carolina Power and Light
GAC Corporation
J. C. Penney, Inc.
Johns-Manville Corp.
Keystone Consolidated Industries
Lehman Corp.
Libbey Owens Ford
Martin Marietta Corp.
Masonite Corp.
Outlet Company
Revlon, Inc.
Simplicity Pattern, Inc.
Southern California Edison
Western Bancorporation

Portfolio 6 - Domestic

American Petrofina
Apache Corp.
Aztec Oil and Gas
Baruch Foster
Clark Oil and Refining
Crestmont Oil and Gas
Crown Central Petroleum
Crystal Oil
Eason Oil
Energy Resources
Equity Oil Company
Kin-Ark Corp.
Livingston Oil
McCulloch Oil
North American Royalties
Texas American Oil
Webb Resources
Wichita Industries
Wilshire Oil

Portfolio 7 - Limited Foreign

Apco Oil
Belco Petroleum
Buttes Gas and Oil
Consolidated Oil and Gas
Creole Petroleum
Felmont Oil
General American Oil of Texas
General Crude Oil
General Exploration Co. of Cal.
Getty Oil
Great Basins Petroleum
Kerr-McGee
Kewanee Oil
Louisiana Land and Exploration
Pennzoil
Quaker State Oil
Shell Oil
Skelly Oil
Standard Oil of Ohio
Westates Petroleum

Portfolio 8 - International

Ashland Oil
Cities Service
Continental Oil
Exxon
Gulf Oil
Marathon Oil
Mobil Oil
Murphy Oil
Occidental Petroleum
Phillips Petroleum
Signal Companies
Standard Oil of California
Standard Oil of Indiana
Sun Oil
Tenneco Corp.
Texaco, Inc.
Union Oil

Portfolio 9 - D/E Up

Ashland Oil
Baruch Foster
Belco Petroleum
Buttes Gas and Oil
Clark Oil and Refining
Crown Central Petroleum
Crystal Oil
Dixilyn Corp.
Dome Petroleum
Dresser Industries, Inc.
Falcon Seaboard
Great Basins Petroleum
Gulf Oil
Louisiana Land and Exploration
McCulloch Oil Corp.
Murphy Oil Corp.
North American Royalties
Occidental Petroleum
Quaker State Oil
Schlumberger
Sedco
Standard Oil of Ohio
Sun Oil
Wilshire Oil

Portfolio 10 - D/E Stable

American Petrofina
Asamera Oil Corp.
Barnwell Industries, Inc.
Canadian Superior Oil
Cities Service
Continental Oil
Eason Oil
Exxon
General American Oil Co. of Texas
Getty Oil
Halliburton
Kewanee Oil
Marathon Oil
Mobil Oil
Pacific Petroleums
Phillips Petroleum
Shell Oil
Skelly Oil
Standard Oil of California
Standard Oil of Indiana
Texaco, Inc.
Union Oil

Portfolio 11 - D/E Down

Apache Corp.
Apco Oil Corp.
Consolidated Oil and Gas
Crestmont Oil and Gas
Felmont Oil Corp.
Global Marine
Helmerich and Payne
Home Oil Company
Husky Oil
Kerr-McGee
Kin-Ark Corp.
Pennzoil
Reading and Bates Offshore Drilling
Santa Fe International Corp.
Scope Industries
Tenneco Corp.
Westates Petroleum
Western Decalta Petroleum
Zapata Corp.

APPENDIX B

Calculations--The Levered Case

This Appendix gives the formal computations for the figures shown in the model pertaining to the levered case presented in Chapter III. The data contained in Chapter III are presented below:

$\tilde{X}_j$	Interest	$\tilde{X}_j$-I	Taxes	Repayment of Bond Principal	Cash Flow to Equity-$\tilde{Y}_j$
2500	120	2380	476	1904	-0-
5000	120	4880	976	2000	1904
7500	120	7380	1476	2000	3904

The joint probability distribution of $\tilde{Y}_j$ (after-tax cash flow to equity) and $\tilde{R}_m$ (return on the market) was

$\tilde{R}_m$	$\tilde{Y}_j$ = 0	1904	3904
.95	.10	.00	.00
1.00	.10	.10	.05
1.10	.05	.30	.10
1.25	.00	.10	.10

where

$E(\tilde{Y}_j) = 1928$

$E(\tilde{R}_m) = 1.09$

$Var(\tilde{R}_m) = .00915$

$Cov(\tilde{Y}_j, \tilde{R}_m) = 67.84$

$\lambda = 4.37$

$R_f = 1.05$ (assumed).

