This page has been inserted during digitization.

Either the original page was missing or the original pagination was incorrect.

AN ASSESSMENT OF THE STOCK MARKET EFFECTS OF PROPOSED ACCOUNTING CHANGES IN THE OIL AND GAS INDUSTRY

DISSERTATION

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

Ahmad Etebari-Khorasgani, B.B.A., M.B.A.
Denton, Texas
August, 1979

Ahmad Etebari-Khorasgani, An Assessment of the Stock Market Effects of Proposed Accounting Changes in the Oil and Gas Industry. Doctor of Philosophy (Finance), August, 1979, 147 pp., 18 tables, bibliography, 23 titles.

Companies engaged in oil and gas producing activities have followed two primary methods of accounting (with numerous variations of each) for public financial reporting: full costing, a method which capitalizes all exploration and development costs, and successful-efforts accounting, a method which capitalizes only those costs which actually result in producing properties.

Since enactment of the Energy Policy and Conservation Act of 1975, which required compilation of a reliable energy data base, two steps have been taken towards establishing the most appropriate method of financial reporting for oil and gas producers. On July 15, 1977, the Financial Accounting Standards Board (FASB) issued an exposure draft of its Statement No. 19 which proposed to require all oil and gas producers to use a form of successful-efforts accounting for financial reporting, thereby eliminating full costing. The FASB proposal which finally became Statement No. 19 was rejected by the Securities and Exchange Commission (SEC). The SEC, instead, released its own rules on August 31, 1978, which call for the disclosure of a great deal of information on size and value of reserves, etc., as well as the development of a new method of accounting (reserve-recognition accounting). The new method would recognize the value of proved oil and gas reserves as assets, and additions to proved

reserves as current revenue. The SEC proposal permits oil and gas producers to continue to use either full costing or successful-efforts accounting until the new method has been developed and fully mandated.

This dissertation research addresses the question of whether the issuance of the FASB and SEC proposals had any effect on the common stock values of oil and gas producers. Of primary interest is a determination of the differential impact of these proposals on stock values of full-cost versus successful-efforts firms.

The information impact of each proposal was examined using two samples of oil and gas producers. One sample was chosen from the national exchanges (New York or American stock exchange); the other was chosen from the over-the-counter (OTC) market. Research procedures employed utilized the Efficient Market Hypothesis as well as parametric statistical techniques. Weekly returns on stocks of selected firms were tested over a thirty-two-week period surrounding issuance of the FASB proposal and a twenty-six-week period surrounding release of the SEC proposal.

It was found that releases of the FASB and SEC proposals were associated with a downward shift in the level of returns (risk-adjusted) for full-cost companies traded in the OTC market compared to the level of those returns for successful-efforts companies traded in the OTC market. On the other hand, the release of these proposals was not followed by any persisting difference in the level of returns for the listed full-cost firms as compared to the level of returns for the listed

successful-efforts firms. In addition, the test results show that the impact of the FASB proposal was much greater on the performance of returns for small full-cost firms traded in the OTC market than on the performance of returns for the large full-cost firms traded in the same market.

The difference in the impact of these proposals on the listed full-cost firms as compared to the OTC-traded full-cost firms is subject to either of two possible explanations: (1) price efficiency is not the same in the two markets, i.e., the OTC market possesses a lower degree of efficiency than do the national exchanges, or (2) consistent with the efficient market hypothesis, the accounting changes proposed by the FASB and SEC were perceived by investors as imposing substantial costs (including cost of obtaining external funds) on the smaller full-cost firms traded in the OTC market.

Whatever the reason for the observed difference in the stock price behavior may be, a difference for the listed and OTC markets clearly exists; inferences concerning the behavior of stock prices for oil and gas producing companies in one of these markets should not be applied indiscriminantly to the other.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES--Continued

LIST OF ILLUSTRATIONS

CHAPTER I

INTRODUCTION

This dissertation research examines empirically the effects on the behavior of oil and gas company stock prices of the issuance of two authoritative accounting proposals: (1) the elimination of full costing proposed in the exposure draft of Financial Accounting Standards Board (FASB) Statement No. 19 on July 15, 1977, and (2) the proposed oil and gas accounting rules announced by the Securities and Exchange Commission (SEC) on August 31, 1978.

The stock market effects of the accounting change proposed in the FASB exposure draft have already been investigated by a number of empirical research studies. However, due to conflicts in the results of those studies, bias in their sampling procedures, and the importance of the subject matter itself, the issue is re-examined in the present study. There have been no published results of research into the stock market impact of the SEC's proposed rules. The results of this study may provide a basis for assessing the potential economic effects on oil and gas procedures of the foregoing and similar proposals.

An Overview of Oil and Gas Accounting

Methods of Accounting for Exploration and Development Activities

Companies in the oil and gas industry have adopted two diverse methods of financial reporting: "Full Costing" and "Successful-Efforts Accounting." Under full costing, a method followed especially by small non-integrated oil and gas producers, costs of unsuccessful exploration (including exploratory dry holes) are considered unavoidable in finding and developing minerals; hence, these costs are capitalized when incurred and they are amortized as oil and gas reserves are produced. In contrast, under the successful-efforts method, used by most large integrated oil and gas companies, only costs leading directly to discoveries of proved reserves and to their development are capitalized and the costs of unsuccessful exploration (including exploratory dry holes) are charged to expense. Full costing smooths earnings and, ceteris paribus, results in higher book values for assets and in higher income figures than does successful-efforts accounting. Both of these methods have numerous variations in practice which cause differences in the treatment of certain expenditures in the financial reports of different companies.

Despite their broad adoption and usage, both full costing and successful-efforts accounting have severe limitations. In fact, because they are based on the historical-cost concept of accounting, both methods presumably fail (1) to represent the

economic realities of oil and gas exploration and production activities as evidenced by reserves value, and (2) to reflect adequately the effects of inflation on the financial statements. As a consequence, several alternatives to these historical-cost-based methods have been suggested. Among them, perhaps "discovery-value accounting" and "current-value accounting" deserve special attention.

Discovery-value accounting considers the value of mineral reserves as revenue at the time of discovery of the reserves. The discovery value becomes the recorded value of reserves which will be amortized against the revenue from the production and sale of the minerals in the future. Under this method of accounting, changes in reserves value due to changes in the unit value are not recognized until the reserves are produced and sold. However, changes in reserves value may be recorded to reflect the possible revision of the estimated quantities of reserves discovered, and the possible capitalization of additional development costs as they are incurred.[1] Under current-value accounting, on the other hand, oil and gas reserves are revalued periodically and changes in their value are reported as income in the period of the change. Such a system of accounting can be designed to provide segregated data for "(1) value increases resulting from new discoveries, and value changes resulting

---

[1]For a complete discussion of discovery-value accounting, see Joseph E. Conners, "Discovery Value--The Oil Industry's Untried Method," Journal of Accountancy, 139 (May, 1975), 54-63.

from adjustments of reserve quantities and (2) holding gains and losses resulting from revaluing end-of-period reserve quantities to reflect the change in unit value during the period."[2] Discovery-value accounting and current-value accounting are supported on the theoretical grounds that they provide financial and operating information which is highly useful to investors in assessing and analyzing the operating results of oil and gas exploration and producing companies.

However, from a practical standpoint, there are serious questions about whether these methods are appropriate if they are to be used for the purpose of presenting reserve values in the primary financial reports. Both discovery-value accounting and current-value accounting rely on highly subjective estimates of reserve values that are inherently imprecise and uncertain. It is possible that the incorporation of such subjective values in the primary financial statements could lead to erratic and manipulated financial results over time. As a result, many accountants and financial analysts have suggested that oil and gas reserves be reported at their current (or discovery) values only in supplementary financial statements.[3]

Historical Developments

The broad acceptance and use of the two historical costing methods of full-cost and successful-efforts (and the numerous

---

[2]Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries," Discussion Memorandum (Stamford, Connecticut, FASB, December 23, 1976), pp. 241-258.

[3]Ibid.

versions of each method) have created a great deal of concern about the lack of comparability in financial reports of oil and gas companies. During the last decade, the accounting profession, the regulatory agencies, and the petroleum industry itself have attempted to establish a single method of accounting (full-costing, successful-efforts accounting, or an alternative method) to be used by all petroleum companies in their financial reports. The first major step toward accomplishing this objective was taken in 1964 when the American Institute of Certified Public Accountants (AICPA) commissioned Robert E. Field to study the different accounting methods in the extractive industries. The study was published in 1969 by the AICPA as Accounting Research Study No. 11 (ARS 11). ARS 11 recommended the adoption of the successful-efforts concept of accounting, the more conservative of the two existing methods. Acting upon this recommendation, the Accounting Principles Board (APB) of the AICPA in 1971 announced a proposed "opinion" (an authoritative pronouncement) requiring a uniform adoption of successful-efforts accounting by the industry. However, this proposition was opposed by proponents of full-costing and by many others who advocated modified versions of the successful-efforts method. As a consequence, the APB withdrew its proposal with the announced intention to study the subject further in the future.

The oil and gas accounting controversy came into full bloom with the enactment of the "Energy Policy and Conservation Act of 1975" (EPCA). This Act required the SEC to develop accounting

practices to be followed by oil and gas producing companies in preparing financial reports to be filed with the Department of Energy (DOE) for the purpose of establishing a national energy data base. The SEC already held power under several securities acts to specify the rules of financial accounting to be followed by publicly-held companies required to file financial reports with the SEC. Thus, to fulfill its responsibilities under EPCA and to exercise its power under the federal securities laws, the Commission undertook to develop the most appropriate financial accounting standards for oil and gas producing companies (1) for the purpose of reporting to the DOE and (2) for the purpose of preparing financial statements to be included in filings with the SEC. In accordance with its announced policy under Accounting Series Release 150,[4] the SEC relied on the accounting profession for development and formulation of financial accounting standards. In addition, EPCA specifically gave the SEC the right to rely on the FASB in developing accounting practices under that Act. Hence, in December, 1975, the FASB, the private sector's rule-making body for financial accounting, was delegated the task of establishing such standards for reporting by oil and gas producing companies.

---

[4] In Accounting Series Release No. 150 (39, FR 1260), the SEC reaffirmed its policy of relying, in the first instance, on the private sector for the establishment of accounting principles. According to this release, principles and practices promulgated by the FASB in its statements and interpretations are considered by the SEC as having established authoritative support; however, the final authority remains with the Commission.

After issuing a Discussion Memorandum on September 23, 1976, the FASB issued an Exposure Draft of a Proposed Statement of Financial Accounting Standards, "Financial Accounting and Reporting by Oil and Gas Producing Companies" on July 15, 1977. That exposure draft set forth a proposal to require all oil and gas producers to use a single method of financial reporting based on a form of successful-efforts accounting (including the charging to expense of all exploration costs as incurred, except the costs of exploratory drilling that finds proved reserves), thereby eliminating full costing. With minor changes, the FASB adopted the proposed accounting rules advanced in the exposure draft and issued its Statement No. 19 on December 5, 1977.[5]

In adopting Statement No. 19, the FASB concluded that the successful-efforts method was more consistent with the present systems of historical costing than full costing. In addition, to enhance the usefulness of the financial reports, Statement No. 19 called for extensive disclosure of the reserves and costs associated with oil and activities. The reserve disclosures included (1) net quantities of proved reserves and of proved-developed reserves as of the beginning and end of each reporting period, (2) changes in net quantities of proved reserves during each period, and (3) disclosure of both net quantities of reserves and net changes in those reserves in the reporting company's home country and in each foreign country.

---

[5]Financial Accounting Standards Board, "Financial Accounting and Reporting by Oil and Gas Producing Companies," Statement of Financial Accounting Standards No. 19 (Stamford, Connecticut, FASB, December, 1977).

In addition, the amount of capitalized cost for specified types of assets related to oil and gas operations and the amount of expenditures for property acquisition, exploration, development and production activities in each geographical area were required to be disclosed.

The release of the exposure draft and final adoption of Statement No. 19 brought the FASB under severe criticisms by some members of the Congress, the DOE, the Federal Trade Commission, and numerous companies and interested parties in the private sector. Concerns were expressed about the adverse impact which the elimination of full costing might have on (1) the commitment of capital to oil and gas exploration, (2) the fund-raising ability of small "independent" companies required to switch from full costing to successful-efforts accounting, and (3) the successful entry into the oil and gas business of new or smaller participants.

The opposition led to the undertaking of several empirical research studies sponsored by the FASB, the SEC, and other interested groups. Some of these studies examined the effects of issuance of the exposure draft of Statement No. 19 on returns from common stocks of companies using full costing versus those from common stocks of companies using successful-efforts accounting. The results of these research projects were conflicting. Some of them showed a significant reduction in the value of equity securities of full-cost companies relative to that of successful-efforts firms subsequent to the issuance of

the exposure draft of the proposed statement on July 15, 1977; others demonstrated a transitory or an insignificant relative impact on the values of equity securities of both groups of companies over the same test period. Some of these research projects are discussed in Chapter III of this dissertation.

Following public hearings regarding the merits and faults of full costing and successful-efforts accounting, the SEC, on August 29, 1978, announced that it was endorsing neither of the commonly-used methods. Instead, it ordered the development of a completely new method of accounting for oil and gas producing companies based on the present value of their oil and gas reserves. The new method to be developed in the next four years will be called "Reserve-Recognition Accounting" (RRA). According to the SEC, the development and implementation of RRA should lead to preparation of primary financial statements which reflect

> (1) Proved oil and gas reserves as assets in the balance sheet;
> (2) Additions to proved reserves and changes in valuations of proved reserves in the income statement; and
> (3) All costs associated with finding and developing additions to proved oil and gas reserves, together with all costs determined to be non-productive during the current period, in the income statement.[6]

As a step toward the development of RRA, the SEC issued Release 33-5969 on August 31, 1978. This release proposes to

---

[6]Securities and Exchange Commission, "Adoption of Requirements for Financial Accounting and Reporting Practices for Oil and Gas Producing Activities," Releases Nos. 33-5966; 35-20688; IC-10382; AS-253 (Washington, August 31, 1978), p. 4.

require that a supplemental earnings summary for oil and gas activities be included in the financial statements. The earnings summary, to be prepared on the basis of RRA, would include separate identification of income or loss from (1) producing activities, (2) current exploration and development activities, and (3) revisions to valuations of proved oil and gas reserves added in previous periods. In addition, cost of an uncompleted well would be deferred pending determination of whether or not the well has found proved reserves. Property acquisition costs would be deferred until a determination is made whether proved reserves have been discovered or the cost of property has been impaired. This requirement for a supplemental earnings report based on RRA would be effective for years ending after December 25, 1979.[7]

Concurrent with Release 33-5969, the SEC issued three other releases that adopt or propose rules to be followed by oil and gas producers. These rules will be applicable to public companies in their filings with the SEC and presumably will be adopted by the DOE for reports to be filed with that Department. For years ending prior to December 25, 1979, the Commission will permit companies to continue to use the accounting methods currently being used.[8] However, a proposed rule would require, for fiscal

---

[7]Securities and Exchange Commission, "Proposed Supplemental Earnings Summary for Oil and Gas Producing Activities," Releases Nos. 33-5969; 34-15111; 35-20690; IC-10382 (Washington, August 31, 1978).

[8]Securities and Exchange Commission, "Adoption of Requirements for Financial Accounting and Reporting Practices for Oil and Gas Producing Activities," Accounting Series Release No. 253 (Washington, August 31, 1978).

years ending after December 25, 1978, but before December 25, 1979, disclosure outside financial reports of the present value of estimated future net revenue from production of proved reserves (based on a 10 percent rate of discount for all companies), along with certain financial and operating information.[9] Commencing with fiscal years ending after December 25, 1979, companies using successful-efforts accounting will be required to follow the provisions of Statement No. 19, and companies using full-cost accounting will be required to follow rules developed by the SEC. The proposed rules on full-cost companies include requirements for limitations on capitalized costs, country-by-country cost centers, and disclosure of what the impact on certain balance-sheet items would be if successful-efforts accounting were followed instead of full costing.[10]

The intent of the SEC proposal is to narrow the alternative accounting practices in the oil and gas industry; ultimately, both full costing and successful-efforts accounting will be discontinued and financial statements will be based on RRA. Unfortunately, the path toward the development of RRA is a long and uncertain one. More importantly, as Harold Williams,

---

[9]Securities and Exchange Commission, "Disclosure of Oil and Gas Reserves and Operations, Proposed Amendments to Regulation S-K," Releases Nos. 33-5967; 34-15109; 35-20691; IC-10385 (Washington, August 31, 1978).

[10]Securities and Exchange Commission, "Oil and Gas Producers--Full Cost Accounting Practices," Releases Nos. 33-5968; 34-15110; 35-20689; IC-10383 (Washington, August 31, 1978). It must be noted that the requirement for supplemental disclosures based on successful-efforts accounting was later rescinded by the SEC in Releases Nos. 33-6007; 34-15417; 35-20837; IC-10351; AS-258 (Washington, December, 1978).

Chairman of the SEC, stated, "The feasibility of RRA is not assured because of the inherent imprecision of reserve valuation, and, therefore, the ultimate method of reporting is not yet determinable."[11] Thus, it appears that the accounting controversy surrounding oil and gas exploration, development and production is far from final resolution.

Purpose and Significance of the Study

The purpose of this dissertation research is to determine whether (1) issuance of the exposure draft of Statement No. 19 (July 15, 1977) by the FASB and (2) release of the subsequent proposed oil and gas accounting rules (August 31, 1978) by the SEC had any significant effects on the returns (change in Stock price plus dividends) from common stocks of oil and gas producing companies. In particular, the study addresses the question of whether issuance of any of these two proposals has had an effect on stock values of full-cost versus successful-efforts firms.

The results of this research project have significant implications for finance, competition, and formulation of accounting standards in the oil and gas industry. Some of these implications, along with the research hypotheses involved and the contributions from the study of each accounting proposal, are discussed below.

---

[11] Securities and Exchange Commission, Press Release, August 29, 1978.

The Market Impact of the FASB Exposure Draft

In the past few years, those oil and gas producing companies reporting on the basis of full costing have been increasing their expenditures for exploration at a faster rate than firms that report on the basis of successful-efforts accounting.[12] Officials of many full-cost firms have asserted that the accounting change proposed in the exposure draft of Statement No. 19 would adversely affect their stock prices, thereby impairing their ability to raise the capital needed to maintain aggressive exploration programs. Similar concerns have been expressed by other groups advocating the full costing method. The following comment by the president of The First Boston Corporation exemplifies the concerns of full-cost advocates

> . . . the change to the successful efforts method in financial reporting will reduce the ability of small exploration companies to attract sufficient capital to proceed with expanded exploration for domestic oil and gas. . . . Weaker balance sheets, lower and increasingly volatile reported earnings as well as pressures to reduce dividends can be expected to decrease the liquidity and marketability and prices of equity securities issued by small exploration companies. Such reduction in the marketability and prices of equity securities will increase the costs and decrease the availability of this important source of capital to such companies.[13]

If these assertations are true, adoption of the proposed accounting change by the SEC would be in violation of Section 23 (a)(2) of the Securities Exchange Act. That section of the

---

[12]Richard F. Messing, "Testimony re Impact of Adoption of FASB-19 Standard on the Oil and Gas Industry," printed transcript of an address presented to the SEC, Washington, March 30, 1978.

[13]Letter from Paul L. Miller, President, The First Boston Corporation to the SEC, October 13, 1977.

Act prohibits the SEC from adopting accounting rules which impose unnecessary burden on competition within any industry.[14] One of the objectives of the present study is to address the question of whether issuance of the FASB exposure draft had any effects on returns from common stocks of full-cost companies versus those from stocks of successful-efforts companies.

Three major empirical research studies have previously been conducted to assess the differential effects of issuance of the exposure draft on equity securities of full-cost firms versus those of successful-efforts firms. As noted previously, the results of those studies have been conflicting. Separate studies by the FASB, conducted by Thomas Dyckman[15] (hereafter referred to as the Dyckman study), and the SEC[16] (the SEC study) found that issuance of the exposure draft of Statement No. 19 had no significant effects on the stock prices of either full-cost or successful-efforts oil and gas companies.

---

[14]Section 23 (a)(2) of the Securities Exchange Act, as amended, prohibits the Commission from adopting or approving any rule or regulation "which would impose a burden on competition not necessary or appropriate in furtherance of the purposes of this chapter." See 15 U.S.C.A. S 78w (a)(2)(Supp., 1977).

[15]Thomas R. Dyckman, Report on the Effects of the Exposure Draft on the Returns of Oil and Gas Companies' Securities (Stamford, Connecticut, FASB, October, 1977).

[16]Securities and Exchange Commission, "FC (full-cost) vs. SE (successful-efforts): A Study of a Proposed Accounting Change's Competitive Impact," (Washington, February 20, 1978).

The Dyckman study reported that

> The test results we were able to conduct do not show a statistically significant information effect from the issuance of the exposure draft [of Statement No. 19] over the nine-week (July 18, 1977 to September 16, 1977) test period. . . . there is evidence of a transitory effect during the issue week. This effect did not persist, however.[17]

However, a research project by Daniel Collins and Warren Dent[18] concluded that release of the exposure draft had a significant effect on stock prices of oil and gas producers. In addition, the Collins and Dent study found that the effect on share prices of full-cost firms was significantly greater than the effect on share prices of successful-efforts firms. They concluded that

> . . . the proposal to eliminate full cost accounting was associated with a negative shift in the level of returns for full cost firms relative to the level of those returns for successful-efforts firms. This observed difference was found to be sustained over a six-month period.[19]

Obviously these studies have not resolved the controversy over the effects of the FASB exposure draft on stock returns.

A critical look at the previous work.--A careful evaluation of the sampling procedures used in the SEC, Dyckman, and Collins and Dent studies raises questions about the validity of their statistical results. The samples of firms analyzed in all three

---

[17] Dyckman, op. cit., Report 2, p. 2.

[18] Daniel W. Collins and Warren T. Dent, "An Assessment of the Stock Market Effects of the Proposed Elimination of Full Cost Accounting in the Extractive Petroleum Industry," International Paper Company, 220 East 42nd Street, New York, March, 1978.

[19] Ibid., p. B-2.

studies appear to have severe limitations for empirical testing. A closer look at the samples will help clarify their limitations.

The SEC study analyzed a total of 72 full-cost and successful-efforts oil and gas companies, none of which was traded in the over-the-counter (OTC) market. The Dyckman study utilized a sample of 113 companies consisting of 72 full-cost firms and 41 successful-efforts firms.[20] In this sample, 32 percent of the full-cost firms and 51 percent of the successful-efforts firms were traded in the OTC market and the remaining companies were listed on the New York Stock Exchange (NYSE) or the American Stock Exchange (ASE)--the national exchanges. Finally, the sample of firms employed in the Collins and Dent study included 51 full-cost firms and 31 successful-efforts firms. The trading-market breakdown of this sample shows that 41 percent of the full-cost firms and 50 percent of the successful-efforts firms were traded in the OTC market, with the remaining companies being listed on the national exchanges.

The most critical limitation of these samples stems from either the incorporation of both OTC-traded and exchange-traded companies into a single sample (the Dyckman, and Collins and Dent studies) or the selection of sample firms solely from the national exchanges (the SEC study). These are serious shortcomings in view of the objectives of the studies and the related statistical inferences. First, responses to the FASB's proposed statement contended that the elimination of full costing

---

[20]The sample under discussion is Sample B of Report 2 of the Dyckman study. See Dyckman, op. cit., Report 2, pp. 18-20.

could have adversely affected security prices of full-cost producing companies of all sizes, but would have affected especially those of small producers whose stocks are publicly-held and traded primarily in the OTC market. These companies may tend to place greater emphasis on the levels of their incomes and book-values than do larger, listed companies. This is, perhaps, partially due to differences in the judgments and sophistication of the participants (i.e., analysts and investors) in the two markets. Hence, separate investigations of the market effects of the FASB exposure draft on stocks traded on the national exchanges and in the OTC market would seem to be appropriate. Second, the SEC, Dyckman, and Collins and Dent studies have all relied on the efficiency of the capital markets in performing their analyses.[21] Since there is no evidence indicating that the national exchanges and OTC market have the same degrees of market efficiency, the samples of these studies, which pool together both listed and OTC-traded companies, are questionable for empirical testing. Third, the dependent variable (stock returns) tested in these research projects (the Dyckman, Collins and Dent studies) may have incorporated the effects of the nuisance variables which differ with the trading market, such as asset size, diversification, market risk, etc. These variables could easily confound the statistical results and, hence, invalidate the inferences drawn from them.

---

[21]The denoted market efficiency refers to the hypothesis that new public information is quickly impounded in security prices. A complete review of this hypothesis is given in Chapter II.

The Dyckman and Collins and Dent studies have additional sampling bias. For example, samples employed in both studies included Manning Gas and Oil Company. This company was acquired by Cotton Petroleum Company two weeks after issuance of the FASB exposure draft. Given the heavy speculative selling and/or buying of common stocks which customarily takes place around the time of acquisitions and mergers, the propriety of including companies such as Manning Gas and Oil in the samples is highly questionable.

The final sampling issue relates to the Collins and Dent study. The sample of firms employed in that study was the same sample as that used in Report 2 of the Dyckman study (72 full cost and 41 successful-efforts firms).[22] The Collins and Dent study, however, excluded (among other categories) Canadian companies from its sample on the grounds that "both full cost and successful efforts methods remain as acceptable accounting alternatives in Canada and that Canadian firms are less dependent on U. S. capital markets than are U. S. firms."[23] To support their action, Collins and Dent presented a plot of the cumulative risk-adjusted returns for 51 U. S. full-cost firms versus the cumulative risk-adjusted returns for 15 Canadian full-cost firms. The result of their analysis showed a poorer performance for U. S. full-cost firms than for Canadian full-cost firms in the six months following issuance of the FASB

---

[22]Dyckman, op. cit., Report 2, pp. 18-20.

[23]Collins and Dent, op. cit., p. 2.

exposure draft. In this dissertation, too, the behavior of the risk-adjusted returns for Canadian and U. S. full-cost companies included in the Collins and Dent study that are listed on the national exchanges (i.e., 13 Canadian companies versus 32 U. S. companies) has been analyzed. The result of this analysis is illustrated in Figure 11 of Appendix A, which shows that the behavior of the risk-adjusted returns for the two groups of firms is not significantly different in the period following issuance of the exposure draft.[24] On the basis of this outcome, Canadian firms are included in the sample of firms which is selected for the present sutdy in order to enhance the power of the statistical methodology.[25]

The preceding discussion suggests that a re-examination of the market impact of the FASB exposure draft would be both desirable and potentially fruitful.

Research hypothesis.--On the basis of the above discussion and of public response to the issuance of the FASB exposure draft, two hypotheses were tested.

---

[24]In order not to introduce any bias into the analysis, the same market index, return measures, and time period as those used by Collins and Dent were used to construct Figure 11.

[25]The power of an experimental methodology is defined as the probability of rejecting the null hypothesis when the alternative hypothesis is true. Power is equal to 1 - (probability of committing a type-II error). One of the two most common procedures for increasing power is to increase the size of the sample. See, Roger E. Kirk, Experimental Design: Procedures for Behavioral Science (Belmont, California, 1968), pp. 2 and 31.

1. During the weeks surrounding issuance of the exposure draft, the returns from common stocks of companies using full costing performed poorly when compared with those of companies using successful-efforts accounting.
2. Small full-cost firms were affected more adversely than large full-cost firms.

The Market Impact of the SEC Proposal

The second event of interest to this study is the recent (August 31, 1978) announcement by the SEC of proposed rules on oil and gas accounting. As previously noted, these rules require oil and gas producers to disclose a great deal of operating information including the present value of proved reserves, the amount of development and finding costs, and other data associated with oil and gas activities. In addition, the rules permit oil and gas producing companies to continue to use either full costing or successful-efforts accounting until RRA (previously described) has been developed and fully mandated. In announcing its decision, the Commission stated that it had concluded that requiring all companies to use the same costing method (full costing or successful-efforts accounting) in the interim period until RRA is fully developed would be costly and confusing. In essence, the SEC proposal will narrow the alternatives from many to two during the interim period and, further, will require full-cost companies to re-state and disclose certain

data as if Statement No. 19 had been followed. As a result, compliance with the SEC's requirements will affect all companies, both those using full costing and those using successful-efforts accounting. Considering the uncertainty about the feasibility of RRA, it is perhaps reasonable to expect the cost and confusion resulting from the SEC action to be almost as great as, or perhaps even greater than, if it had prescribed only one method.

This dissertation examines the reaction of market-participants to the proposed SEC rules. The purpose is to determine whether announcement of these rules provided the market with any "new information." If the analysis shows an information impact on stock returns resulting from release of the SEC rules, then the differential impact, if any, on the full-cost and successful-efforts oil and gas producers should be tested for its significance. The result of this test would help determine any competitive impact of the rules on different segments of the oil and gas exploration and production industry. (Concurrent with the release of its proposal, the SEC solicited public comments as to the possible impact of that proposal on oil and gas producers.)

Research Hypothesis.--The market impact of the SEC proposal is examined by testing the following hypothesis.

3. The release of the SEC rules had adverse effects on returns from common stocks of both companies using full costing and companies using successful-efforts accounting.

Research Procedures

The research method used in this dissertation study involves (1) selection of two samples of oil and gas producers, one sample from the national exchange, and the other sample from the OTC market, (2) classification of each sample into two groups on the basis of the accounting method followed (full costing or successful-efforts accounting), (3) developing a regression line to estimate the relation between the returns on stocks of each firm and the market portfolio, (4) computing the risk-adjusted returns from the regression line by comparing the forecasted and actual stock returns, and (5) testing the behavior of the risk-adjusted returns to measure the stock market effects of the FASB and SEC proposals.

The present study assumes that the stock markets are efficient to the extent that stock prices reflect all relevant public information rapidly and unbiasedly. In efficient markets, investors and, through them, stock prices adjust to new information as it becomes publicly available. Hence, the stock market effects of the FASB and SEC proposals are measured by examining returns from stocks of oil and gas producing companies during the period surrounding issuance of those proposals.

The time period for which stock prices are examined was divided into two subperiods: an estimation period in which coefficients of the regression line were developed, and a test period in which stock-price behavior was examined. A one-year estimation period which started on March 29, 1976, and ended on

March 29, 1977, was used for the analysis of the FASB exposure draft. For the analysis of the SEC proposal, a two-year estimation period was used.[26] That period started on March 29, 1976, and concluded on March 29, 1978. From that estimation period, however, the five weeks before and the five weeks after issuance of the FASB exposure draft were eliminated in order to stabilize the possible impact on beta (slop of the regression line) estimation from release of the exposure draft. The test period used for studying the FASB exposure draft consisted of thirty-two weeks surrounding the issuance of the exposure draft (i.e., the issue week, along with the eight weeks before and the twenty-three weeks after the issue week). For the analysis of the SEC proposal, the test period included twenty-six weeks around the issuance of that proposal (i.e., the issue week, along with the eight weeks before and the seventeen weeks after the issue week).[27]

---

[26]The two-year estimation period used for examining the effects of the SEC proposal is considered long enough for estimating the regression line with a reasonable degree of reliability. The reason for employing a one-year estimation period for analyzing the impact of the FASB proposal is that the previous investigation of the issue by the SEC, Dyckman, and Collins and Dent studies used an identical estimation period, thus making it possible to compare the results of this study with theirs.

[27]Lack of sufficient price data from the ISL Daily Stock Price Record manual (one of the sources of data collection used) at the time the study was conducted reduced the test period for the SEC proposal to only twenty-six weeks. The ISL manuals usually report the price data with approximately a three-month lag when they first become publicly accessible.

Two samples (Sample A and Sample B) of oil and gas producers were examined. Firms included in the initial samples were those employed in Sample B (113 companies) of Report 2 of the Dyckman study. However, lack of sufficient data, especially on stock prices, resulted in the elimination of a few companies from the initial samples. Sample A included only those oil and gas producers which were listed on the national exchanges throughout the period studied. Those firms were taken from the tapes constructed by the Center for Research in Security Prices (CRSP).[28] In studying the effects of the FASB exposure draft, forty-five full-cost companies and sixteen successful-efforts companies were included in Sample A. The size of that sample was, however, modified to thirty-seven full-cost companies and fifteen successful-efforts companies in studying the impact of the SEC proposal. The reason for the modification was that during the test period some of the chosen companies changed their method of accounting, liquidated their oil and gas properties, etc.

Sample B, on the other hand, included those producing firms which were traded in the OTC market throughout the study period. The ISL Daily Stock Price Record of Standard & Poor's Corporation was used for collecting stock prices. That sample was modified in analyzing the SEC proposal, resulting in sixteen full-cost and seventeen successful-efforts firms. In

---

[28]The Center for Research in Security Prices (CRSP) at the University of Chicago is sponsored by Merrill Lynch, Pierce, Fenner and Smith Incorporated.

addition, the full-cost firms included in each sample were classified into a subgroup of small firms and a subgroup of large firms (based on the companies' operating revenues) in order to measure the differential effects on small full-cost firms versus large full-cost firms from issuance of the FASB exposure draft.

The test procedures followed in this research can be summarized as follows.

1. The market model of Sharpe[29] and Lintner[30] was used to estimate the relation between returns on common stocks of an individual firm and the market portfolio in the estimation period. This relationship was estimated by fitting the ordinary least-squares regression to the return data. The regression model may be represented as

$$R_{it} = a_i + b_i R_{mt} + e_{it}$$

where R_{it} is the return on shares of firm i (defined as the sum of dividend yield plus relative price change) in period t, a_i and b_i are the estimated regression coefficients related to firm i, R_{mt} is the return on the market portfolio in time period t, and e_{it} represents an error term (residual return) having ordinary least-squares properties (an expected

---

[29]William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," Journal of Finance, 19 (September, 1964), 425-442.

[30]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.

value of zero and a constant variance of σ_i^2)

2. The regression equation developed in the estimation period, together with the actual weekly market returns in the test period, were used to estimate the forecasted returns for the test period. These forecasted returns were then subtracted from the actual returns during the test period to give forecast errors or risk-adjusted returns. These risk-adjusted returns reflect events unique to each specific firm which are not explained by the market. In mathematical notations, the risk-adjusted return, U_{it}, for stock i in week t is given by

$$U_{it} = R_{it} - (a_i + b_i R_{mt})$$

where a_i and b_i are the estimated regression coefficients, and R_{it} and R_{mt} are the actual returns for stock i and the market in week t of the test period, respectively.

3. The risk-adjusted returns, the U_{it}'s, were used as an experimental variable to examine the market effects of each proposal. For the FASB proposal, a form of controlled experiment, along with two-way analysis of variance, was employed to measure the differential impact of that proposal on the treatment group (i.e., full-cost companies) versus the control group (i.e., successful-efforts companies).

In a similar way, small full-cost firms and large full-cost firms included in each sample were contrasted.

4. To study the impact of the SEC proposal, the risk-adjusted returns for all firms were combined in each week of the test period to get an average weekly risk-adjusted return figure for each sample group. These average figures were used as the experimental variable to examine the information impact of the SEC proposal. The operational test used for studying the SEC proposal involved a comparison of the mean of the distribution of the U_{it}'s for the test period versus that of the distribution of the e_{ir}'s from the estimation period. In addition, two-way analysis of variance was used again to test for the differential impact on full-cost firms versus successful-efforts firms which may have resulted from issuance of that proposal.

Limitations and Assumptions

The major limitations and assumptions of the study are as follows.

1. The study assumes that stock markets are efficient in the semi-strong form (i.e., that security prices reflect all publicly-available information rapidly). This form of market efficiency has been supported by a large body of empirical

studies as far as the NYSE and ASE are concerned. But, the extent of efficiency in the OTC market and regional exchanges needs further researchand investigation.

If stock markets are really efficient in the semi-strong form, then stock prices will reflect the market effects, if any, from issuances of the FASB and SEC proposals in the time periods for which stock prices are examined in this research. But, if stock markets are inefficient, and if these proposals contained material information, then there will be no assurance about the reaction of market-participants to the proposed rules in the test periods of the study. Under this condition, the study results would be inconclusive.

2. In evaluating the impact of the exposure draft of Statement No. 19, the treatments (the methods of accounting) can not be assigned to the control group (successful-efforts firms) and to the experiment group (full-cost firms) at random. This lack of randomization may result in a distorted experimental variable which in part could incorporate the effects of nuisance variables such as asset size, diversification, etc.

3. The return figure used for the market portfolio does not include dividends. This may distort the beta measurement. However, assuming a constant measurement distortion in the estimation period, the computed beta figures would be unaffected.

Organization of the Study

Chapter II of this dissertation study includes an extensive review of prior work. The topic of "Efficient Market Hypothesis"

is discussed and its forms, assumptions, and significance to this study are explained. In essence, the chapter reviews all related previous studies in order to provide the reader with a background on the subject.

Chapter III involves a detailed description of the research method followed in the study. Sampling and test procedures, along with the time-series models used, are described. Also, the statistical hypotheses tested as well as the statistical tests of significance conducted are set forth.

Chapter IV presents the research results. The results of the statistical tests run on the experimental variable, supplemented with graphical illustrations, are discussed.

Chapter V analyzes the research results and summarizes the study. For each event taken separately, conclusions are drawn as to the extent of its market impact and the underlying financial implications.

CHAPTER II

THE EFFICIENT MARKET HYPOTHESIS AND EMPIRICAL STUDIES OF OIL AND GAS COMPANY STOCKS

Introduction

The objective of this chapter is to present a brief discussion of the efficient market hypothesis and to review some of the empirical research studies of oil and gas company stocks which make use of that hypothesis. The chapter also attempts to explain the relation and significance of the efficient market hypothesis to the present research study.

It is not the purpose of the chapter to make a suggestion concerning acceptance or rejection of the hypothesis. But, on the basis of the discussion included, it is hoped that the reader will be able to develop his own judgement about the validity of the hypothesis, its merits and faults, and its significance for research in finance and accounting.

The Efficient Market Hypothesis

In the past two decades, the idea of market efficiency has been accepted by many persons in both the academic field and the financial community. What this efficiency means has been described by Lorie as

> the ability of the capital markets to function so that prices of securities react rapidly to new

> information. Such efficiency will produce prices that are appropriate in terms of current knowledge, and investors will be less likely to make unwise investments. A corollary is that investors will also be less likely to discover great bargains and, thereby, earn extraordinary high rates of return.[1]

The efficient market hypothesis is a theory used to explain the relationship between security price changes and information available to investors in the markets. In an efficient market, security prices reflect a concensus of the trading participants about the real worth of the security on the basis of all publicly-available information. As new items of relevant information become available, they are processed and interpreted by market participants, resulting in a series of random changes in a security's price. Consequently, security prices follow a "random walk" process.[2] In addition, reaction to news is instantaneous, or nearly so, in an unbiased fashion if a security market is efficient.

The significance of the efficient market hypothesis to investors is obvious. If the stock market is really efficient,

---

[1]James H. Lorie, "Public Policy for American Capital Markets," (Washington, D.C., U.S. Dept. of Treasury, 1974), p. 3.

[2]The idea of efficient market became known as a result of the empirical evidence which showed that stock prices followed a "random walk" process. A "random walk" process, commonly identified with the weak form of the hypothesis, is one in which "1) successive price changes are (statistically) independent, and 2) price changes conform to some probability distribution." See Eugene F. Fama, "The Behavior of Stock-Market Prices," Journal of Business, 38 (January, 1965), 35.

then the individual investors can gain no excess returns from the analysis of public information. That is, neither fundamental analysis of the firms, nor technical analysis of their past stock prices will enable investors to "beat the market." In regard to the technical analysis, Fama states that

> if the random walk model is a valid description of reality, the work of the chartist is of no value in stock market analysis. . . . the only way the chartist can vindicate his position is to show that he can consistently use his technique to make better than chance predictions of stock prices.[3]

Regarding the fundamental analysis, Fama also suggests that "if the random walk theory is valid and if security exchanges are efficient markets, then stock prices in any point in time will represent good estimates of intrinsic or fundamental values."[4] On this basis, he concludes that the fundamental analysis of public information by the analysts is of no value.

Despite its challenge to the value of security analysis in general, the efficient market hypothesis does not reject the possibility of obtaining excess returns from individual securities. In fact, the hypothesis applies to the market as a whole, not necessarily to an individual investor or individual securities. However, for obtaining returns higher than the market in general, one needs to have information that is not available to the market. Some advocates of the

---

[3]Eugene F. Fama, "What Random Walk Really Means," Institutional Investor, 2 (April, 1968), 40.

[4]Ibid.

hypothesis have shown that in general the excess returns from the analysis of firms and their stock prices do not justify the search and transaction costs involved.[5]

Requirements for an Efficient Market

For a market to be really efficient, several requirements have to be met. Black, Francis, Lorie and others[6] have set forth the following major requirements:

1. Effective Information Flow--the first prerequisite for investors' reaction to new information is that news must quickly and freely flow into the market.
2. Rational Investors--investors must be able to recognize efficient assets, those assets which provide the highest return for a given level of risk or the lowest level of risk for a specified level of return. The recognition of efficient assets would induce investors to place their money in those industries with relatively high earning power and to reap a relatively high rate of return.
3. Low Transaction Cost--transaction costs including brokers' commissions and sales taxes must be kept low enough to encourage potential buyers and sellers to take action in the securities market.

---

[5]A complete review of the evidence on the subject is detailed in: William F. Sharpe, Portfolio Theory and Capital Markets (New York, 1970), Chapter 8.

[6]See Fisher Black, "Toward a Fully Automated Stock Exchange," Financial Analysts Journal, 27 (July-August, 1971), 35; Jack C. Francis, Investment Analysis and Management (New York, 1972), p. 53; James H. Lorie, op. cit. p. 3.

4. Continuous Trading--the investors willing to sell or purchase securities have to be able to do so promptly, without a significant chance of facing a "thin-market"--a market in which there are insufficient bids and offers to price securities properly. In addition, execution of a small trade must not ordinarily affect security prices drastically.
5. Rapid Price Adjustment To New Information--the distribution system of new information must facilitate competition in the market. Existence of an independent financial press, absence of legal restrictions, and existence of a rapid and extensive communication system are essential.

Whether all of the above requirements for the efficiency of securities markets are necessary or sufficient is in dispute. Fama, for instance, has concluded that existence of transaction costs does not necessarily suggest that prices do not react to new information.[7] In addition, many writers argue that even the presence of substantial numbers of naive investors in the market does not conflict with the efficient market hypothesis. They suggest that the hypothesis requires only financial experts in sufficient numbers or wealth to make a market efficient. These experts compete for superior returns using public information. In this regard, Lorie and Hamilton state that

---

[7]Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, 25 (May, 1979), 383-417.

> There is a curious paradox. In order for the [efficient market] hypothesis to be true, it is necessary for many investors to disbelieve it. That is, market prices will promptly and fully reflect what is knowable about the companies whose shares are traded only if investors seek to earn superior returns, make conscientious and competent efforts to learn about the companies whose securities are traded, and analyze relevant information promptly and preceptively. If the efforts were abandoned, the efficiency of the market would diminish promptly.[8]

Forms of Efficient Markets

Three forms of efficient markets are identified in the finance literature today: "weak form," "semi-strong form," and "strong form."[9] These forms or levels of market efficiency differ with respect to the kinds of information that market prices are believed (hypothesized) to reflect. The weak form of the hypothesis states that market prices fully reflect all known information about the past security prices, trends, volumes and other technical data. Hence, it suggests that technical analysis such as charting practiced by many security analysts has no value in investment analysis. The semi-strong form states that the market prices fully reflect all public information in addition to information about the sequences of the past prices. This form directly challenges the fundamental analysis, suggesting that the study of corporate profits, economic factors, and other related information is of little value.

---

[8]See James H. Lorie and Mary T. Hamilton, The Stock Market: Theories and Evidence (Homewood, Illinois, 1973), p. 98.

[9]For a detail description of the topic, see Fama, "Efficient Capital Markets," Journal of Finance, 25 (May, 1970) 383-417.

The strong form states that the market prices fully reflect not only all public information, but they also reflect all non-public or "insider" information.

Application of the Efficient Market Hypothesis to the U. S. Stock Markets

The application of the efficient market hypothesis to the U. S. stock markets is a controversial matter. There are two major reasons for this controversy. First, the traditional views of security analysis reject the idea of market efficiency insofar as it implies that stock prices reflect all public information. Second, the hypothesis is new and complex and, hence, not fully understood. Over the last dozen years, however, a large number of empirical studies have tested the hypothesized stock-price behavior in different forms of the efficient market hypothesis. The results of many of these studies have supported the weak and semi-strong forms of the hypothesis for the prices of stocks traded on the New York Stock Exchange (NYSE) and the American Stock Exchange (ASE).[10] (A summary of two such studies is presented in the following section of the present chapter.) As far as the over-the-counter (OTC) market and regional changes are concerned, the notion of market efficiency needs further investigation and research, even though a study of the insurance company

[10]Some evidence appears to question the semi-strong form of the efficient market hypothesis. A summary of some of the studies which contradict (and also that of those supporting) the efficient market hypothesis is provided in Thomas Dyckman, David Downes, and Robert Magee, Efficient Capital Markets and Accounting: A Critical Analysis (Englewood Cliffs, New Jersey, 1975); also, see Sumner N. Levine, Financial Analysts Handbook (Homewood, Illinois, 1975), I, 1234-1294.

stocks (most of which traded OTC) by George Foster found its data consistent with that notion.[11]

Despite the results of the empirical tests, it must be recognized that the efficient market hypothesis is an extreme concept and, hence, it may not hold precisely in practice. What interests this dissertation research is, however, the degree to which U. S. stock markets are efficient (or inefficient). Depending on their characteristics, different stock markets could have different degrees of efficiency. The U. S. stock markets which include national exchanges, regional exchanges and the OTC market are not homogenous with respect to such factors as size and diversity of ownership of securities traded, trading mechanics applied, sophistication of investors, etc. It may be reasonable, on the basis of these differences, to assume that regional exchanges and the OTC market possess lower degrees of market efficiency than national exchanges, even though few studies have attempted to investigate this issue.