Formal computation of these items follows:

1. $E(\tilde{Y}_j) = .25(0) + .50(1904) + .25(3904) = 1928$

2. $E(\tilde{R}_m) = .10(.95) + .25(1.00) + .45(1.10) + .20(1.25) = 1.09$

3. $Var(\tilde{R}_m)$:

1 $\tilde{R}_m$	2 $E(\tilde{R}_m)$	3 $[\tilde{R}_m - E(\tilde{R}_m)]$	4 $[\tilde{R}_m - E(\tilde{R}_m)]^2$	5 Probability	(4 x 5) Weighted
.95	1.09	-.14	.0196	.10	.001960
1.00	1.09	-.09	.0081	.25	.002025
1.10	1.09	.01	.0001	.45	.000045
1.25	1.09	.16	.0256	.20	.005120
				1.00	.009150

4. $Cov(\tilde{Y}_j, \tilde{R}_m)$:

1 $\tilde{Y}_j$	2 $E(\tilde{Y}_j)$	3 $\tilde{Y}_j - E(\tilde{Y}_j)$ (1 - 2)	4 $\tilde{R}_m$	5 $E(\tilde{R}_m)$	6 $\tilde{R}_m - E(\tilde{R}_m)$ (4 - 5)	7 $[\tilde{Y}_i - E(\tilde{Y}_i))(\tilde{R}_m - E(\tilde{R}_m)]$ (3 x 6)	8 Probability	9 Weighted
0	1928	-1928	.95	1.09	-.14	269.92	.10	26.992
1904	1928	-24	.95	1.09	-.14	3.36	.00	0.000
3904	1928	1976	.95	1.09	-.14	-276.64	.00	0.000
0	1928	-1928	1.00	1.09	-.09	173.52	.10	17.352
1904	1928	-24	1.00	1.09	-.09	2.16	.10	0.216
3904	1928	1976	1.00	1.09	-.09	-177.84	.05	-8.892
0	1928	-1928	1.10	1.09	.01	-19.28	.05	-0.964
1904	1928	-24	1.10	1.09	.01	-.24	.30	-0.072
3904	1928	1976	1.10	1.09	.01	19.76	.10	1.976
0	1928	-1928	1.25	1.09	.16	-308.48	.00	0.000
1904	1928	-24	1.25	1.09	.16	-3.84	.10	-0.384
3904	1928	1976	1.25	1.09	.16	316.16	.10	31.616
							1.00	67.840

5. $\lambda = [E(\tilde{R}_m) - R_f]/Var(\tilde{R}_m) = (1.09 - 1.05)/.00915 = 4.3716$

The effects of a specialized tax increase on risk was examined in Chapter III and it was stated there that a price hike would tend to restore former risk levels. This proposition is demonstrated below. Recall that following the tax increase, the risk of a stock increased. Specifically, in the example presented in Chapter III the risk rose to 5.52 from 4.77 and data following the tax increase were as follows:

$\tilde{X}_j$	Interest	$\tilde{X}_j$-I	Taxes	Repayment of Bond Principal	Cash Flow to Equity-$\tilde{Y}_j$
2500	120	2380	1190	1190	-0-
5000	120	4880	2440	2000	440
7500	120	7380	3690	2000	1690

where

$E(\tilde{Y}_j) = 642.50$
$Cov(\tilde{Y}_j,\tilde{R}_m) = 25.525$
$P_j = [642.50 - 4.37(25.525)]/1.05 = 505.67$
$\beta_j = 25.525/(505.67)(.00915) = 5.52$

Suppose that Firm j now raises its prices in an attempt to pass the tax on to consumers. Specifically, assume that cash flows are now as follows:

$\tilde{X}_j$	Interest	$\tilde{X}_j$-I	Taxes	Repayment of Bond Principal	Cash Flow to Equity-$\tilde{Y}_j$
3,750	120	3,630	1815	1815	-0-
7,500	120	7,380	3690	2000	1690
11,250	120	11,130	5565	2000	3565