The Efficient Market Hypothesis and The Previous Studies of Oil and Gas Company Stock Prices

A large number of empirical studies have used stock-price behavior to assess the market impact of new information. The information of interest to this study is the announcement of a

---

[11]George Foster, "Earnings and Stock Prices of Insurance Companies," The Accounting Review, 50 (October, 1975), 686-698.

proposed change in accounting requirements in the oil and gas industry. Until August 29, 1978, when the SEC ordered development of reserve-recognition accounting, such announcements had generally taken the form of a proposal requiring a switch from full costing to successful-efforts accounting. As a result, the majority of studies conducted in this area have attempted to measure the stock market effects resulting from an announced elimination of full costing. This is one of the objectives of the present study, too.

Patz and Boatsman Study[12]

Patz and Boatsman of the University of Texas examined the market reaction to the APB's release of a memorandum on October 22, 1971, recommending a switch from full costing to successful-efforts accounting. The authors used return on a share of common stock as the experimental variable to test (1) the differential price behavior of the stocks of oil and gas producers using full costing as compared to those using successful-efforts accounting, and (2) the degree to which small and large full-cost companies were affected by the announced recommendation.

The Patz and Boatsman study (as well as the research studies discussed below) was conducted as a result of extensive reactions and protests against the proposed elimination of the full-cost method. As stated in the preceding chapter, advocates of full

---

[12]Dennis H. Patz and James R. Boatsman, "Accounting Formulation in an Efficient Markets Environment," Journal of Accounting Research, 10 (Autumn, 1972), 392-405.

costing argued that a switch to successful-efforts accounting would result in (1) lower earnings, (2) curtailment of exploration activities, and (3) additional difficulty in obtaining capital funds for those companies required to change their reporting method. These advocates believed that these effects would be substantial on small producers which reported on the basis of full costing. In addition, they suggested that the required use of successful-efforts accounting would restrict competition and discourage entry into oil and gas production and exploration by new interprises.

Patz and Boatsman employed a two-step procedure in their analysis. First, over the 26-week period prior to the date of the announced proposal by the APB (April 22, 1971 to October 22, 1971), a linear regression equation was developed. This equation was used to estimate the relation between the return on stocks of the sample firms and the market portfolio. (A complete description of this equation is given in Chapter III.) Then, based on that equation, the expected returns and forecast errors for the pretest period (two weeks before the event) and the impact period (five weeks after the event) were estimated. Their analysis utilized a sample consisting of a total of 49 full-cost and successful-efforts integrated oil and gas companies, all of which were traded on the NYSE. Each group of full-cost and successful-efforts companies was subdivided into two subgroups, small and large sizes

(according to the companies' gross revenue amounts), to conduct a two-way analysis of variance test.

The statistical results of this study showed that "the stock prices of the full-cost firms [and those of the successful-efforts companies] were not adversely affected at any time during the impact period. Likewise, small and large full-cost companies were not affected differently,"[13] Hence, Patz and Boatsman concluded that the market had evaluated the APB's proposal as a bookkeeping change with no real economic substance. This conclusion provided further support for the efficiency of the NYSE.

The Patz and Boatsman study has been re-examined recently (November-December 1978) by Melvin O'Connor and Daniel Collins.[14] O'Connor and Collins questioned the propriety of the sample of firms used by Patz and Boatsman because it pooled large integrated companies with small producing companies. They contended that "a switch from full cost to successful efforts accounting would typically affect the earnings of [small oil and gas] producers more adversely [than those of large integrated oil and gas companies], since exploration costs constitute a relatively larger proportion of their cost structure."[15] For this reason, O'Connor and Collins replicated the Patz and Boatsman study using the same methodological and testing procedures, but with a

---

[13] Ibid., p. 402.

[14] Daniel W. Collins, Warren T. Dent and Melvin C. O'Connor, "Market Effects of the Elimination of Full Cost Accounting in the Oil and Gas Industry," Financial Analysts Journal, 34 (November-December, 1978), 48-57.

[15] Ibid., p. 53.

sample which included a group of producing oil and gas firms and a group of integrated oil and gas companies. The results of their study did not show any significant market effect on stock prices of the integrated companies. However, for the producing firms, that study found that "beginning two weeks before the Board's [the APB's] announcement, both full-cost and successful-efforts firms experienced a marked downward drift in returns;"[16] but that the drop in returns for the firms which used full-cost accounting was dramatically larger than for the firms which used successful-efforts accounting.

Eskew Study[17]

Similarly, Robert Eskew of the University of Iowa in his study, issued in April 1975, addressed the question of whether a firm's adoption of specific accounting principles from several acceptable alternatives could influence its security prices. Using two comparable groups of full-cost and successful-efforts oil and gas companies, this study examined two issues: (1) the relative effects of full costing and successful-efforts accounting on financial data and (2) the subsequent influence of such data on share prices of the firms selected for the analysis.

In the first part of his research, Eskew compared two sample groups of full-cost and successful-efforts companies

---

[16] Ibid., p. 54.

[17] Robert K. Eskew, "An Examination of the Association Between Accounting and Share Price Data in the Extractive Petroleum Industry," The Accounting Review, 48 (April, 1973), 317-324.

on the basis of financial data such as revenue, earnings, growth and size of assets, earnings volatility, etc. The result of this comparison showed that "the adoption of one of these two accounting methods [full costing or successful-efforts accounting] relative to the other could affect the reported accounting data."[18] Based on this knowledge, in the second part of his study, Eskew attempted to measure the relationship between the accounting data and the share price behavior. The test procedure employed was to correlate the accounting measures of risk, estimated largely by the financial ratios of liquidity, solvency, and profitability, with the market risk measure, represented by beta or systematic risk.

The statistical results of this study showed that "each of the accounting risk measures for the successful-efforts sample was more highly associated with the market risk measure than was any of the accounting risk measures for the full-cost companies."[19] That meant, presumably, that the accounting data provided by the full-cost method was less consistent with the information set embodies in share prices.[20] Consequently, Eskew concluded that the market did not respond naively to the accounting data provided by full costing and

---

[18] Ibid., pp. 321-322.

[19] Ibid., p. 322.

[20] Similarly, Horace Brock and Barry King of North Texas State University have shown that correlation between accounting data and share price is much stronger for the firms using successful-efforts accounting than for the firms using full costing. Horace Brock and Barry King, "An Analysis of Stock Prices, Earnings, Reserves, Sources and Uses of Funds, and Expenditure Data for a Selected Group of Oil and Gas Producers, 1971-1976," An unpublished paper presented at the SEC hearings, March 30, 1978.

successful-efforts accounting, and that the adoption of either one of these two methods in lieu of the other did not seem to have the capability for affecting stock prices. The results of this study were, thus, consistent with the efficient market hypothesis.

Dyckman Study[21]

On behalf of the FASB, Thomas Dyckman of Cornell University attempted to measure the effects of issuing the exposure draft (July 15, 1977) and of the final adoption of Statement No. 19 (December 5, 1977) by the FASB on returns from securities of the full-cost and successful-efforts oil and gas producing firms. This study consisted of three reports; the first two reports examined the impact of the exposure draft and the third examined the effects of the final adoption of Statement No. 19.

The research method used in Report 1 was one of choosing an equal number (22) of full-cost and successful-efforts oil and gas producers, computing their common-stock returns, adjusting those returns for market factors, and testing the difference between the adjusted returns for the full-cost and successful-efforts sample firms over a 22-week period surrounding issuance of the exposure draft. Report 2, on the other hand, employed a research approach similar to the one used by Patz and Boatsman and the one used in this dissertation research. Two samples

---

[21]Thomas Dyckman, Report on the Effects of the Exposure Draft on the Returns of Oil and Gas Companies' Securities (Stamford, Connecticut, FASB, October, 1977).

were selected for analysis in Report 2: Sample A which consisted of 32 full-cost and 19 successful-efforts companies being heavily involved in oil and gas producing activities, and Sample B which included 72 full-cost and 41 successful-efforts companies in both producing and integrated categories.

Using parametric statistical tests, distributions of returns before and after the date of issue of the exposure draft were contrasted. The test results of Report 1 did not show a statistically-significant information impact from issuance of the exposure draft over the entire test period--the 22 weeks around the exposure draft date. However, in the issue week, a transitory effect was observed. The same result was found for Sample A of Report 2. But for Sample B of Report 2, Dyckman found that during both the 21-week test period and the 11 weeks after the exposure draft date, the returns of the full-cost firms performed more poorly relative to those of the successful-efforts firms. Dyckman attributed the significance of this result to the difference in returns between full-cost and successful-efforts firms only during the last two weeks of the test period. Such a delayed market response, he believed, could be due to other economic factors arising after issuance of the exposure draft.

Report 3 of the Dyckman study examined the market impact of the final adoption of Statement No. 19 by the FASB on December 5, 1977. Using an approach similar to the one employed in Report 2, Dyckman studied returns from full-cost and successful-

efforts firms over a 4-month test period (October 10, 1977 to February 3, 1978). The statistical results of this study showed that the differential effect of Statement No. 19 on securities of full-cost and successful-efforts companies was not significant.[22]

Collins and Dent Study[23]

In a manner similar to the Dyckman study, Daniel Collins and Warren Dent of the University of Iowa evaluated the impact of the exposure draft of Statement No. 19 on a group of full-cost and successful-efforts companies. Their study conformed to that of Dyckman in its objectives, hypotheses, and overall methodology. However, the authors employed different statistical tests and sampling procedures.

The statistical tests used in the Collins and Dent study were nonparametric. As opposed to parametric statistical tests, nonparametric tests are distribution free, requiring no assumption of normality for distribution of data. As regards their sample selection procedures, they initially selected the sample of firms employed in Report 2 of the Dyckman study with two exceptions: 1) Canadian firms were excluded from their sample

---

[22]Thomas Dyckman, Report 3, on the Effects of Statement No. 19, Financial Accounting and Reporting by Oil and Gas Producing Companies, on Returns of Oil and Gas Company Securities (Stamford, Connecticut, FASB, March, 1978).

[23]Daniel W. Collins and Warren T. Dent, "An Assessment of the Stock Market Effects of the Proposed Elimination of Full Cost Accounting in the Extractive Petroleum Industry," International Paper Company, 220 East 42nd Street, New York, March 1978, pp. B-1 to B-34.

on the grounds that full-cost and successful-efforts accounting remained as acceptable alternatives in Canada and that these firms relied on U. S. capital markets relatively less than U. S. firms, and 2) both Canadian and U. S. firms involved in a major oil discovery in the West Pembina Devonian Area were excluded, too.

In contrast to the Dyckman study, Collins and Dent found that

> the proposal to eliminate full cost accounting was associated with a negative shift in the level of returns for full-cost firms relative to the level of those returns for successful efforts companies. This observed difference was found to be sustained over a 6-month period [July 15, 1977 to January 15, 1978].[24]

Relation of the Efficient Market Hypothesis to the Present Study

The present study assumes that the capital markets are efficient in the semi-strong form: security prices reflect all public information, including that contained in the proposed changes in reporting requirements specified by the FASB and SEC proposals. Thus, any conclusion about reaction of oil and gas stocks to issuances of the FASB and SEC proposals must depend on the correctness of this hypothesis.

As noted previsouly, a large number of empirical studies have supported the semi-strong form of market efficiency in the NYSE and ASE. But, any inference about the efficiency of the OTC market could be highly speculative, given the limited number of research conducted on securities traded in this market.

---

[24] Ibid., p. B-2

For that reason, separate studies of the equity securities of oil and gas companies traded on the national exchanges and in the OTC market were conducted in this dissertation research.

CHAPTER III

RESEARCH METHODOLOGY

Introduction

The research methodology used in the present study involved the following steps:

1. Selecting two samples of oil and gas producers, one from the universe of those producers traded on the national exchanges and the other from the population of the producers traded in the OTC market;
2. Classifying the firms included in each sample into two groups based on the method of reporting followed (i.e., full-cost or successful-efforts);
3. Using the market model to estimate the relation between the returns on the common shares of the individual firm and the market portfolio;
4. Computing the risk-adjusted returns (the experimental variable) for the test period from the regression line (the market model) by comparing the forecasted and actual returns; and
5. Testing the differential behavior of the risk-adjusted returns to measure the stock market effects, if any, resulting from issuances of the FASB and SEC proposals.

As noted previosuly, the research method followed assumes that stock markets are efficient to the extent that stock prices reflect public information rapidly and unbiasedly. The research is then designed to examine returns from common stocks of oil and gas producers in the weeks surrounding the issue dates of the FASB and SEC proposals in order to determine the market effects, if any, resulting from the announcements of those proposals. In efficient markets, the effects of such accounting proposals would be expected to show up in stock prices at or near the issue dates of those pronouncements rather than at a later time.

Time Periods Involved in the Study

The time period for which security prices were studied began on March 20, 1976, and concluded on December 23, 1978. This period consisted of two subperiods: an "estimation period," in which coefficients of the regression line were estimated, and a "test period," in which stock prices were examined.

The estimation period used for measuring the effects of the FASB exposure draft covered a period of one year, starting on March 29, 1976, and ending on March 29, 1977. For studying the effects of the SEC proposal, however, a two-year estimation period was used.[1] This period started on March 29, 1976, and

---

[1]As noted in Chapter I, the two-year estimation period used for examining the impact of the SEC proposal is considered long enough for estimating the regression line with a reasonable degree of reliability. The reason for employing a one-year estimation period for analyzing the effects of the FASB's proposed statement is that previous investigation of the issue by the SEC, Dyckman, and Collins and Dent studies used an identical estimation period, thus making it possible to compare the results of this study with theirs.

terminated on March 29, 1978. From this period, the five weeks before and the five weeks after the issue date of the FASB exposure draft (June 10, 1977 to August 12, 1977) were excluded. The reason for excluding these observations was to remove the effects on estimation of the regression line which could have resulted from high volatility of stock prices near the issuance of the FASB exposure draft.

The test period for examining the effects of the FASB exposure draft included the event week (July 15, 1977), along with the eight weeks before and the twenty-three weeks after the event week, whereas the test period for examining the effects of the SEC proposal consisted of the event week (August 31, 1978), along with the eight weeks before and the seventeen weeks after the event week.[2] The dates of these time periods appear in Table I.

Sampling Procedures

Two samples of firms were selected for empirical testing of each proposal: Sample A and Sample B. Firms included in both samples were taken from the sample of oil and gas producers (113 companies) employed in Report 2 of the Dyckman study.[3] In fact, the firms employed in the denoted sample in the Dyckman study were screened for the final selections of Samples A and B.

---

[2]As reported in Chapter I, unavailability of sufficient data from ISL manuals at the time this study was performed reduced the test period for the SEC proposal to only twenty-six weeks.

[3]The indicated sample is Sample B in Report 2 of the Dyckman study. See Thomas Dyckman, Report on the Effects of the Exposure Draft on the Returns of Oil and Gas Companies' Securities (Stamford, Connecticut, FASB, October, 1977), Report 2, pp. 18-20.

TABLE I

TIME PERIODS SUBJECT TO ANALYSIS

	Starting Date	Ending Date	Length (weeks)
FASB Exposure Draft			
Estimation period	March 29, 1976	March 29, 1977	52
Test period	May 20, 1977	December 23, 1977	33
SEC Proposal			
Estimation period	March 29, 1976	March 29, 1978	93*
Test period	July 7, 1978	December 29, 1978	26

*The eleven weeks surrounding the issuance of the FASB exposure draft (June 10, 1977 to August 12, 1977) were eliminated from the estimation period, giving an estimation period of ninety-three weeks.

The screening process resulted in the elimination of those firms for which data, primarily on stock prices, were not available in the estimation period and/or the test period.

Sample A included only the oil and gas producing companies that were listed on the New York Stock Exchange (NYSE) or the American Stock Exchange (ASE) throughout the period covered by the study. Another inclusion criterion for this sample was the availability of stock return data for the period of analysis on the tapes constructed by the Center for Research in Security Prices (CRSP) at the University of Chicago.[4]

[4]The Center for Research in Security Prices (CRSP) at the University of Chicago is sponsored by Merrill Lynch, Pierce, Fenner and Smith Incorporated.

Sample B included the firms traded in the over-the-counter (OTC) market. The ISL Daily Stock Price Record (a quarterly publication of Standard & Poor's Corporation) was used for computing return data for these companies. As stated in Chapter I, Canadian companies for which data were available were included in these samples to increase the power of the experimental methodology. The companies in each sample were classified into two groups according to the method of accounting used. The final samples chosen for studying the impact of the FASB exposure draft and their grouping appear in Table II.

TABLE II

GROUPING OF SAMPLE COMPANIES USED FOR MEASURING THE EFFECTS OF THE FASB EXPOSURE DRAFT

FASB Proposal	Full-Cost Companies	Successful-efforts Companies	Total
Sample A (New York Exchange and American Exchange)	45	16	61
Sample B (over-the-counter)	19	18	37

In addition, in order to evaluate the differential impact of the exposure draft on small full-cost companies versus large full-cost companies, the full-cost firms included in each sample

were subdivided into a subgroup of small firms and a subgroup of large firms as determined by the companies' operating revenue amounts reported for the fiscal years ending nearest to December, 1976. For Sample A, full-cost firms with revenues of $100 million or more were considered as large firms and full-cost firms with revenues less than $50 million were regarded as small firms. That procedure resulted in fifteen large full-cost firms and twenty-one small full-cost firms being chosen. For sample B, a sales revenue amount of $10 million was used as a cutoff level for subgrouping the full-cost firms into a subgroup of small firms and a subgroup of large firms. On that basis, a total of nine full-cost firms in Sample B fell into the subgroup of small firms and the remaining ten full-cost firms comprised the subgroup of large firms.

The sample selection process for measuring the effects of the SEC proposal began with the firms used for studying the effects of the FASB exposure draft. However, due to the change in both estimation and test periods, each firm included in the previous samples was analyzed for data availability, possible changes in method of accounting and/or in trading markets, etc. This analysis produced two qualified samples of producing firms, as shown in Table III. The names of firms included in each sample, along with classification of their reporting methods, are shown in Appendix B.

TABLE III

GROUPING OF SAMPLE COMPANIES USED FOR MEASURING THE EFFECTS OF THE SEC PROPOSAL

	Full-cost Companies	Successful-efforts Companies	Total
Sample A (New York Exchange and American Exchange)	37	15	52
Sample B (over-the-counter)	16	17	33

Test Procedures

The following test procedure was used in the present study. The steps described below apply to either of the two samples studied for each event.

Beta Estimation

The market model of Sharpe[5] and Lintner[6] was used to estimate the relation between the return on the shares of an individual firm and the market portfolio. This relation is assumed in the market model to be linear and it may be represented as

$$R_{it} = \alpha_i + \beta_i (R_{mt}) + \varepsilon_{it}$$

[5]William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," Journal of Finance, 19 (September, 1964), 425-442.

[6]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

$E(\varepsilon_{it}) = 0$,

$COV(\varepsilon_{it}, \varepsilon_{it}) = \sigma_i^2$ $\quad i$ = firm index

$COV(\varepsilon_{it}, R_{mt}) = 0$, $\quad t, p$ = time index

$COV(\varepsilon_{it}, \varepsilon_{ip}) = 0$,

R_{it} is the return on stock i in period t, defined as[7]

$$\ln [(P_{it} + D_{it}) \div P_{i,t-1}],$$

P_{it} is the closing price of stock i in period t (adjusted for stock splits and stock dividends),

D_{it} is the cash dividends on stock i in period t,

R_{mt} is the return on market protfolio in period t defined in a similar way to R_{it},

ε_{it} is the error term, or residual retrun, having a mean of zero and a variance of α_i^2; also being independent over time and uncorrelated with the return on the market portfolio,

α_i and β_i are the regression coefficients specific to stock i, and

β_i represents the systematic risk (beta) of stock i.

According to the market model, the stochastic portion of a security's return can be partitioned into two components: a systematic component ($\beta_i R_{mt}$), and a specific component (ε_{it}). The systematic component of return reflects the association of movements of an individual security's return with the market factor. The specific component of return, however, reflects

---

[7]The return figures used in analyzing the firms traded in the OTC market did not include dividend data. Sharpe and Cooper have shown that the exclusion of dividends from the return data does not alter the statistical results of such empirical studies. See William F. Sharpe and Guy M. Cooper, "Risk-Return Classes of New York Stock Exchange Common Stock, 1931-1967," Financial Analysts Journal, 28 (March-April, 1972), 46-54.

that portion of a security's return that varies independently of the market factor. Accordingly, b_i represents an estimate for the systematic or unavoidable risk of the security and measures the securities' sensitivity to market-wide events. Whereas, the variance of the specific component of return changes (σ_i^2) estimates the specific or diversifiable risk of the security. A rationale behind the use of the market model in the present context is provided by the fact that the model can be used to classify events into two major categories: (1) those events that have economy-wide effects, which are reflected in the market factor, and (2) those events that have impact on a particular security, which are reflected in the specific component. The announcements of the FASB and SEC proposals fall into the second group of events and, by definition, their effects would be reflected in the specific component.[8]

Ordinary least-squares regression was performed on the observed values of R_{it} and R_{mt} to obtain estimates a_i and b_i for the regression coefficients α_i and β_i, respectively. These coefficients were estimated using daily data for Sample A but weekly data for Sample B.[9] The market surrogates used for these

---

[8]William Beaver, "The Behavior of Security Prices and Its Implications for Accounting Research (Methods)," The Accounting Review, 47 (1972), 410-411.

[9]The daily return data were used to estimate the coefficients of the regression line for the companies in Sample A for two reasons: (1) the convenience in collection of data from CRSP tapes for that sample, and (2) the likelihood of obtaining more reliable values for the estimated coefficients from the daily data rather than the weekly data.

samples were different. The value of the Standard & Poor's Composite Stock Price Index was used in analyzing Sample A (which contained only the NYSE and ASE companies) and that of the National Association of Securities Dealers Automated Quotation (NASDAQ) Index was used in studying Sample B (which included only the OTC companies).

Risk-Adjusted Returns

The least-squares estimates of the regression coefficients (a_i and b_i) found in the estimation period, together with the actual market returns (R_{mt}'s) in the test period, were used to forecast returns for the test period. These forecasted returns were then compared with the actual stock returns during the test period to obtain forecast errors. The forecast errors represent the abnormal returns from security i in each week of the test period which are not explained by the market-wide elements of price changes. The forecast error, U_{it}, of stock i in week t is given by

$$U_{it} = R_{it} - (a_i + b_i R_{mt})$$

where

R_{it} is the actual return on stock i in week t,

and $(a_i + b_i R_{mt})$ is the forecasted return for stock i in week t.

These forecast errors (hereafter referred to as 'risk-adjusted returns') were used as an experimental variable to examine the effects of the FASB exposure draft and those of

the SEC proposal on stock prices. In addition, the risk-adjusted returns across each week of the test period for the companies involved in each group (full-cost or successful-efforts) were combined to compute a weekly average return figure for each sample group. Using these average figures, cumulative risk-adjusted figures related to each week of the test period were obtained. These cumulative figures were used primarily for graphical illustrations.[10]

Statistical Testing of Risk-Adjusted Returns

In order to apply the powerful parametric statistical tests on the experimental variable, U_{it}, two major assumptions were made. First, it was assumed that the distribution of returns and disturbances (residuals) from the estimation period, and that of risk-adjusted returns for the test period were normal. Second, it was also assumed that U_{it}'s were independent (i.e., that they had a zero serial correlation coefficient) both over time and cross-sectionally. The assumption regarding the cross-sectional independence of U_{it}'s ignores correlation of risk-adjusted returns due to industry effects found by Benjamin King.[11] (Ideally, the industry effects should have been removed through regression in order to arrive at error terms which would reflect return changes attributable only to factors unique to each company.) The industry effects

---

[10]The cumulative return figures are serially dependent (correlated over time) and, hence considered inappropriate for the statistical tests conducted in the present study.

[11]Benjamin F. King, "Market and Industry Factors in Stock Price Behavior," Journal of Business, 39 (January, 1966), 139-190.

were not removed from the securities' returns because King's study has found that these effects explain only about 10 percent of the variations in stock price changes.

Different statistical procedures were used to test the market effects resulting from issuances of these proposals. These procedures are discussed below.

FASB exposure draft.--The statistical procedure used for studying the effect of the FASB exposure draft utilized a "control" group of firms and a "treatment" group of firms. Since the exposure draft proposed to require all oil and gas producers to report on the basis of successful-efforts accounting and, hence, to eliminate full costing, the successful-efforts firms were treated as a control group whereas the full-cost firms were considered as a treatment group. In effect, a form of controlled experiment (along with parametric analysis of variance) was used to examine the behavior of the experimental variable.

The differential behavior of U_{it}'s for full-cost and successful-efforts companies was then tested for its significance. A significant difference between the two sets of U_{it}'s for full-cost and successful-efforts companies would indicate that one or more events had occurred that affected, on the average, share prices of one or both groups of companies. If the mean of U_{it}'s for the full-cost group should be significantly lower than the mean of U_{it}'s for the successful-efforts group,

then the effect would be attributed to release of the FASB exposure draft, among other factors having differentiating effects on full-cost companies.

Likewise, if the mean of U_{it}'s for small full-cost firms should be significantly lower than that of large full-cost firms, then it would be concluded that issuance of the exposure draft (among other factors) had a more discernible impact on stock prices of small full-cost firms than on stock prices of large full-cost firms.

Two-way analysis of variance with repeated measures was used to test the experimental variable, U_{it}. The layout of the design included methods of accounting (full-cost and successful-efforts) as independent variables and time (weeks) involved in the test period as repeated measures.[12]

The weekly values of U_{it}'s for the companies included in the full-cost group and in the successful-efforts group were analyzed for each sample separately. The research hypothesis leading to this experiment was then evaluated by testing the following null hypotheses.

N1: There is no significant difference between the means of U_{it}'s for the two groups of full-cost and successful-efforts companies.

N2: There is no significant interaction between time (week) and method of accounting used. That is, the U_{it}'s for

---

[12]For a complete description of two-way (or two-factor) analysis of variance, see Roger E. Kirk, Experimental Design: Procedures for the Behavioral Sciences (Belmont, California, 1968), pp. 171-244.

full-cost and successful-effort groups do not behave differently in any way for the different weeks of the test period.

N3: There is no significant difference between the means of U_{it}'s for small full-cost companies and of U_{it}'s for large full-cost firms.

N4: There is no interaction between time (week) and size of full-cost companies. That is, the U_{it}'s for small and large full-cost companies do not behave differently in any one of the weeks of the test period.

The SEC proposal.--The statistical procedure used for studying the market effects of releasing the SEC proposal involves a comparison of the distribution of residuals from the estimation period, ε_{ir}'s, versus that of risk-adjusted returns estimated for the test period, U_{it}'s. In particular, the means of the distributions of ε_{ir}'s and U_{it}'s were initially standardized and subsequently tested. The test procedures followed in this part of the study are described in detail in a recent study by James Patell.[13] A brief discussion of that method is given below.

If equation (1) is valid in the test period for firm i, the risk-adjusted returns, U_{it}'s, will be distributed with the following properties:

$$E(U_{it}) = 0,$$

$$COV(U_{it}, U_{ip}) = 0,$$

---

[13]James M. Patell, "Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical Tests," Journal of Accounting Research, 14 (Autumn, 1976), 246-276.

$$\text{COV}\ (U_{it},\ U_{it}) = C_{it}\ \sigma_i^2, \qquad i = \text{firm index}$$

$$\text{COV}\ (U_{it},\ R_{mt}) = 0, \qquad t,p = \text{time index}$$

where C_{it} is a correction factor which reflects the increase in variance due to prediction outside the estimate period, given by

$$C_{it} = 1 + \frac{1}{T} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{r=1}^{T} (R_{mr} - \bar{R}_m)^2}$$

T = number of weeks in the estimation period (52 weeks)

$\bar{R}_m = \frac{1}{T} \sum_{r=1}^{T} R_{mr}$ = the average market return during the estimation period.

The U_{it}'s for the test period were transformed to standardized scores. The transformation involves subtracting each individual score (U_{it}) from the hypothesized mean (zero) and dividing the result by the hypothesized standard deviation ($\sigma_i \sqrt{C_{it}}$). That is,

$$\text{Standardized Value of U} = \frac{U_{it} - 0}{\sigma_i \sqrt{C_{it}}}$$

The standardized value of residuals from the estimation period have, by construction, a mean of zero. The statistical test of significance performed, thus, involves measuring deviations of the standardized values of U_{it}'s from zero in order to establish whether there was a shift in the level of returns over time.

This test is run on the mean values of the standardized U_{it}'s over the whole test period and the subperiods before and

after release of the SEC proposal. If there is no significant difference in the means of the standardized returns between the estimation and test periods, then it would be concluded that there has been no relevant information released to the market (including any information from the announcement of the SEC proposal) which affected the returns from common stocks of the sample firms significantly. On the other hand, a significant difference in the means of the two sets of residuals indicates that an information was released to the market (possibly issuance of the SEC proposal) which changed the return behavior of common stocks of the firms involved. The statistical tests are performed on the standardized mean values for each group of firms (full-cost and successful-efforts) separately.

As explained in the Patell's study, the standardized values of U_{it}'s are distributed as Student-t statistics with T-2 degrees of freedom.[14] These standardized values can be summed and then normalized to make the cumulative (through time) average standardized risk-adjusted returns. Under certain assumptions, the cumulative values conform to the z distribution, allowing performance of z test.[15] Therefore, z-table is used to find the probability levels associated with the differences in cumulative residuals from the estimation period and cumulative risk-adjusted returns for the test period.

---

[14] Ibid., p. 256.

[15] Ibid., pp. 256-257.

The research hypothesis embodied in the study of the SEC proposal is translated into statistical hypothesis and evaluated by the following null hypothesis.

N5: There is no significant difference in the means of returns between the estimation and test periods. That is, the means of the standardized values of U_{it}'s in the test period are not significantly different from zero.

CHAPTER IV

RESULTS OF THE STUDY

Chapter IV presents results of the statistical tests conducted on the risk-adjusted returns (the experimental variable), along with evaluations of the statistical hypotheses stated in the preceding chapter. The first part of this chapter includes the test results of the effects of the FASB exposure draft; the second part details the test results of the analysis of the impact of the SEC proposal. In addition, Appendices C and D provide further information which is supportive of the results reported in each part of this chapter. Appendix C includes the regression statistics for the analysis of return data for each sample in both the estimation period and the test period. Appendix D contains the average values of both raw (unstandardized) and standardized risk-adjusted returns for each week of the test period for all companies included in each sample group.

Results of the Analysis of Impact of the FASB Exposure Draft

Two-way analysis of variance was used to test the null hypotheses N1 and N2. The results of the tests performed appear in Tables IV and V. Table IV shows the F-ratios and

TABLE IV

ANALYSIS OF VARIANCE WITH REPEATED MEASURES
FOR THE STUDY OF THE IMPACT OF THE
FASB EXPOSURE DRAFT

Source of Variation	F-ratios and Levels of Significance for Time Period 5-20-77 to 12-23-77	
	F-ratio	Level of Significance
Sample A (NYSE and ASE companies)		
Between types of companies	0.06140	0.89920
Interaction between method of accounting and week	1.09140	0.33326
Sample B (OTC-traded companies)		
Between types of companies	0.70081	0.40821
Interaction between method of accounting and week	0.85192	0.70387
Sample A vs. Sample B (Listed full-cost companies vs. OTC full-cost companies)		
Between groups	7.16629	0.00949*
Interaction between trading market and week	1.42300	0.06145**

TABLE IV--Continued

F-ratios and Levels of Significance for Time Period			
7-22-77 to 12-9-77		9-9-77 to 12-23-77	
F-ratio	Level of Significance	F-ratio	Level of Significance
0.12203	0.72809	0.17092	0.68079
1.36067	0.13716	1.17502	0.27066
1.50475	0.22811	3.61472	0.06553**
0.86908	0.62237	0.99240	0.45745
4.94248	0.02986*	9.71535	0.00277**
2.10563	0.00366*	2.22868	0.00732*

TABLE IV--Continued

Source of Variation	F-ratios and Levels of Significance for Time Period 5-20-77 to 12-23-77	
	F-ratio	Level of Significance
Small vs. Large Full-cost Companies (Sample A)		
Between groups	0.12874	0.72195
Interaction between size of companies and week	0.89059	0.64029
Small vs. Large Full-cost Companies (Sample B)		
Between groups	0.76220	0.39480
Interaction between size of companies and week	1.02391	0.43309
Sample A vs. Sample B (Small full-cost companies vs. small full-cost companies)		
Between groups	5.52209	0.02580*
Interaction between trading market and week	1.68352	0.01167*

*$p < .05$: significant at the .05 probability level.

**$.05 < p < .10$: significant at the .10 probability level.

TABLE IV--Continued

F-ratios and Levels of Significance for Time Period			
7-22-77 to 12-9-77		9-9-77 to 12-23-77	
F-ratio	Level of Significance	F-ratio	Level of Significance
2.00246	0.16614	0.09993**	0.75384
0.05243	0.51711	1.14547	0.31218
0.53246	0.47551	2.73536	0.11649
0.68470	0.83409	0.86229	0.62982
2.85279	0.10194	7.76149	0.00931*
1.64697	0.04137*	1.11384	0.34083

their related levels of significance for the whole test period (May 20, 1977 to December 23, 1977), the twenty-one weeks after the issuance of the exposure draft (July 22, 1977 to December 9, 1977) and the final sixteen weeks (September 9, 1977 to December 23, 1977) of the test period. Means of the risk-adjusted returns for the two groups compared in each part of Table IV are shown in Table V. From the statistical results presented in Tables IV and V, the following observations can be made.

For neither Sample A nor Sample B can the null hypotheses N1 and N2 be rejected at the .05 significance level--the conventional testing level used in classical probability theory. However, for Sample B (OTC-traded companies) alone, the null hypothesis N1 can be rejected at the .10 level of significance. Even though the difference between the performance of the full-cost group and that of the successful-efforts group included in Sample B is not significant at the .05 level, this difference (reflected in the probability level of .065 in the second part of Table IV) is meaningful in the present context. Therefore, on the basis of the test results, the conclusion is reached that returns from common stocks of full-cost companies and from common stocks of successful-efforts companies traded on the national exchanges (Sample A) did not behave significantly different in any of the weeks involved in the test period. For the OTC sample (Sample B), however, it is concluded that at a time starting eight weeks

TABLE V

MEANS OF RISK-ADJUSTED RETURNS FOR THE COMPARED GROUPS FOR THE STUDY OF THE IMPACT OF THE FASB EXPOSURE DRAFT

	Time Period		
	5-20-77 to 12-23-77	7-22-77 to 9-12-77	9-9-77 to 12-23-77
Sample A			
Full-cost group	0.0049	0.0014	0.0055
Successful-efforts group	0.0052	0.0022	0.0046
Sample B			
Full-cost group	-0.0011	-0.0041	-0.0025
Successful-efforts group	0.0020	0.0023	0.0056
Sample A vs. Sample B			
Listed full-cost group	0.0049	0.0014	0.0055
OTC-traded full-cost group	-0.0011	-0.0041	-0.0025

TABLE V--Continued

	Time Period		
	5-20-77 to 12-23-77	7-22-77 to 9-12-77	9-9-77 to 12-23-77
Small vs. Large Full-cost Companies (Sample A)			
Small full-cost companies	0.0055	0.0034	0.0089
Large full-cost companies	0.0045	-0.0010	0.0075
Small vs. Large Full-cost Companies (Sample B)			
Small full-cost companies	-0.0030	-0.0034	-0.0056
Large full-cost companies	0.0009	-0.0003	0.0008
Sample A vs. Sample B (Small full-cost companies vs. small full-cost companies)			
Listed full-cost companies	0.0055	0.0034	0.0089
OTC-traded full-cost group	-0.0030	-0.0034	-0.0056

after issuance of the exposure draft the full-cost firms, on the average, performed poorly relative to successful-efforts firms. This can be observed from the comparision of the means shown in the second part of Table V.

A further analysis of the issue is provided in Figures 1 and 2. Both of these figures reveal that the market reacted to issuance of the FASB exposure draft. Figure 1 shows that the listed full-cost companies performed poorly relative to the listed successful-efforts companies only during the eight weeks following release of the exposure draft. This difference in return behavior was only temporary--a conclusion different from the one reached in the Collins and Dent study--[1]as the cumulative risk-adjusted returns for full-cost companies regained the level of those for successful-efforts companies in the last month of the test period. Figure 2, on the other hand, shows the disparity of the cumulative risk-adjusted returns for the companies traded in the OTC market. This figure reveals a considerable difference between the two sets of the cumulative risk-adjusted returns starting eight weeks after issuance of the exposure draft. This difference increased progressively with no indication of any reversal by the end of the test period--a conclusion contrary to the one reached

---

[1]Daniel Collins and Warren Dent, "An Assessment of the Stock Market Effects of the Proposed Elimination of Full Cost Accounting in the Extractive Petroleum Industry," International Paper Company, 220 East 42nd Street, New York, March, 1978, p. B-2

FIGURE 1

CUMULATIVE RISK-ADJUSTED RETURNS

5-20-77 THRU 12-23-77

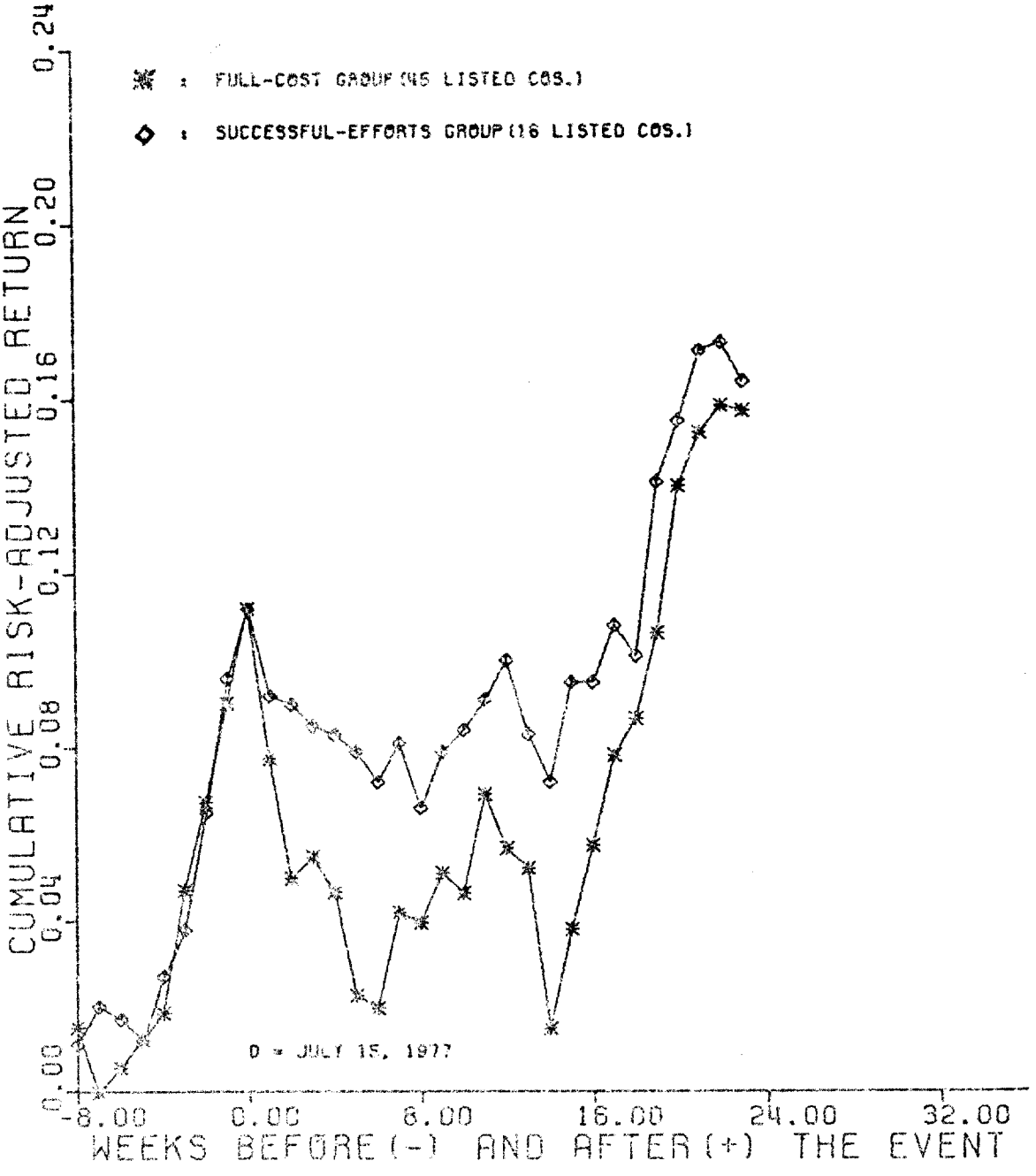
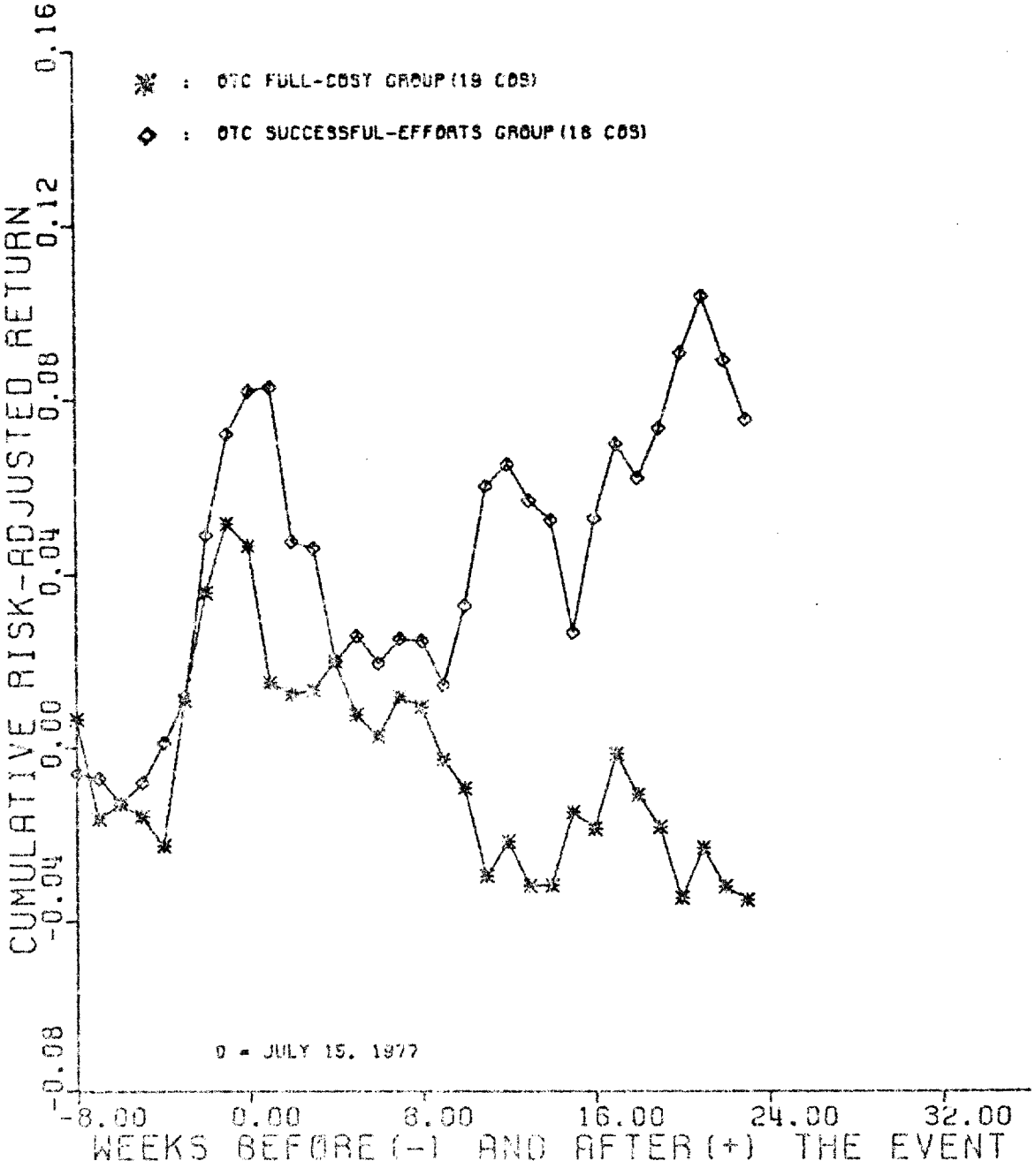


FIGURE 2

CUMULATIVE RISK-ADJUSTED RETURNS

5-20-77 THRU 12-23-77



in the Dyckman study.[2] The values of weekly average risk-adjusted returns for the sample groups involved in these figures (and also those for the other figures to appear later in this chapter) are given in Appendix D.