The after-tax cash flows to equity and joint probabilities with $\tilde{R}_m$ are thus

$\tilde{R}_m$ \ $\tilde{Y}_j$	0	1904	3904
.95	.10	.00	.00
1.00	.10	.10	.05
1.10	.05	.30	.10
1.25	.00	.10	.10

where

$E(\tilde{Y}_j) = 1736.25$

$Cov(\tilde{Y}_j, \tilde{R}_m) = 62.9425$

and

$$P_j = [1736.25 - 4.37(62.9425)]/1.05 = 1391.61$$

$$\beta_j = 62.9425/(1391.61)(.00915) = 4.94$$

Consequently, the price increase has the effect of lowering the risk of the firm.

APPENDIX C

Forms and Questionnaires

811-G Cherry Lane
East Lansing, MI 48823
June 8, 1976

As you know, one of the most controversial areas in the taxation of oil and gas properties has centered upon percentage depletion. Many arguments have been advanced both for and against this measure, and recent tax legislation has substantially eliminated it.

However, no one knows how investors reacted to the Tax Acts of 1969 and 1975. As a doctoral candidate, I am currently doing research to see if the Tax Act of 1969 had any impact on investors assessment of risk in the petroleum industry. In order to do so, I need to control confounding variables and past research indicates that accounting changes may have a bearing upon risk assessment by investors.

I would, therefore, appreciate it if you would take a few minutes to fill out the enclosed form regarding any accounting changes made by your firm that resulted in a "consistency exception" in your financial statements.

I have enclosed a self addressed stamped envelope and wish to thank you for helping me complete my dissertation.

Sincerely yours,

Richard F. Boes

Enclosures

Please complete the following items:

1. Name of firm_____

2. Circle letter that best describes your involvement in the oil industry--i.e., major activity

   a. Technical Service Firm
   (includes contract drilling, engineering, exploration and field services, etc.)

   b. Producer
   (development and extraction of oil but no refining or consumer marketing)

   c. Integrated
   (all phases including production, refining, and marketing)

3. List any accounting changes made by your firm between 1957 (or date of incorporation if later) and 1974. If none were made, please indicate none.

	Year	Changed From	Changed To	Did the change have any significant effect upon computation of taxable income	
				Yes	No
Examples	1963	FIFO	LIFO	X	
	1968	Successful Wells	Full Costing		X
	1974	Accelerated Depreciation	Straight Line		X
	___	_____	_____	___	___
	___	_____	_____	___	___
	___	_____	_____	___	___
	___	_____	_____	___	___
	___	_____	_____	___	___

Please return to: Mr. Richard F. Boes
811-G Cherry Lane
East Lansing, MI 48823

APPENDIX D

A Legislative History of Percentage Depletion and Intangible Drilling Costs

This appendix gives a brief account of the legislative history of the percentage depletion allowance and the intangible drilling and development costs.

The Depletion Allowance

Congress first authorized cost depletion in the Revenue Act of 1913. This Act called for "a reasonable allowance" for capital consumption in the computation of taxable income. For oil and gas wells, the maximum deduction allowed was 5 percent of the gross value of output at the well during the tax period. The deductions made during the life of the property were not to be greater than the original cost or market value of the property as of March 1, 1913. The 1916 Revenue Act changed the 5 percent limitation on oil and gas wells to a "reasonable allowance for actual reduction in flow." The capital to be recovered was not to exceed the "capital originally invested" or the March 1, 1913, "fair market value." To compute the depletion deduction, it was necessary to estimate the amount of oil remaining in a property, divide this estimate into the larger of the two capital measures, and multiply by the number of barrels produced during the taxable year. Inequities arose because of the two capital measures--cost or fair market value on March 1, 1913. The fair market value of an oil property usually has no relation to the original cost of the property; the value may be far