A comparison of the cumulative risk-adjusted-returns curves in Figures 1 and 2 suggests also that the stocks of companies in full-cost groups traded in the OTC market performed poorly compared to the general market (i.e., the average of stocks traded in the market), whereas the stocks of the other three groups of companies performed better than the general market. This point is reflected in a downsloping curve for the OTC-traded full-cost group but rising curves for the other groups. The curves shown in these figures (and also those to appear later in the chapter) demonstrate the cumulative average deviations (risk-adjusted returns) of the portfolio returns from the normal (longer-term historical) relationships with the market. The deviations are cumulative, thus, sloping upward to reflect positive deviations and sloping downward to indicate negative deviations.

In addition, the differential behavior of the risk-adjusted returns for the listed full-cost companies compared to the OTC-traded full-cost companies was tested for its significance. The results of the test are tabulated in the

---

[2]Thomas Dyckman, Report on the Effects of the Exposure Draft on the Returns of Oil and Gas Companies' Securities (Stamford, Connecticut, FASB, October, 1977), Report 2, p. 2.

third part of Tables IV and V. For all three periods tested, the mean differences between the risk-adjusted returns for the listed full-cost firms and the OTC-traded full-cost firms are significant at the 0.05 probability level. From a comparison of the means of the risk-adjusted returns for these sample groups, shown in Table V, it is concluded that, on the average, full-cost companies traded in the OTC market did not perform as well as the full-cost firms traded on the national exchanges.[3] Figure 3 illustrates this point. The difference in the cumulative risk-adjusted returns for the full-cost companies listed on the national exchanges and the full-cost companies traded in the OTC market shows a widening trend throughout the test period, especially in the period following issuance of the exposure draft.

Finally, the means of the risk-adjusted returns for small full-cost companies and those of the risk-adjusted returns for large full-cost companies were compared for each sample in the test period and the three subperiods comprising the test period. The results of tests performed are given in parts four and five of Tables IV and V. On the basis of those test results, the study fails to reject the null hypotheses N3 and N4 at the .05 or at the .10 testing level for either Sample A or Sample B in

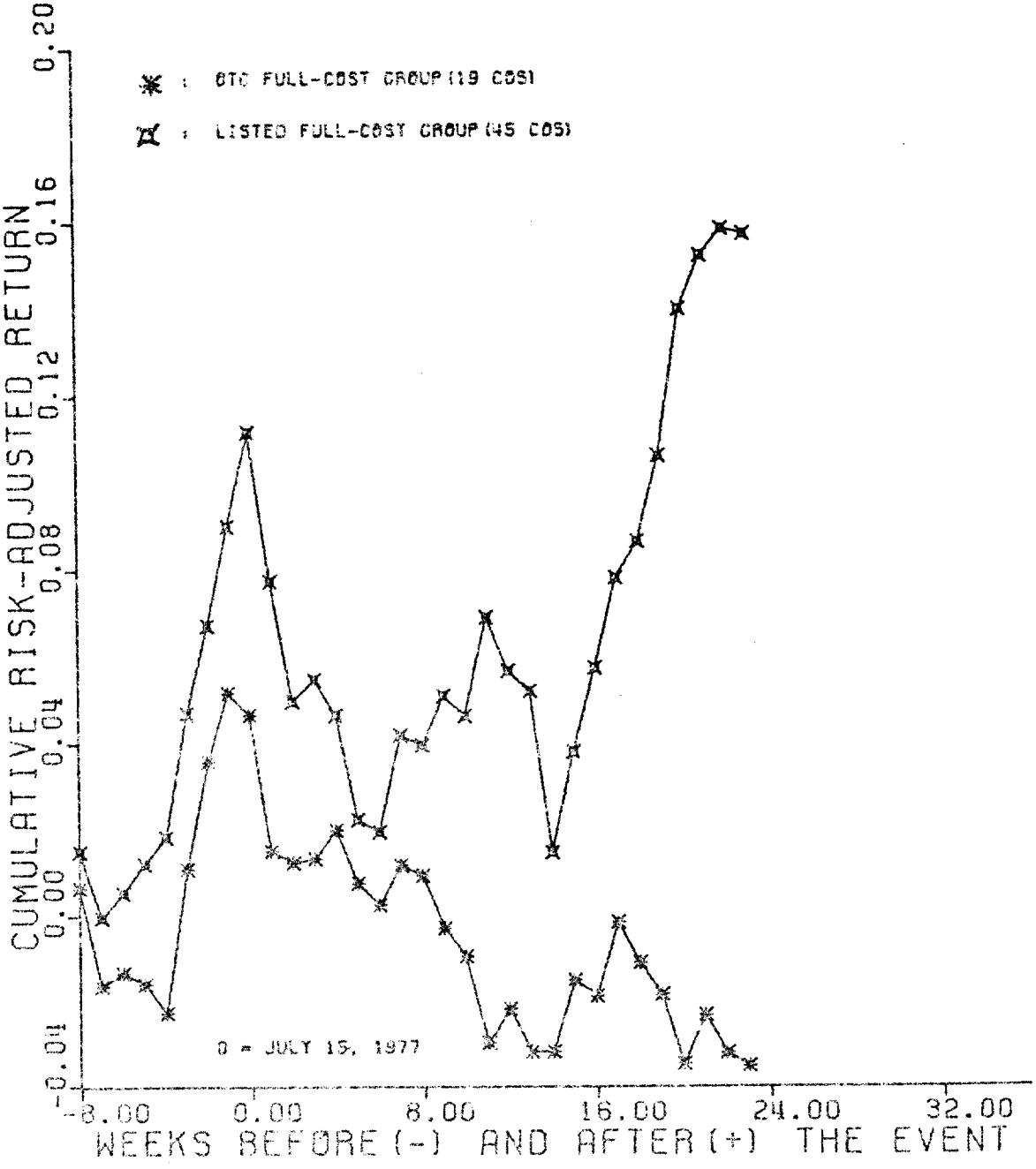
---

[3]The difference in returns performances during the test period for the two sets of successful-efforts firms (those traded on the national exchanges and those traded OTC) was also tested for significance. The results of the test conducted were not significant (reflected in a probability level of .43475, and means of .0052 and .0028 for the listed and the OTC-traded full-cost firms, respectively) at any reasonable testing level.

FIGURE 3

CUMULATIVE RISK-ADJUSTED RETURNS

5-20-77 THRU 12-23-77



any of the periods involved. Graphic presentations of the results are provided in Figures 4 and 5. Figure 4 shows that small and large full-cost firms traded on the national exchanges did not perform significantly different in the test period. Figure 5, illustrating the cumulative risk-adjusted returns for the full-cost firms traded in the OTC market, demonstrates that there was a considerable difference between the cumulative risk-adjusted returns for small full-cost firms compared to large full-cost firms developing eight weeks after issuance of the exposure draft. On the basis of these results, it is concluded that there was a meaningful difference between performances of the small and large full-cost firms traded in the OTC market in the test period. That difference is reflected in the probability level of .11 (see part five of Table IV) which is close to the testing level of .10. Furthermore, the test results from a comparison of the risk-adjusted returns for the small full-cost firms traded on the national exchanges versus those for the small full-cost firms traded in the OTC market are given in the last parts of Tables IV and V.[4] These results demonstrate a relatively poorer performance for the small full-cost firms traded in the OTC market relative to the small full-cost firms traded on the national exchanges.

---

[4]Also, see Figure 9 in the following chapter for comparative graphical illustrations of small and large groups traded in the two markets.

FIGURE 4

CUMULATIVE RISK-ADJUSTED RETURNS FOR THE LISTED COMPANIES 5-20-77 THRU 12-23-77

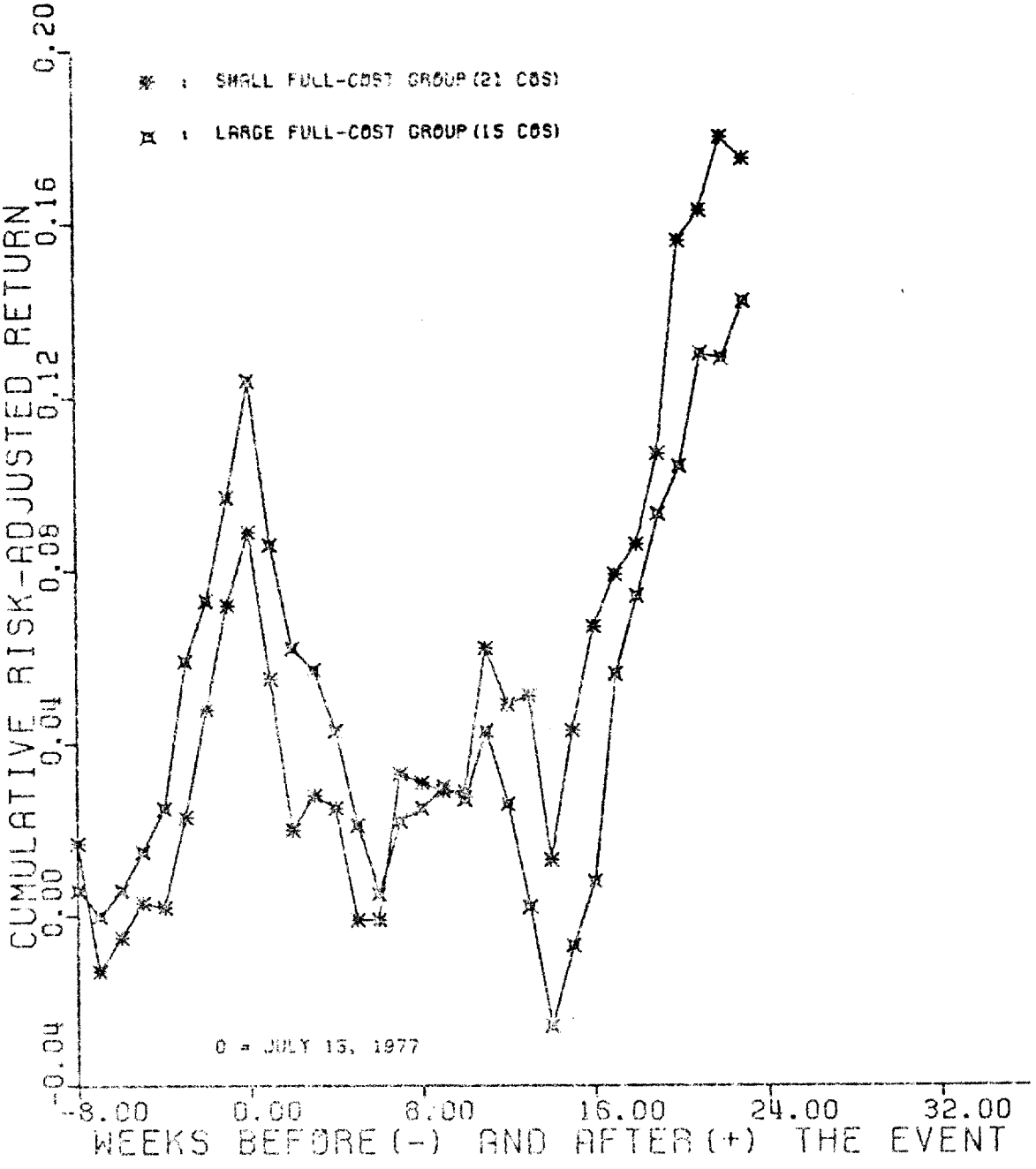
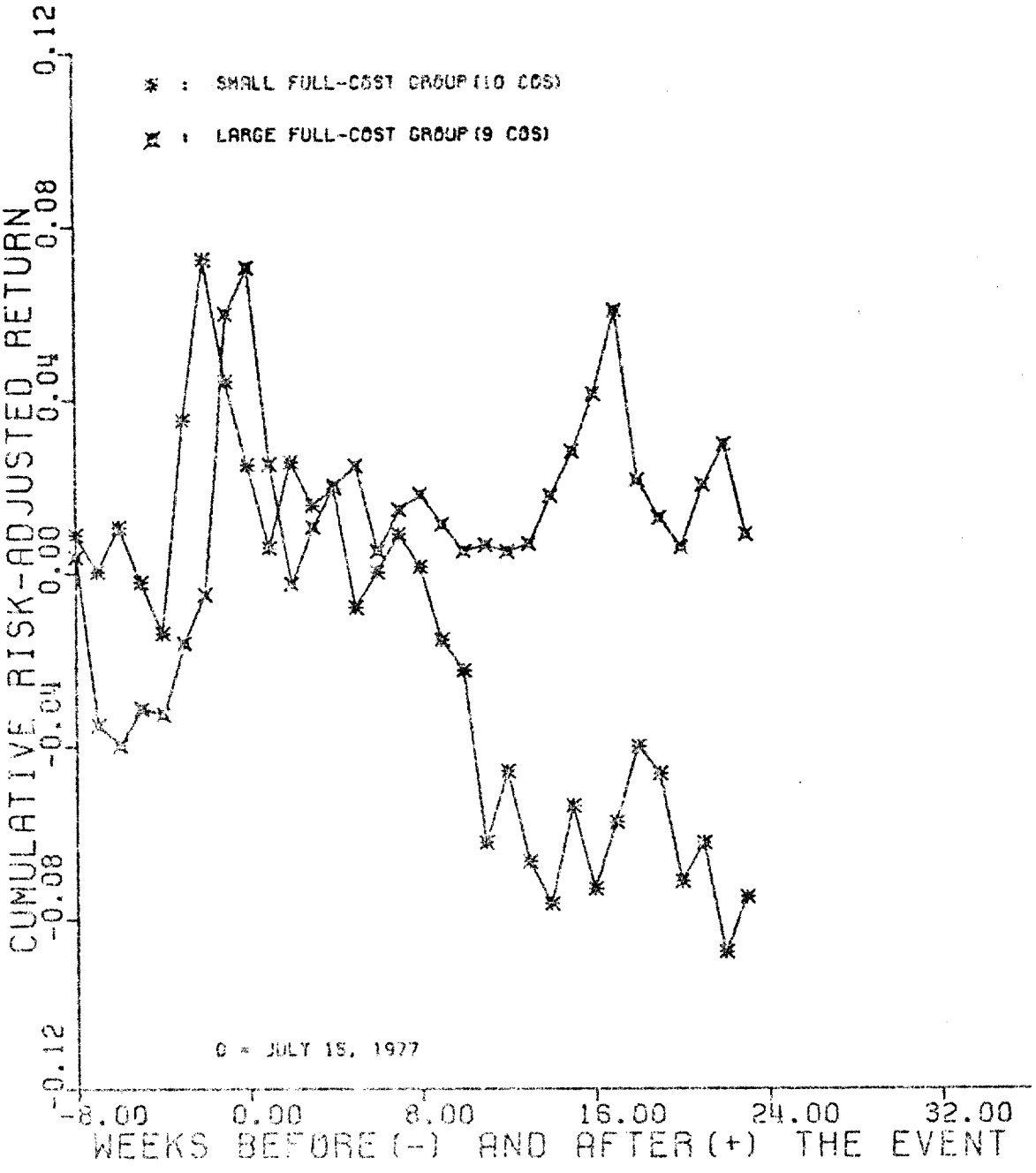


FIGURE 5

CUMULATIVE RISK-ADJUSTED RETURNS FOR THE OTC COMPANIES 5-20-77 THRU 12-23-77



Results of the Analysis of Impact of the SEC Proposal

As noted previously, the SEC's recent proposed rules on accounting for exploration efforts call for ultimate elimination of both full costing and successful-efforts accounting. These rules propose to require all oil and gas producers to prepare financial statements based on RRA--a method of accounting which capitalizes proved oil and gas reserves as assets and recognizes the estimated value of additions to proved oil and gas reserves as revenue. The following lines discuss the test results of examining the impact of issuance of the SEC rules on the valuation of stocks of those companies which have traditionally reported based on full costing or successful-efforts accounting.

Tables VI and VII provide the cumulative average standardized risk-adjusted returns for each of the two samples (listed companies and OTC-traded companies) over the whole test period and for three segments of the test period. Each cumulative value in the Tables represent the cumulative effect across firms and weeks which is given by[5]

$$\text{Cumulative Ave. Std. Risk-adjusted Return} = \frac{\text{(Sum of weekly average standardized returns)}}{\text{(Number of weeks in the test period) } 1/2}$$

The mean value of the standardized risk-adjusted return for each week of the test period averaged over all firms included in each

---

[5]James Patell, "Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical Tests," Journal of Accounting Research, 14 (Autumn, 1976), 256-257.

TABLE VI

TEST FOR A CHANGE IN THE MEAN VALUE OF RETURNS FROM RELEASE OF THE SEC PROPOSAL: SAMPLE A

Weeks in Test Period	Full-Cost Firms		Successful Efforts Firms	
	Cumulative Average Standardized Returns	Probability of More Extreme Value*	Cumulative Average Standardized Returns	Probability of More Extreme Value*
-8 to -1 (7-7-78--8-25-78)	-0.161345	0.163	-0.293546	0.128
0 to +8 (8-31-78--10-27-78)	-0.620413	0.008	-0.152184	0.278
+9 to +17 (11-3-78--12-29-78)	+0.473060	0.002	+0.857022	0.004
-8 to +17 (7-7-78--12-23-78)	-0.176193	0.142	+0.251860	0.165

*The probability figures are related to the risk-adjusted returns corresponding to the population values, estimated from the sample means. The population values are obtained by dividing the mean values in the Table by the square root of the number of companies included in each group. The probability figures correspond to a one-tailed test of the null hypothesis.

TABLE VII

TEST FOR A CHANGE IN THE MEAN VALUE OF RETURNS FROM THE RELEASE OF THE SEC PROPOSAL: SAMPLE B

Weeks in Test Period	Full-Cost Firms		Successful-Efforts Firms	
	Cumulative Average Standardized Residuals	Probability of More Extreme Value*	Cumulative Average Standardized Residuals	Probability of More Extreme Value*
-8 to -1 (7-7-78--8-25-78)	-0.3804	.071	+0.8253	.001
0 to +8 (8-31-78--10-27-78)	-0.5858	.012	-0.7997	.003
+9 to +17 (11-3-78--12-29-78)	+0.0609	.476	+0.0489	.421
-8 to +17 (7-7-78--12-23-78)	-0.5198	.022	+0.0161	.476

*The probability figures are related to the risk-adjusted returns corresponding to the population values, estimated from the sample means. The population values are obtained by dividing the mean values in the Table by the square root of the number of companies included in each group. The probability figures correspond to a one-tailed test of the null hypothesis.

sample is given in Appendix D. Based on the analytical method described in Chapter III, the individual values comprising the denoted mean values have been standardized so that their expected values would be zero if there has been no shift in the level of returns from the estimation to the test period. The probability levels shown in the Tables reflect the likelihood of obtaining values more extreme (in either the positive or the negative direction) than those obtained in the samples. Those probabililty levels have been found using the percentiles of the standardized normal distribution, a distribution characterized by a population mean of zero and a population variance of one.

The cumulative values for the entire test period (July 7, 1978 to December 29, 1978) are shown in the final rows of Tables VI and VII for samples A and B, respectively. As stated in the preceding paragraph, each of these values reflects the cumulative effect on returns from stocks of the firms included in the sample group (full-cost or successful-efforts) over the total test period. The results shown for Sample A in Table VI indicate that the cumulative value for full-cost firms is negative but that the one for successful-efforts firms is positive. This means that, on the average, the full-cost firms traded on the national exchanges performed more poorly, relative to the market, in the test period than in the estimation period. On the other hand, on the average, successful-efforts firms traded on the national exchanges performed better than the market during the same test period. The probability figures

shown in the adjoining columns in Table VI are not significant at the .05 or at the .10 probability level for either full-cost firms or successful-efforts firms, indicating that there was no significant change in the level of returns for these companies from the estimation period to the test period.

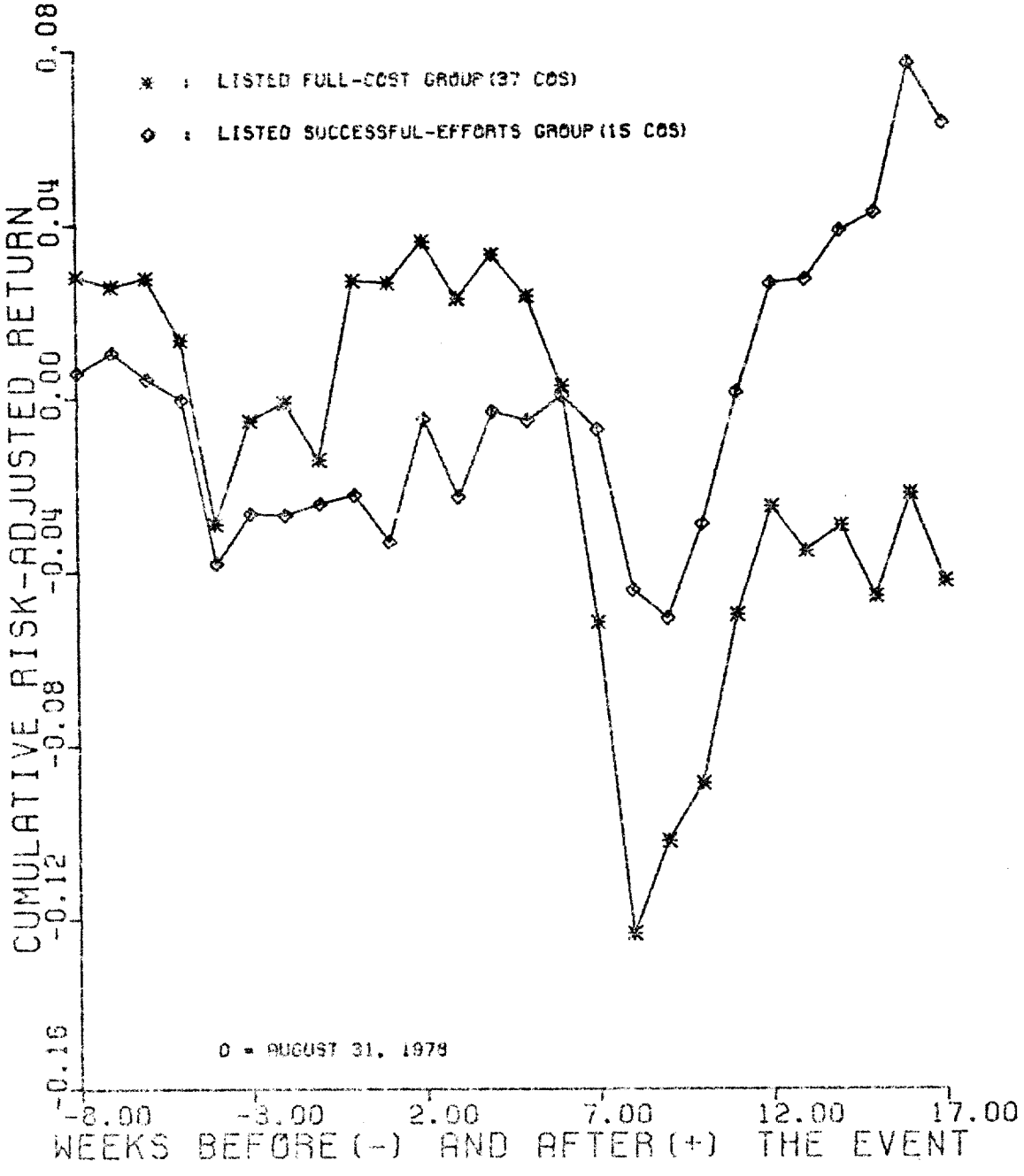
Table VII shows the statistical results from the analysis of Sample B. The cumulative values over the total test period are again negative for full-cost firms and positive for successful-efforts firms, as shown in the last row of the Table. These results suggest that the full-cost firms traded in the OTC market performed poorly compared to the market but that the successful-efforts firms traded in the OTC market performed better than the market. These results are identical to those found for Sample A (listed companies). However, the probability figures shown in Table VII demonstrate that for the test period as a whole--July 7, 1978 to December 29, 1978--only the drop in the level of returns for full-cost companies is significant at the .05 probability level, i.e., significant relative to their performance in the estimation period.

Figure 6 shows the behavior of the cumulative risk-adjusted returns in the test period for the companies traded on the national exchanges (Sample A). From that figure, several points are evident. First, in the eight weeks before release of the SEC proposal, both full-cost companies and successful-efforts companies performed poorly relative to the market. However, as Table VI demonstrates, the differences in performance of each

FIGURE 6

CUMULATIVE RISK-ADJUSTED RETURNS

7-7-78 THRU 12-29-78



of the two sets of companies and the market are not significant. Second, in the week that the SEC pronouncement was issued and the eight weeks following the week of issue, both groups of companies performed poorly compared to the market, as indicated by the decline in the level of cumulative returns. A contrast of the two cumulative-returns curves for that period shows a more pronounced decline in the level of returns for full-cost firms than in the level of returns for successful-efforts firms. However, as Table VI shows, only the decline in the mean of returns for full-cost firms is significant. Third, in the final nine weeks of the test period, both sets of companies did significantly (see Table VI) better than the market, as evidenced from rising cumulative-returns curves in that period. Finally, over the total test period, full-cost companies performed poorly relative to both successful-efforts companies and to the market. (The weekly average values of the risk-adjusted returns are given in Appendix D.)

Because of the inferiority of the performance of full-cost companies relative to that of successful-efforts companies, the difference in the means of the risk-adjusted returns for the two sets of firms in the test period was tested for its significance. The results of the two-way analysis of variance are presented in the first parts of Tables VIII and IX. These results show that there is no significant difference between the means of the risk-adjusted returns for full-cost firms and those for successful-efforts firms in the whole test period. However, for the week

TABLE VIII

ANALYSIS OF VARIANCE WITH REPEATED MEASURES
FOR THE STUDY OF THE IMPACT OF THE
SEC PROPOSAL

Source of Variation	F-ratios and Levels of Significance for Time Period			
	7-7-78 to 8-25-78		8-31-78 to 10-27-78	
	F-ratio	Level of Significance	F-ratio	Level of Significance
Sample A (NYSE and ASE companies)				
Between types of companies	0.11070	0.74074	5.89076	0.01887*
Interaction between method of accounting and week	0.73432	0.64304	2.76069	0.00559*
Sample B (OTC-traded companies)				
Between types of companies	10.00074	0.00349*	0.06123**	0.80620
Interaction between method of accounting and week	3.28075	0.00246*	1.33706	0.22543

*$p < .05$: significant at the .05 probability level.

**$.05 < p < .10$: significant at the .10 probability level.

TABLE VIII--Continued

Source of Variation	F-ratios and Levels of Significance for Time Period			
	10-3-78 to 12-29-78		7-7-78 to 12-29-78	
	F-ratio	Level of Significance	F-ratio	Level of Significance
Sample A (NYSE and ASE companies)				
Between types of companies	0.43865	0.51083	2.23204	0.14144
Interaction between method of accounting and week	0.68065	0.70863	1.42831	0.07907**
Sample B (OTC-traded companies)				
Between types of companies	0.00056*	0.98134	2.94380	0.07377**
Interaction between method of accounting and week	1.13681	0.33890	1.99385	0.00334*

*$p < .05$: significant at the .05 probability level.

**$.05 < p < .10$: significant at the .10 probability level.

TABLE IX

MEANS OF RISK-ADJUSTED RETURNS FOR THE COMPARED GROUPS
FOR THE IMPACT STUDY OF THE SEC PROPOSAL

	Means for Time Period			
	7-7-78 to 8-25-78	8-31-78 to 10-27-78	11-3-78 to 12-29-78	7-7-78 to 12-29-78
Sample A				
Full-cost group	-0.0018	-0.0121	0.0090	-0.0016
Successful-efforts group	-0.0030	-0.0022	0.0119	0.0024
Sample B				
Full-cost group	-0.0101	-0.0169	0.0000	-0.0090
Successful-efforts group	0.0175	-0.0187	-0.0001	-0.0017

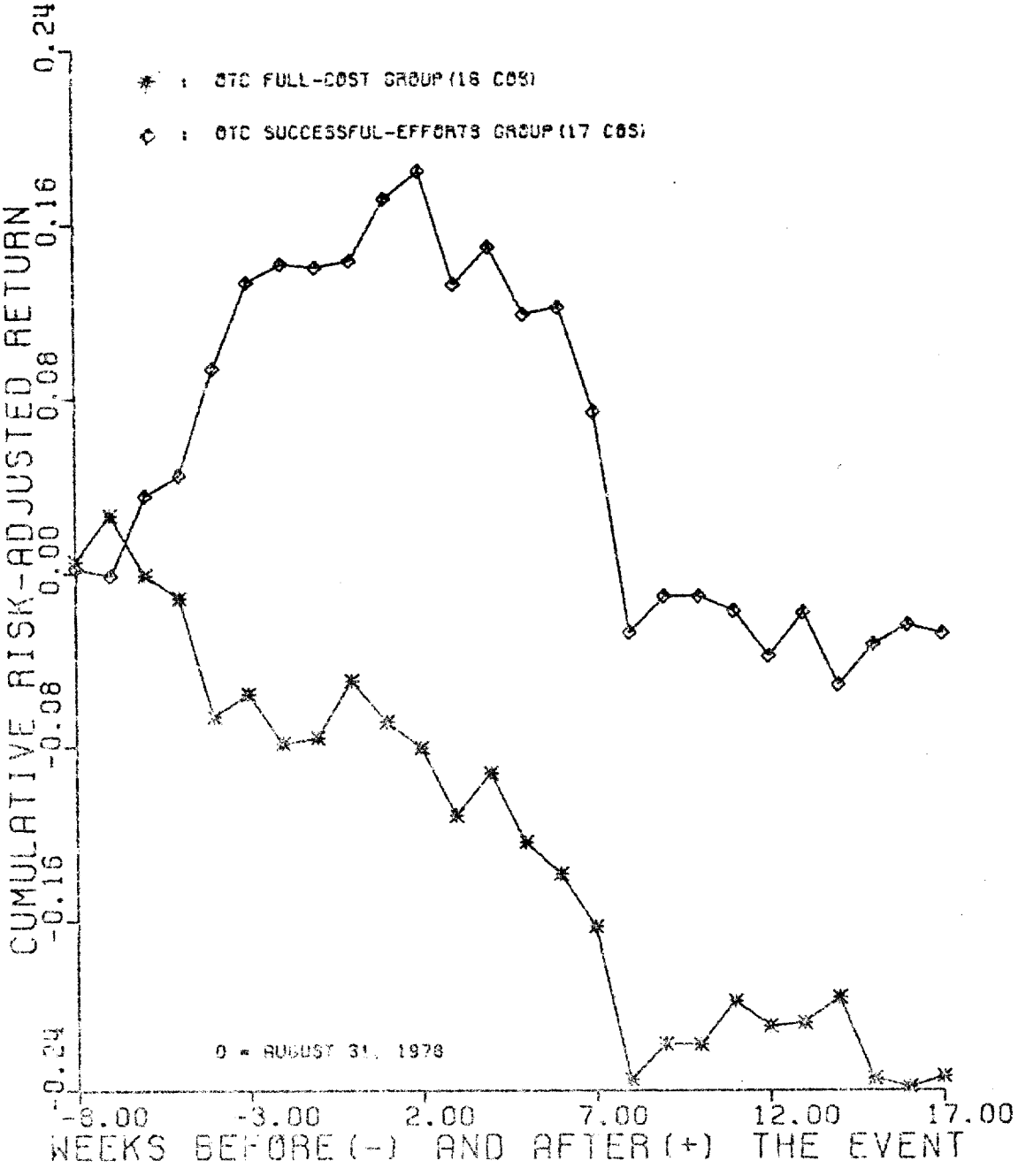
of issue and the eight weeks following the week of issue, full-cost firms did significantly worse than successful-efforts firms, as indicated by the probability level of .018 in Table VIII and also by a comparison of the means in Table IX.

Figure 7 shows the behavior of the cumulative risk-adjusted returns in the test period for the companies traded in the OTC market (Sample B). From that figure, the following observations are made. First, in the eight weeks prior to release of the SEC proposal, full-cost firms performed significantly poorly compared to the market in general, whereas successful-efforts firms performed significantly better than the market. (See the significance levels in Table VII.) An explanation of such a disparity in returns performances between the two sets of companies is provided by the presumption that the trading audience in the OTC market had anticipated that the SEC would adopt the method of reporting (i.e., successful-efforts accounting) specified in FASB Statement No. 19. On that basis, traders may have speculated heavily on stocks of the companies involved, buying those of successful-efforts companies but selling those of full-cost companies. Second, in the week of issue and the eight weeks following the week of issue, the level of returns for both sets of companies dropped drastically. As Table VII shows, the drop in the level of returns, relative to the market, for both full-cost and successful-efforts firms is significant at the .05 testing level. Third, for the final nine weeks of the test period, both full-cost and successful-efforts firms performed

FIGURE 7

CUMULATIVE RISK-ADJUSTED RETURNS

7-7-78 THRU 12-29-78



as well as the market; this is reflected in the level trends of the cumulative curves for the two groups of companies. Finally, the behavior of the cumulative curves over the whole test period in Figure 7, as well as the probability figures in Table VII, demonstrates that full-cost companies performed significantly poorly, relative to the market in general, in the test period than in the estimation period. Figure 7 shows that successful-efforts companies performed almost identically to the market over the whole test period. As Table VII indicates, the performance of the risk-adjusted returns for successful-efforts firms over the whole test period, relative to the market, is not significant at any reasonable probability level.

Given the observed difference between the performance of full-cost and successful-efforts firms in the test period, the means of the risk-adjusted returns for the two sets of companies were compared. The operational test used was again two-way analysis of variance. The results of that test are shown in the second parts of Tables VIII and IX. These Tables indicate that the two groups of companies performed similarly in the two subperiods following issuance of the SEC proposal, but that full-cost firms did significantly worse than successful-efforts firms in the subperiod preceding issuance of the proposal. For the total test period, the Tables show that full-cost firms performed poorly relative to successful-efforts firms; the difference in means of the risk-adjusted returns for the two groups of companies is significant at the .10 testing level, indicating

the presence of a meaningful difference in the impact of the proposal on the two sample groups.

On the basis of the preceding discussion, the present study accepts the null hypothesis N5 for Sample A over the total test period. For Sample B, the study accepts the stated hypothesis insofar as it applies to successful-efforts firms, but rejects the hypothesis as applied to full-cost firms over the entire test period. These results provide the basis for concluding that, during the test period, the release of the SEC proposal did not exert a significant impact on stock returns of the sample companies traded on the national exchanges. It also supports a conclusion that release of the proposal did not affect in any significant way the return behavior of stocks of the successful-efforts firms traded in the OTC market, but that it had a significantly adverse effect on returns from stocks of the OTC-traded full-cost firms involved in the study. The results also show that the returns from stocks of all sample groups were adversely affected in the subperiod (August 31, 1978 to October 27, 1978) following release of the SEC proposal. The effects on the full-cost and successful-efforts companies traded on the national exchanges were mild and only transitory, as returns for both sets of companies showed strong recoveries in the final segment (November 3, 1978 to December 29, 1978) of the test period. However, the adverse effects on the two groups of firms traded in the OTC market were more drastic. There were sharp drops in the levels of returns from stocks of both full-cost and successful-

efforts firms in the subperiod following release of the SEC proposal. The drops in the level of returns were not followed by any abnormal (above-the-market) recoveries in the next period.

CHAPTER V

CONCLUSION AND SUMMARY

The first part of this chapter summarizes the results of the study. In the second part, the results are interpreted and conclusions are drawn. Finally, the third part summarizes the research.

Results of the Study

The basic findings of the study can be re-iterated as follows.

1. The effects of release of the FASB and SEC proposals on returns from stocks of full-cost companies traded on the national exchanges (NYSE and ASE) were not significantly different from the effects on returns from stocks of successful-efforts companies traded on those exchanges (see Figures 8 and 10).
2. Issuance of both proposals had significant adverse effects on returns from stocks of full-cost companies traded in the OTC market as compared to returns from stocks of successful-efforts companies traded in the OTC market (see Figures 8 and 10).
3. Release of the proposals had significant adverse impacts on performance of returns for the full-cost firms traded in the OTC market as compared to that

of returns for the full-cost firms traded on the national exchanges (see Figures 8 and 10).

4. Issuance of the FASB's proposed statement did not have any differentiating effects on returns performance for the small as compared to the large full-cost firms traded on the national exchanges, but it had an adverse impact on returns performance for the small full-cost firms traded in the OTC market as compared to the large full-cost firms traded in the OTC market (see Figure 9).

In sum, the findings suggest that issuance of both proposals had significantly adverse effects only on the values of common stocks of full-cost firms traded in the OTC market; the results also show that the effects of the FASB's proposed statement on small full-cost firms traded in the OTC market were much greater than its effects on large full-cost firms traded in that market.

Interpretation and Conclusion

Any attempt to explain the different impact on the OTC-traded full-cost firms as compared to the listed full-cost firms from issuance of the FASB and SEC proposals is highly speculative. Undoubtedly, however, the difference in impact on OTC-traded firms and listed firms must be attributed to factors (or a single factor) which differently affect stock prices of full-cost companies traded in the two markets. Some possible explanations for the effects from each accounting proposal are given below.