in excess of the cost of discovery. Therefore, properties operating prior to March 1, 1913, could be depleted on market value at that date but those which became productive after March 1, had to be depleted on a cost basis. This inequity led to "discovery depletion." The Revenue Act of 1918 extended the application of fair market value as a basis for depletion to newly discovered oil wells--depletion could be computed based upon the discovery value of the property. Discovery value was defined as the amount of money the producer could obtain were he to sell his property within thirty days after discovery. The Revenue Act of 1921 limited discovery depletion to 100 percent of the property's net income, and subsequently the Revenue Act of 1924 limited it to 50 percent of the property's net income before the depletion deduction. The discovery depletion concept proved extremely difficult to administer, however, because controversies continually arose between the taxpayers and the Bureau of Internal Revenue as to just what the discovery value was for each new property. Consequently, percentage depletion was substituted for discovery depletion in the Revenue Act of 1926. This Act provided that 27½ percent of the gross income from the well could be deducted as the depletion allowance subject to the 50 percent limitation on net income. Percentage depletion remained unchanged until the Tax Reform Act of 1969 reduced the percentage rate to 22 percent of the gross income. Further reform occurred with the Tax Reduction Act of 1975 which generally repealed percentage depletion for oil and gas wells. This Act provided for two exemptions, however. One was for certain production from domestic gas wells, and the other was for the independent producer and royalty owner.

Intangible Drilling Costs

The election to expense intangibles was first made available by administrative ruling (U.S. Treasury Regulation 33, Article 170) in connection with the Revenue Act of 1916, and it has been available in modified form ever since. Until 1954, however, no specific statutory authority existed for the election to deduct these costs. The Revenue Acts of 1918 and 1921 indicated by implication that Congress may have considered intangibles to be deductible by providing that "In case of . . . oil and gas wells . . . a reasonable allowance for depletion . . . , according to the peculiar conditions in each case based upon cost including cost of development not otherwise deducted.[1]

Because the initial regulation of 1916 did not have specific statutory authority, there was a considerable amount of litigation over the validity of the ruling. The first attack was made under the Revenue Act of 1918, and was founded upon the argument that the expenditure was capital in nature and that the Commissioner had no authority to determine arbitrarily, by regulation or otherwise, that a purely capital item could be treated as a business expense.[2] The Board of Tax Appeals did not rule on the validity of the regulation because the question was not properly at issue. In 1931, the question came before the District Court for the Western District of Kentucky, and the Court concluded that although it felt that intangibles might more properly be classified as a capital expenditure, the point was sufficiently debatable to justify the

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[1]Clark W. Breeding and A. Gordon Burton, Taxation of Oil and Gas Income (New York: Prentice-Hall, Inc., 1954), p. 145.

[2]Old Farmers Oil Company, 12 B.T.A. 203(1928), acq., VII-2 C.B. 30 (1928).

Commissioner's action in devising a regulation to govern the situation.[3] It was not until 1945 that a contrary view appeared in the courts when the Court of Appeals for the Fifth Circuit held that the regulations granting the election in respect of intangibles were invalid.[4] The Court reasoned that the nature of the expenditure was capital, and that such an allowance was contrary to Section 24(a)2 of the 1939 Internal Revenue Code which prohibited a deduction for any amounts paid for permanent improvements or betterments made to increase the value of the property. Since the industry had long accepted the right to make such an election as provided in the regulations, the decision was followed by a request for rehearing of the case in which 30 briefs were filed by counsel for other oil producers as amici curiae. The court denied the request for rehearing stating that it would reach the same conclusions. The industry was sufficiently concerned, though, to obtain a concurrent resolution from the Seventy-ninth Congress recognizing the validity of Section 29.23(m)(16) of Regulations 111 and corresponding provisions of prior regulations. In denying a second request for rehearing, the court indicated that a congressional resolution did not have the force of law since it was not an act of Congress approved by the president or passed over his veto. Because of this decision, there was some uncertainty about the right to expense intangibles, but the Revenue Service continued to follow the regulation and allowed the deduction if properly claimed. This policy was impliedly sanctioned by Congress in the Excess Profits

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[3] Sterling Oil and Gas Company v. Lucas, 51 F.(2d)413, 10 AFTR 255.

[4] F.H.E. Oil Company v. Commissioner, 147 F.(2d)1002, 33 AFTR 785.

Tax Act of 1950 which gave recognition to the practice of expensing intangibles. The question was finally laid to rest in 1954 by express statutory direction to prescribe regulations granting the option.

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