FIGURE 8

CUMULATIVE RISK-ADJUSTED RETURNS

5-20-77 THRU 12-23-77

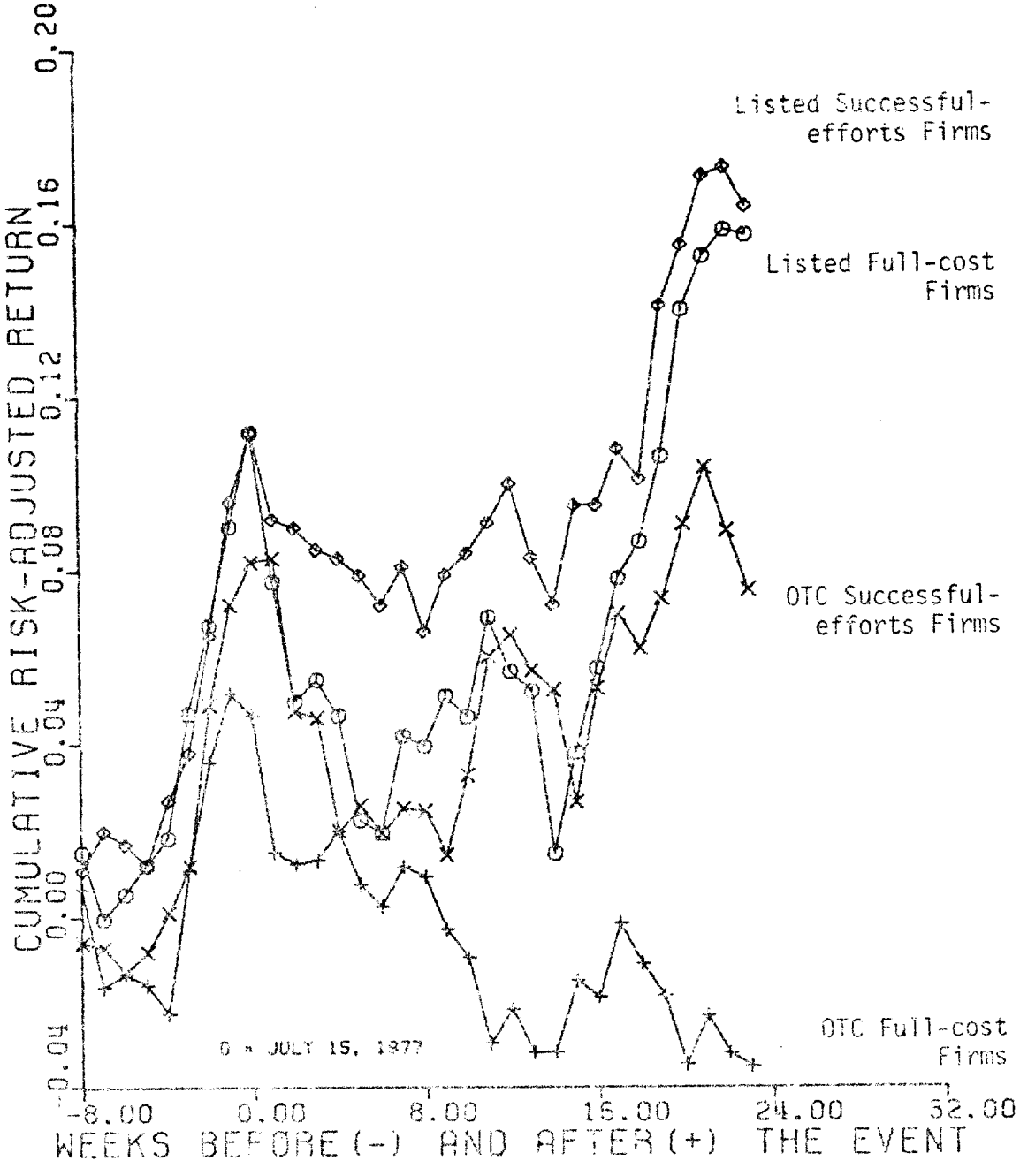


FIGURE 9

CUMULATIVE RISK-ADJUSTED RETURNS FOR THE FULL-COST COMPANIES 5-20-77 THRU 12-23-77

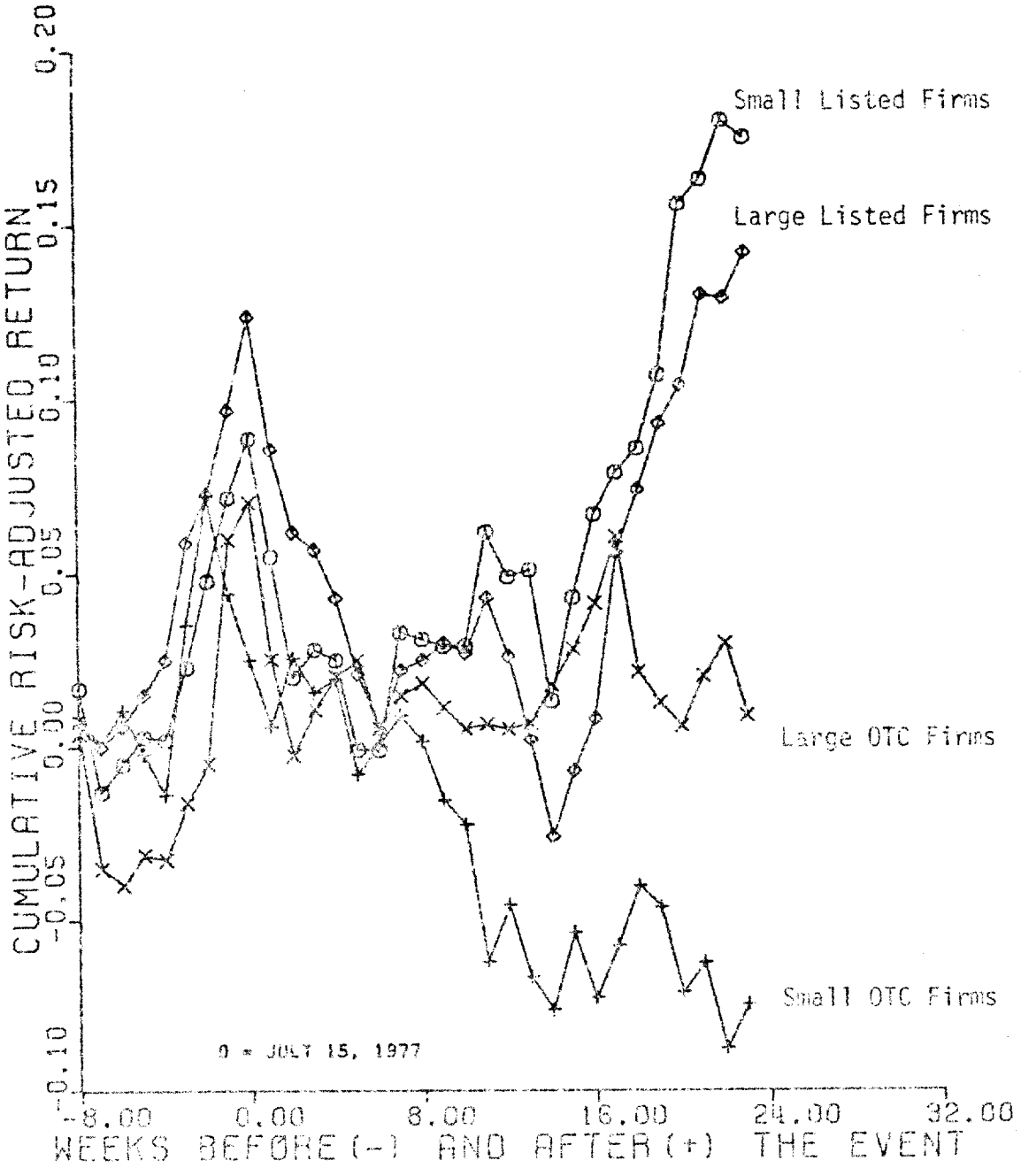
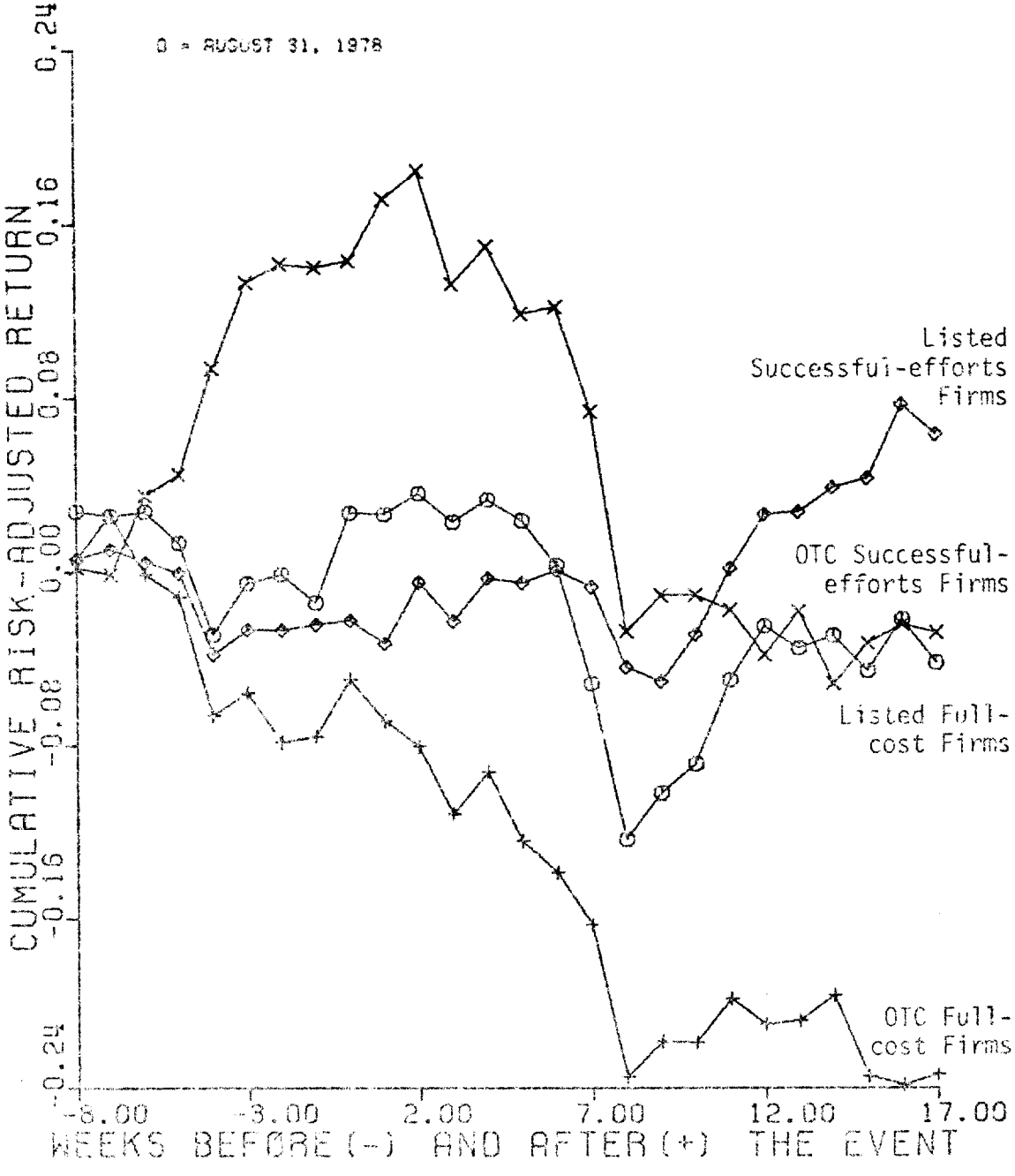


FIGURE 10

CUMULATIVE RISK-ADJUSTED RETURNS

7-7-78 THRU 12-29-78



The FASB Proposal

As noted in Chapter I, the FASB exposure draft proposed to require all oil and gas producing companies to use the successful-efforts method of financial reporting. Thus, companies using full costing would have to change to successful-efforts accounting. Evidence shows that a change from full costing to successful-efforts accounting would, in most cases, substantially reduce the reported earnings and equity of the companies required to change their reporting method.[1] The advocates of full costing have expressed various concerns over the possible unfavorable effects of eliminating full costing. An evaluation of these concerns may help to explain the difference in the impact of the FASB's proposed statement on stock prices of full-cost firms traded in the OTC market and on the national exchanges.

The advocates of full costing are concerned with several alleged unfavorable results from the elimination of full costing. First, they suggest that the damage to full-cost companies' financial reports (especially lower and more volatile earnings) resulting from a change to successful-efforts accounting would impair their ability to raise capital from external sources. A second factor is the potential impact on management behavior resulting from the accounting change. Given the important role of reported earnings and their stability in the evaluation of a

---

[1]John P. Klingstedt, "Effects of Full Costing in the Petroleum Industry," Financial Analysts Journal, 26 (September-October, 1979), 81.

company's performance, the managements of full-cost firms might be motivated to avoid highly risky and costly exploration programs in order to temper the adverse impact on the reported earnings that would result from charging all exploration costs (except costs of successful exploratory wells) against current income. Another concern expressed by those opposing the abolition of full costing is that the accounting change could reduce earnings, equity, and certain financial ratios of full-cost companies to levels below those stipulated in bond indentures or other debt convenants, thereby adversely affecting their immediate and future financing and operating plans.

If one accepts the notion that the national exchanges and the OTC market are equally efficient, there will be either (1) no basis for concluding that any of the above factors can explain the difference in impact of the exposure draft on the OTC-traded full-cost firms as compared to the listed full-cost firms, or (2) a simple conclusion that the problems over which concern was expressed are, for the full-cost companies, principally a function of size. For example, small size and volatile earnings may be positively correlated because a small company can undertake fewer exploratory or drilling ventures in a given year; because smaller firms can "diversify" their venture risks less effectively, their management may feel that they have little choice except to retreat into safer ventures. Finally, small,

less diversified producing companies may be subject to stiffer indenture and earnings-coverage requirements than large, more stable diversified firms.

On the other hand, the analysis is brought into question by the almost identical performance of returns for both small and large full-cost firms traded on the national exchanges. Therefore, an interpretation of the results, at least equally possible, must question the assumption that efficiency is similar in the two markets. For the group of full-cost firms traded on the national exchanges, where empirical evidence overwhelmingly supports the efficient market hypothesis, the research results provide no support for attributing an information impact to the FASB exposure draft. According to Figures 9 and 10, it appears that there was no persisting adverse effect on full-cost firms traded on the national exchanges due to issuance of the exposure draft; these figures also suggest that investors' reaction on the national exchanges to the elimination of full costing was initially an overreaction which was corrected subsequently. Thus, consistent with the efficient market hypothesis, conclusion is reached that the FASB's proposed statement did not contain information that adversely affected the valuation of stocks of the full-cost firms listed on the national exchanges. However, for the companies traded in the OTC market (where few studies have investigated the issue of market efficiency), investors' reaction to the announced elimination of full costing was negative (especially for the

smaller full-cost companies) and so continued over much of the test period (see Figures 8 and 9). This difference in the market reaction to the proposed accounting change could well support the notion that the OTC market possesses a lower degree of efficiency than the national exchanges.

The SEC Proposal

As reported previously, the August 31, 1978, accounting rules proposed by the SEC call for (1) the ultimate elimination of both full costing and successful-efforts accounting, (2) the disclosure of a great deal of operating data including the present value of proved oil and gas reserves, and the amount of development and finding costs, and (3) the development of reserve-recognition accounting (RRA)--a method of accounting which requires charging all expenditures for exploration and development activities to expense and considers the resulting value of proved oil and gas reserves discovered as current revenue. In addition, the SEC rules permit oil and gas producers to continue to use either full costing or successful-efforts accounting until RRA has been developed and fully mandated. Furthermore, commencing with fiscal years ending after December 25, 1979, companies using successful-efforts accounting will be required to follow the provisions of Statement No. 19, and companies using full costing will be required to follow the full-cost rules developed by the SEC. The proposed rules on full-cost companies include requirements for limitations on capitalized costs, country-by-country cost centers, and

disclosure of what the impact on certain balance-sheet items would be if successful-efforts accounting were applied instead of full costing.

As noted previously, there is a great deal of uncertainty over the eventual feasibility of RRA because of imprecision in estimates of oil and gas reserves and in their valuation. Nevertheless, the SEC proposal takes steps to divert investors' emphasis away from the operating and financial data published in the primary statements toward the more meaningful supplemental data on quantity of oil and gas reserves and their values, amounts expended for exploration, etc. The SEC expressed its belief that "meaningful analyses [of operations of oil and gas producers] would focus almost exclusively on the supplemental data to be disclosed persuant to the rules"[2] prescribed by the Commission.

It may be rationalized that the shift in emphasis from reported earnings to reserve data could have an adverse effect on the equilibrium values of full-cost firms. These firms have traditionally reported their performance to investors in terms of statements that smooth earnings--i.e., statements that capitalize both productive and unproductive exploration costs and amortize the capitalized costs against revenue from future production of oil and gas reserves. Under RRA, companies engaged in oil and gas producing activities are required to charge costs of

---

[2]Securities and Exchange Commission, "Adoption of Requirements for Finanical Accounting and Reporting Practices for Oil and Gas Producing Activities," Releases Nos. 33-5966; 34-15108; 35-02688; IC-10382; AS-253 (August 31, 1978), p. 8.

unsuccessful exploratory wells to expense immediately and treat the value of proved oil and gas reserves discovered as current income, thereby reporting earnings figures which are a function of the individual company's success ratio (the ratio of the amount spent on exploration and drilling efforts to the value of reserves discovered). Clearly, income statements prepared under RRA by small, marginal companies would show highly volatile earnings because these companies could not undertake enough drilling ventures annually to stablize their operating results through the "law of large numbers". It is also true that smaller firms generally have poor success ratios which would be reflected in their performance results and, possibly, in their stock prices.

The evidence shown in Figure 10, reflecting the investors' response to the SEC rules, clearly suggests that there was a significant adverse impact on the OTC-traded full-cost firms due to the SEC proposal. The figure also indicates that there was a short-lived downward drift in the level of returns for the listed full-cost firms related to the SEC's proposed rules. This drift could be attributed to the presence of some uncertainty surrounding the ultimate impact of the rules on the affected companies.

These results are subject to nearly the same interpretations as those discussed in the analysis of the FASB proposal. The adverse impact on the full-cost firms traded in the OTC market can be attributed to either (1) the lower degree of efficiency in the OTC market as compared to the national exchanges, or

(2) the investors' perceptions of the potential adverse impact on the smaller, full-cost firms traded in the OTC market.[3] In addition, consistent with the efficient market hypothesis, the results provide no support for attributing a persistent information impact on the listed firms to the SEC proposal.

In sum, empirical evidence suggests that the accounting standards proposed by the FASB in the exposure draft of Statement No. 19 and the August 31, 1978, SEC rules could have had a measurable negative impact on the stock values of small oil and gas producers traded in the OTC market. This impact could adversely affect the entry into the oil and gas producing activities by new enterprises.

The notion of market efficiency as indicated in the analysis needs further explanation. It might be rationalized that stock prices in the OTC market are much more reactive to reported earnings and/or book values than are stock prices in the national exchanges. If this is true, a conclusion by analysts and investors that the (immediate or eventual) elimination of full costing would produce lower reported earnings and book values for the former full-cost firms might cause their stock prices to behave unfavorably. The national exchanges are populated with relatively more sophisticated trading participants (institutions and analysts) than is the OTC market. Presumably

---

[3]On the average, the firms traded in the OTC market are smaller, and less-diversified relative to the firms listed on the national exchange.

investors in the national exchanges place greater emphasis on underlying economic data than on (actual or expected) accounting data, thus making the national exchanges a relatively more efficient trading market than the OTC market.

In addition, the sophisticated institutional investors trade mainly in stocks of larger listed firms, while the purchasers of stocks of small (and even medium-sized) OTC firms are likely to consist largely of unsophisticated individuals. These investors could be expected to react negatively to the elimination of full costing. The Chairman of the ASE has shown his concern over this issue in a letter submitted to the SEC in regard to the FASB's statement:

> The Amex [ASE] is concerned over the possibility that non-institutional investors could be confused or misled rather than enlightened by the proposed change. Since the individual investors tend to rely on a company's historical record of earnings, price/earnings ratios and net worth as criteria for making an investment decision, material reductions in reported earnings and net worth could deter many persons from continuing their investments in oil and gas companies which currently follow the "full cost" method.[4]

Whatever reasons one wishes to advance for the behavior of stock prices in this study, it must be concluded that conclusions from research on the market behavior of stock prices must not be applied indiscriminantly to companies in both the OTC market and national exchanges. The two markets have different characteristics (including, possibly, different degrees of market efficiency) and identical behavior patterns must not be assumed if research is to be meaningful.

---

[4]Letter dated February 17, 1978, from Arthur Levitt, Jr., Chairman, American Stock Exchange, Inc., to the SEC.

Summary of the Research

Statement of the Problem

The oil and gas industry has adopted two basic methods of accounting for exploration expenditures: (1) full costing, and (2) successful-efforts accounting. Under full costing, all (both productive and unproductive) exploration costs are capitalized when incurred and the capitalized costs are amortized against future revenue from production of oil and gas reserves, thus smoothing the adverse impact on income of unproductive exploration efforts. In contrast, under successful-efforts accounting, only those exploratory costs leading directly to discoveries of proved reserves and to their development are capitalized and the costs of unproductive exploration are charged to expense.

Both full costing and successful-efforts accounting are based on the historical-cost concept of accounting which fails to provide sufficient information concerning the financial position and operating results of oil and gas companies. In addition, the broad usage of the two methods (and numerous variations of each one) has severely limited the comparability in financial reports of the companies involved in the petroleum industry. For those reasons, the FASB and the SEC have issued new accounting proposals which aim at the establishment of the most appropriate standards of accounting for exploration activities in the oil and gas industry.

The FASB proposal, as reflected in the exposure draft of Statement No. 19 (July 15, 1977), was to require all oil and gas producers to use a single method of financial reporting based on a form of successful-efforts accounting, thereby eliminating full costing. The FASB's proposed statement was expected to have a negative impact on the reported income and equity of almost all oil and gas producers, but especially on those of the smaller publicly-held producers using full costing.

As anticipated, the release of the FASB's proposed statement was opposed by the advocates of full costing. Those advocates asserted that the accounting change proposed by the FASB would adversely affect their security prices, thereby impairing their ability to raise the capital needed to maintain aggressive exploration programs.

Concerned over the alleged adverse impact of the FASB's decision, a number of empirical research studies have been conducted to examine the impact of the FASB exposure draft on stock prices of oil and gas producers. These studies have reached conflicting conclusions. Separate studies, one conducted by Thomas Dyckman, commissioned by the FASB, and another conducted by the SEC concluded that issuance of the exposure draft did not affect the stock prices of full-cost firms and successful-efforts firms in a significantly different way. A third study by Daniel Collins and Warren Dent concluded that issuance of the exposure draft had a significant adverse impact on the stock prices of full-cost companies as compared to those of successful-efforts companies. Clearly these studies have not

resolved the controversy over the market impact of the FASB exposure draft.

Even though the SEC (the final authority for setting standards of accounting) had found the economic impact of requiring successful-efforts accounting to be little and shortlived, it decided to reject the decision made by the FASB. The action by the SEC was taken on the grounds that neither full costing nor successful-efforts accounting could reflect the operating results and financial position of oil and gas companies. Thus, on August 31, 1978, the SEC released its own proposal which calls for the development of a new method of accounting to be called reserve-recognition accounting (RRA). Under RRA, all exploration costs are written off immediately as incurred and the estimated value of the additions to prove oil and gas reserves is treated as current revenue. This method of reporting requires also the estimation and reporting of the present value of all proved oil and gas reserves as assets.

According to the SEC, the development of RRA is expected to take at least three to four years with no assurance about its eventual feasibility. Some industry officials have asserted that compliance with the rules proposed by the SEC will be costly and confusing. The future economic effects of the SEC proposal on the oil and gas producers that have followed full costing and successful-efforts accounting in their reporting to investors is not clear at this point. However, the impact on the security

prices of these companies from issuance of the SEC proposal has been an empirical issue of interest to the present study.

Purpose and Significance of the Study

The objective of this dissertation study has been to examine the effects on the behavior of stock prices of oil and gas producers resulting from issuance of (1) the exposure draft of Statement No. 19 by the FASB on July 15, 1977, and (2) the proposed rules on oil and gas accounting by the SEC on August 31, 1978.

The FASB and SEC proposals both called for the elimination of full costing, even though the SEC proposal permits companies to use either full costing or successful-efforts accounting until detailed rules for implementing RRA have been developed. Evidence shows that, over the past few years, companies using full costing have been increasing their exploratory expenditures at a faster rate than the companies using successful-efforts accounting. If the elimination of full costing adversely affects the security prices of full-cost companies, then it is possible that there will be some curtailment of exploration and drilling activities, and a resulting reduction in competition in the oil and gas exploration industry. The significance of the issue can be recognized from the following comment to the SEC (February 27, 1978) from the Department of Justice:

> The SEC must determine whether the proposed mandated switch would likely affect capital market behavior in ways that would significantly disadvantage the competitive viability of any segment of the oil and gas industry. . .

As noted previously, the market impact of the FASB's proposed statement has been examined by the SEC, Dyckman, and Collins and Dent studies. However, due to the conflict in results of those studies, the selection bias in their sampling procedures, and the importance of the subject matter itself, the market impact of the FASB proposal has been re-examined in this dissertation study.

Research Hypothesis

On the basis of the preceding discussion and of public responses to releases of the two proposals, the following hypotheses were tested.

1. During the weeks surrounding issuance of the FASB exposure draft, (1) the returns from stocks of companies using full costing performed poorly when compared with those of companies using the successful-efforts method, and (2) the performance of returns for small full-cost companies was poorer than that of returns for large full-cost companies.
2. During the weeks near the issuance of the SEC proposal, there were sharp drops, relative to the market as a whole, in the level of returns from stocks of both full-cost and successful-efforts companies.

Research Methodology

The research method followed assumed that stock markets are efficient to the extent that stock prices reflect all relevant public information, including those contained in the FASB and SEC proposals, rapidly and unbiasedly. The information effects of the two proposals were then studied by examining the stock returns (change in stock price plus dividends)[5] for companies engaged in the oil and gas producing activities.

Two samples of oil and gas producers were employed for empirical testing: sample A, which included only those oil and gas producing firms which were listed on the national exchanges (the NYSE and the ASE), and sample B, which contained only those producing firms which were traded in the OTC market. A total of 98 oil and gas producers (61 firms in sample A and 37 firms in sample B) were studied for measuring the impact of the FASB exposure draft, and a total of 85 oil and gas producers (52 firms in sample A and 33 firms in sample B) were examined in assessing the impact of the SEC proposal. The samples of firms employed for studying the impact of each proposal were classified into two groups on the basis of the reporting method followed, making a group of full-cost firms and a group of successful-efforts firms in each sample.

---

[5]As reported previously, the return figures used for examining Sample B (OTC companies) did not include dividends from stocks of the companies involved.

The test procedures employed for examining the effects of each proposal began with the estimation of the relation between the returns on stocks of the individual firms selected and the market portfolio. That estimation process was accomplished by fitting a simple regression model to the return data over a period called the estimation period. The estimation period used in examining the impact of the FASB proposal started on March 29, 1976, and concluded on March 29, 1977, whereas the estimation period used for examining the impact of the SEC proposal began on March 29, 1976, and terminated on March 29, 1978.

The regression equation developed for the estimation period was then used to forecast returns for stocks of each company as a function of return on the market portfolio over a period called the test period. The test periods used for examining the effects of the FASB and SEC proposals covered thirty-two weeks and twenty-six weeks surrounding the issue dates of the FASB and SEC proposals, respectively. The forecasted returns for stocks of each company in each week of the test period, together with the actual stock returns during the same test period, were then used to compute the forecast errors. The forecast errors (referred to as the risk-adjusted returns) were assumed to reflect events unique to each specific firm which were not explained by the general behavior of the market. The value of the risk-adjusted returns was used as an experimental variable for studying the stock market effects of the FASB and SEC proposals.

Parametric statistical tests were performed on the mean values of the risk-adjusted returns to evaluate the stated research hypothesis for each proposal. In particular, analysis of variance was used to test the difference in the means of the risk-adjusted returns for the two groups of full-cost and successful-efforts companies over the test periods involved.

Research Results and Conclusion

The statistical tests conducted show that issuance of the FASB and SEC proposals had significantly adverse effects only on the values of common stocks of full-cost firms traded in the OTC market; the adverse effects of the FASB exposure draft on small full-cost firms traded in the OTC market were much greater than its effects on large full-cost firms traded in that market. In addition, the research results suggest that there was no significant difference in the impact of the two proposals on the listed full-cost firms as compared to the listed successful-efforts firms; however, the difference in the impact of those proposals was significant for the OTC-traded full-cost firms as compared to the OTC-traded successful-efforts firms.

From these results, the following conclusion is reached:

1. The issuance of the proposed accounting standards (the FASB and SEC proposals) has had a measurable negative impact on the stock prices of small OTC-traded full-cost firms. The adverse impact on stock

prices can be attributed to the likelihood that the cost of external funds will increase for the affected firms, and to the possible effects on the management behavior which could result from the accounting change; or

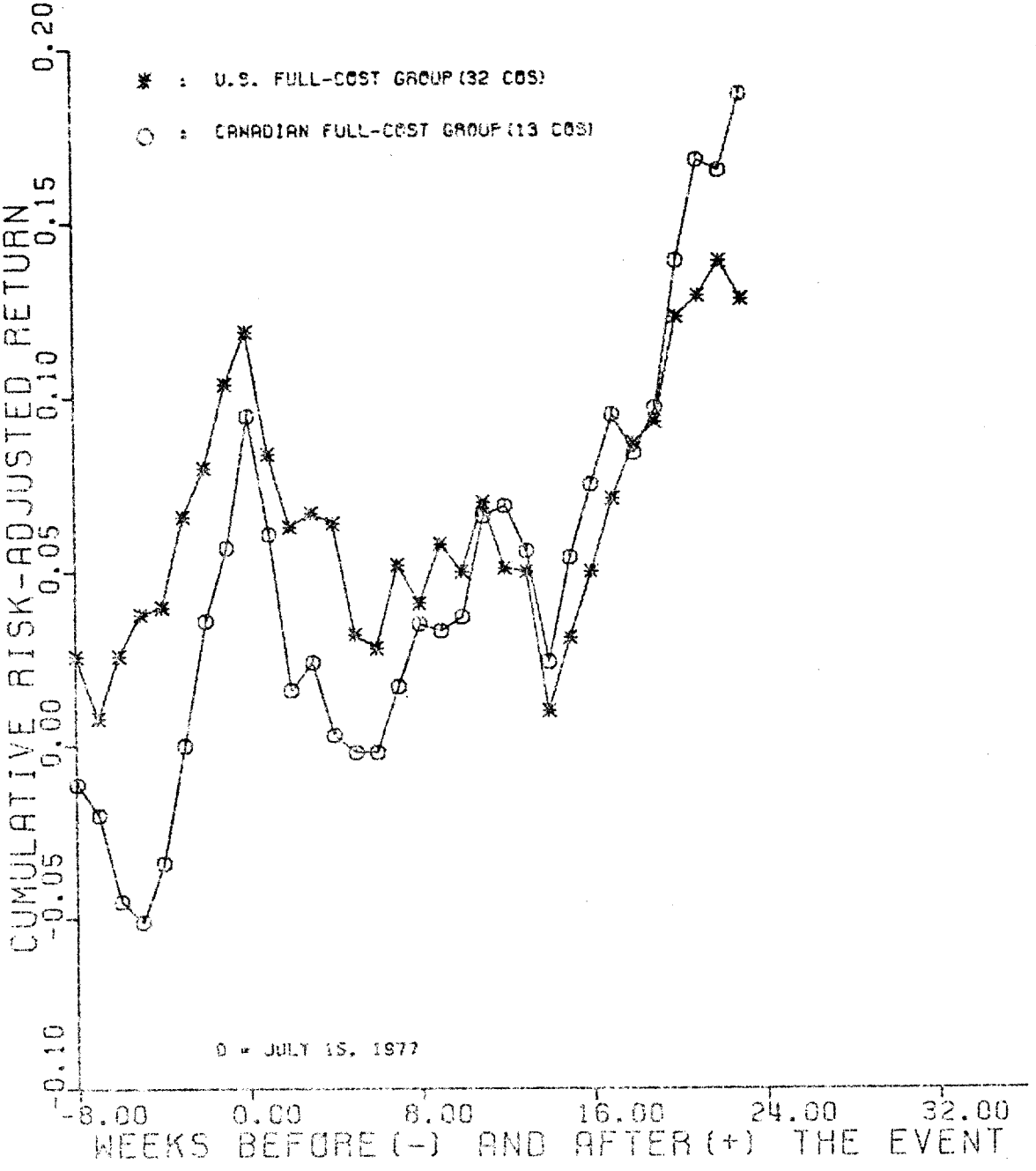
2. The observed difference in the impact of the two proposals has been due to the difference in the degrees of efficiency for the OTC market as compared to the national exchanges. This means that investors in the OTC market place a greater emphasis on the accounting data than do investors on the national exchanges.

APPENDIX A

FIGURE 11

CUMULATIVE RISK-ADJUSTED RETURNS

5-20-77 THRU 12-23-77



APPENDIX B

APPENDIX B

Sample A: NYSE and ASE Companies

Full-Cost Group

Adobe Oil & Gas Corp.
Apache Corp.
Aquitaine Co. Cda. Ltd.
Asamera Oil Ltd.
Ashland Oil Cda. Ltd.
Austral Oil Inc.
Barnwell Inds. Inc.
Belco Pet. Corp.
Bow Valley Inds. Ltd.
Buttes Gas & Oil Co.
C & K Pet. Inc.
Canadian Homestead Oils Ltd.
Canadian Merrill Ltd.
Canadian Occidental Pet. Ltd.
Consolidated Oil & Gas Inc.
Damson Oil Corp.
Dome Pet. Ltd.
Entex Inc.
Falcon Seaboard Inc.
Florida Gas Co.
Flying Diamond Oil Corp.
Great Basins Pet. Co.
Houston Oil & Minerals Corp.
Husky Oil Ltd.
Inexco Oil Co.
Juniper Pet. Corp.
McCulloch Oil Corp.
Mesa Pet. Co.
Mitchell Energy & Dev. Corp.
Natomas Co.
North American Rtys. Inc.
North Cdn. Oils Ltd.
Numac Oil & Gas Ltd.
Pacific Pets. Ltd.
Panhandle Eastern Pipe Line Co.
Patrick Pet. Co.
Petro-Lewis Corp.
Prairie Oil Rtys. Ltd.
Scurry Rainbow Oil Ltd.
Shenandoah Oil Corp.
Texas Oil & Gas Corp.
Total Pet. North America Ltd.
Universal Res. Corp.
Wainoco Oil Corp.
Wilshire Oil Co. Tex.

Successful-Efforts Group

Apco Oil Corp.
Baruch Foster Corp.
Canadian Superior Oil Ltd.
Clark Oil & Refng. Corp.
Crown Cent. Pet. Corp.
Crystal Oil Co.
Felmont Oil Corp.
General American Oil Co. Tex.
Helmerich & Payne Inc.
Hudson's Bay Oil & Gas Ltd.
Louisiana Land & Expl. Co.
Sabine Corp.
Southern Nat. Res. Inc.
Southland Rty. Co.
Superior Oil Co.
Texas Gas Transmission Corp.

Sample B: OTC Companies

Full-Cost Group	Successful-Efforts Group
Amarex Inc.	Altex Oil Corp.
Argo Pet.	Beard Oil Co.
Argonaut Energy Corp.	Echo Oil Corp.
Arkansas Western Gas	Equity Oil Co.
Brock Exploration Corp.	Flynn Energy Corp.
Burns, R. L. Corp.	Gulf Energy & Dev. Corp.
Callon Pet. Co.	Intercontinental Energy
Forest Oil Corp.	MGF Oil Corp.
Galaxy Oil Co.	May Pet. Inc.
Hamilton Bros. Pet. Corp.	Maynard Oil Co.
Helmet Pet. Corp.	Noble Affiliates Inc.
KRM Pet. Corp.	Ocean Oil & Gas Co.
McMoran Exploration	Pauley Pet. Inc.
Summit Energy Corp.	Petrox Industries Inc.
Supron Energy Corp.	Statex Pet.
Triton Oil & Gas Corp.	Texas American Oil Corp.
Weatherford Inter'l Inc.	Tomlinson Oil
Webb Resources Inc.	Wiser Oil Co.
Westcoast Pet. Ltd.	

In examining the impact of the SEC proposal, the following companies were eliminated from the samples for the reasons given below.

Companies Eliminated from Sample A

1. Apco Oil Corporation--the company's oil and gas properties were acquired by Shenandoah Oil Corporation (May, 1978).

2. Ashland Oil Cda. Ltd.--Ashland Oil, Inc., controlling as much as 83 percent of the company's stocks, sold its interests to Kaiser Resources Ltd. (October 23, 1978).

3. Austral Oil Inc.--was acquired by Superior Oil (April, 1978).

4. Buttes Gas & Oil Co.--changed its reporting method to successful-efforts accounting (December, 1977).

5. Entex Inc.--had a two-for-one stock split (August, 1978).

6. Flying Diamond Oil Corp.--was acquired by Bow Valley Inds. Ltd. (May, 1978).

7. Numac Oil & Gas Ltd.--had a two-for-one stock split (September 8, 1978).

8. Patrick Pet. Co.--Changed its reporting method to successful-efforts accounting (May, 1978).

9. Shenandoah Oil Corp.--involved in acquisitions in 1978; also, liquidated its properties (February, 1978).

Companies Eliminated from Sample B

1. Burns, R. L. Corp.--changed the trading market for its stocks from OTC to NYSE (December, 1977); also, changed its reporting method to successful-efforts accounting (December, 1977).

2. Flynn Energy Corp.--was acquired by Reserve Oil Inc. (December, 1978).

3. McMoran Exploration--changed the trading market for its stocks from OTC to NYSE (November, 1978).

4. Supron Energy Corp.--changed the trading market for its stocks from OTC to ASE (October, 1978).

APPENDIX C

TABLE X

REGRESSION STATISTICS FOR STOCKS AGAINST THE S & P 500 COMPOSITE INDEX FOR THE ANALYSIS OF THE IMPACT OF THE FASB EXPOSURE DRAFT: SAMPLE A

Company Name	Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)		
	Alpha	Beta	R-Squared
Adobe Oil & Gas Corp.	0.0010	0.6756	0.0300
Apache Corp.	0.0018	0.9131	0.0723
Apco Oil Corp.	0.0011	0.2074	0.0114
Aquitaine Co. Cda. Ltd.	-0.0015	0.2700	0.0077
Asamera Oil Ltd.	0.0015	1.6499	0.0744
Ashland Oil Cda. Ltd.	0.0005	0.1708	0.0034
Austral Oil Inc.	0.0023	0.9813	0.0375
Barnwell Inds. Inc.	0.0005	0.1391	0.0007
Baruch Foster Corp.	0.0013	0.5272	0.0027
Belco Pet. Corp.	0.0017	1.6276	0.1588
Bow Valley Inds. Ltd.	-0.0002	1.1749	0.0819
Buttes Gas & Oil Co.	-0.0005	1.5485	0.1478
C & K Pet. Inc.	0.0035	0.7096	0.0174
Canadian Homestead Oils Ltd.	0.0004	0.8149	0.0269
Canadian Merrill Ltd.	0.0031	0.3613	0.0061
Canadian Occidental Pet. Ltd.	0.0011	0.1786	0.0053
Canadian Superior Oil Ltd.	-0.0000	0.4341	0.0499
Clark Oil & Refng. Corp.	0.0020	1.3626	0.1012
Consolidated Oil & Gas	0.0003	1.0653	0.0603
Crown Cent. Pet. Corp.	0.0010	1.1613	0.0762
Crystal Oil Co.	0.0026	1.0510	0.0500
Damson Oil Corp.	0.0020	1.4809	0.0578
Dome Pet. Corp.	0.0006	0.7932	0.0934
Entex Inc.	0.0019	0.8997	0.0910
Falcon Seaboard Inc.	0.0034	1.1774	0.0999
Felmont Oil Corp.	0.0027	1.3947	0.1170
Florida Gas Co.	0.0019	0.7771	0.0827
Flying Diamond Oil Corp.	0.0014	1.3957	0.1023
General American Oil Co. Tex.	0.0009	0.0043	0.0000
Great Basins Pet. Co.	0.0026	0.8546	0.0198

TABLE X--Continued

Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)			Statistics For Test Period (May 20, 1977 to December 23, 1977)	
S.E.E.	T-Ratio (Beta)	N.O.B.	Auto-Coefficient	Durbin-Watson
0.0238	2.7904	254	-0.2680	2.5353
0.0203	4.4311	254	-0.1833	2.3117
0.0119	1.6990	253	0.3097	1.3802
0.0189	1.3970	252	0.0617	1.8761
0.0361	4.4995	254	-0.2323	2.4636
0.0181	0.9281	254	0.1432	1.7050
0.0308	3.1348	254	-0.0800	2.1540
0.0318	0.4271	252	0.1930	1.6058
0.0677	0.8228	253	-0.1290	2.2167
0.0232	6.8971	254	-0.0283	2.0254
0.0244	4.7428	254	-0.1054	2.1960
0.0230	6.6103	254	-0.1437	2.2702
0.0331	2.1100	254	-0.3150	2.4898
0.0303	2.6412	254	0.1663	1.5724
0.0285	1.2477	254	-0.2310	2.4577
0.0152	1.1592	254	0.1617	1.6764
0.0117	3.6325	253	-0.1863	2.3706
0.0252	5.3270	254	-0.3267	2.6525
0.0261	4.0216	254	0.0753	1.8202
0.0250	4.5600	254	-0.1760	2.3518
0.0284	3.6418	254	-0.0172	1.9739
0.0369	3.9229	253	0.0590	1.8534
0.0153	5.0945	254	0.2637	1.4148
0.0176	5.0240	254	-0.3612	2.6817
0.0219	5.2882	254	-0.2796	2.5532
0.0237	5.7781	254	-0.0296	2.0131
0.0160	4.7670	254	0.0362	1.9173
0.0256	5.3589	254	0.1213	1.7573
0.0202	0.0209	252	-0.0869	2.1726
0.0372	2.2578	254	-0.2481	2.4920

TABLE X--Continued

Company Name	Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)		
	Alpha	Beta	R-Squared
Helmerich & Payne Inc.	0.0014	1.3771	0.2800
Houston Oil & Minerals Corp.	0.0035	1.1192	0.0680
Hudsons Bay Oil & Gas Ltd.	-0.0003	0.2828	0.0311
Husky Oil Ltd.	0.0004	0.5027	0.0352
Inexco Oil Co.	0.0033	1.4604	0.0675
Juniper Pet. Corp.	0.0002	0.7671	0.0105
Louisiana Ld. & Expl. Co.	0.0006	1.3544	0.2904
McCulloch Oil Corp.	-0.0015	0.9728	0.0274
Mesa Pet. Co.	0.0013	1.2783	0.1941
Mitchell Energy & Dev. Corp.	0.0034	1.6871	0.1232
Natomas Co.	0.0017	1.5366	0.1160
North American Rtys. Inc.	0.0017	1.1112	0.0641
North Canadian Oils Ltd.	0.0010	1.0000	0.0488
Numac Oil & Gas Ltd.	0.0006	0.3437	0.0087
Pacific Pets. Ltd.	-0.0005	0.2475	0.0176
Panhandle Eastn. Pipe Line Co.	0.0011	0.5794	0.0904
Patrick Pet. Co.	0.0019	1.2956	0.0638
Petro-Lewis Corp.	0.0030	0.6863	0.0226
Prairie Oil Rtys. Ltd.	0.0025	0.9304	0.0340
Sabine Corp.	0.0009	0.6618	0.0560
Scurry Rainbow Oil Ltd.	0.0003	0.2001	0.0042
Shenandoah Oil Corp.	-0.0001	1.0728	0.1011
Southern Nat. Res. Inc.	0.0005	0.6985	0.1293
Southland Rty. Co.	0.0012	0.8476	0.0820
Superior Oil Co.	0.0008	0.8771	0.1247
Texas Gas Transmission Corp.	0.0013	0.9198	0.1847
Texas Oil & Gas Corp.	0.0022	1.2057	0.1474
Total Pet. North American Ltd.	0.0005	1.3562	0.0989
Universal Res. Corp.	0.0035	0.9672	0.0360
Wainoco Oil Corp.	0.0043	0.8289	0.0186
Wilshire Oil Co. Tex.	0.0008	0.8740	0.0392

TABLE X--Continued

Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)			Statistics For Test Period (May 20, 1977 to December 23, 1977)	
S.E.E.	T-Ratio (Beta)	N.O.B.	Auto-Coefficient	Durbin-Watson
0.0137	9.8984	254	-0.3073	2.5466
0.0257	4.2894	254	-0.0013	1.9696
0.0098	2.8342	252	-0.0239	2.0290
0.0163	3.0319	254	0.1570	1.6846
0.0336	4.2693	254	-0.1199	2.1632
0.0461	1.6285	253	-0.3032	2.6015
0.0131	10.1565	254	-0.0430	2.0861
0.0359	2.6645	254	-0.2469	2.4917
0.0161	7.7896	254	0.2605	1.4504
0.0279	5.9493	254	-0.0306	2.0072
0.0263	5.7496	254	0.0661	1.8401
0.0263	4.1551	254	-0.2605	2.5125
0.0273	3.5975	254	-0.2471	2.4928
0.0226	1.4845	252	0.1435	1.7093
0.0115	2.2150	254	-0.0778	1.8198
0.0114	5.0031	254	0.0528	1.8942
0.0307	4.1454	254	-0.3154	2.5599
0.0280	2.4142	254	-0.1497	2.2864
0.0308	2.9724	253	0.2635	1.4726
0.0169	3.8341	250	0.0250	1.9289
0.0189	1.0327	252	-0.1464	2.2666
0.0198	5.3230	254	-0.2064	2.3520
0.0112	6.1169	254	0.3914	1.1985
0.0176	4.7444	254	-0.2146	2.4232
0.0144	5.9921	254	0.0422	1.8963
0.0120	7.5555	254	0.1202	1.4371
0.0180	6.5994	254	0.0850	1.8297
0.0254	5.2591	254	-0.0057	2.0067
0.0310	3.0687	254	0.1037	1.7808
0.0373	2.1840	254	0.4694	1.0456
0.0268	3.2067	254	-0.1016	2.2012

TABLE XI

REGRESSION STATISTICS FOR STOCKS AGAINST THE NASDAQ INDEX
FOR THE STUDY OF THE IMPACT OF THE
FASB EXPOSURE DRAFT: SAMPLE B

Company Name	Statistics for the Estimation Period (March 29, 1976 to March 29, 1977)			
	Alpha	Beta	R-Squared	S.E.E.
Altex Oil	0.0135	2.1332	0.0230	0.1664
Amarex Inc.	0.0158	1.1893	0.0331	0.0770
Argo Pet.	0.0057	1.7282	0.0800	0.0701
Argonaut Engy.	0.0242	-1.4176	0.0192	0.1212
Arkansas W. Gas	0.0123	1.5517	0.1908	0.0382
Beard Oil	0.0133	-0.5115	0.0056	0.0816
Brock Exp.	0.0123	3.0686	0.1023	0.1088
Burns, R. L.	0.0060	1.7499	0.1035	0.0617
Callon Pet.	0.0057	1.2141	0.0247	0.0846
Echo Oil	-0.0047	2.3986	0.0563	0.1176
Equity Oil	0.0134	1.1833	0.0456	0.0648
Flynn Engy.	0.0169	0.7252	0.0081	0.0959
Forest Oil	-0.0004	1.9442	0.2073	0.0455
Galaxy Oil	0.0092	1.1394	0.0308	0.0765
Gulf Engy.	0.0079	0.7026	0.0171	0.0638
Hamilton Bros. Pet.	0.0116	0.8783	0.0192	0.0751
Helmet Pet.	0.0228	-1.0259	0.0230	0.0800
Intercont'l Engy.	0.0036	1.9352	0.0901	0.0736
KRM Pet.	0.0205	0.6503	0.0108	0.0746
MGF Oil	0.0055	-0.0579	0.0001	0.0696
May Pet.	0.0082	1.4143	0.0408	0.0820
Maynard Oil	0.0025	0.1620	0.0014	0.0517
McMoran Exp.	0.0089	1.7086	0.0879	0.0659
Noble Aff.	0.0085	1.5999	0.1559	0.0445
Ocean Oil & Gas	0.0002	0.8774	0.1237	0.0279
Pauley Pet.	0.0045	0.8590	0.0252	0.0639
Petrox Inc.	0.0069	2.5507	0.1127	0.0856
Statex Pet.	0.0090	-0.5162	0.0046	0.0908
Summit Engy.	0.0062	1.8760	0.0322	0.1232
Supron Engy.	0.0070	0.3441	0.0116	0.0379
Tx. Am. Oil & Gas	0.0075	0.9178	0.0362	0.0567
Tomlinson Oil	0.0128	0.1712	0.0007	0.0774
Triton Oil & Gas	0.0174	3.0101	0.2117	0.0695
Weatherford Int.	-0.0022	1.3116	0.0313	0.0874
Webb Resources	0.0108	-0.0819	0.0001	0.0821
Westcoast Pet.	0.0068	0.7417	0.0378	0.0447
Wiser Oil	0.0090	0.7508	0.0328	0.0488

TABLE XI--Continued

Estimation Period (continued)		Statistics for Test Period (May 20, 1977 to December 23, 1977)	
T-Ratio (Beta)	N.O.B.	Auto-Coefficient	Durbin-Watson
-1.0848	52	0.3131	1.2992
1.3074	52	-0.2927	2.5346
2.0851	52	-0.1482	2.1931
-0.9896	52	-0.2399	2.4714
3.4341	52	0.2199	1.5600
-0.5308	52	0.2268	1.5301
2.3869	52	0.1767	1.5922
2.4024	52	-0.1989	2.3930
1.1246	52	-0.2099	2.3869
1.7263	52	-0.0947	2.1823
1.5454	52	-0.2529	2.3647
0.6395	52	0.1236	1.6714
3.6163	52	0.3166	1.9304
1.2601	52	0.1501	1.6523
0.9324	52	0.1412	1.6487
0.9890	52	0.0652	1.8137
-1.0850	52	-0.2581	2.4457
2.2246	52	0.0480	1.8571
0.7380	52	0.0350	1.9296
-0.0704	52	-0.0673	2.1172
1.4591	52	0.1301	1.7160
0.2650	52	0.1722	1.6241
2.1947	52	-0.1572	2.2311
3.0387	52	-0.2764	2.4188
2.6576	52	-0.1272	2.0499
1.1376	52	-0.0283	2.0493
2.5207	52	-0.2089	2.4125
-0.4808	52	0.1423	1.6800
1.2893	52	-0.0095	1.9830
0.7674	52	0.0420	1.9012
1.3703	52	-0.3005	1.9646
0.1870	52	0.1718	1.6505
3.6642	52	-0.0289	2.0043
1.2707	52	-0.0816	2.1326
-0.0845	52	-0.0983	2.1446
1.4024	52	-0.0098	1.9260
1.3031	52	0.5148	1.8863

TABLE XII

REGRESSION STATISTICS FOR STOCKS AGAINST THE S & P 500 COMPOSITE INDEX FOR THE ANALYSIS OF THE IMPACT OF THE SEC PROPOSAL: SAMPLE A

Company Name	Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)		
	Alpha	Beta	R-Squared
Adobe Oil & Gas Corp.	0.0014	0.7741	0.0404
Apache Corp.	0.0016	1.4103	0.1209
Aquitaine Co. Cda. Ltd.	-0.0006	0.3101	0.0110
Asamera Oil Ltd.	0.0007	1.5944	0.0841
Barnwell Inds. Inc.	0.0007	0.1850	0.0016
Baruch Foster Corp.	0.0019	0.6555	0.0044
Belco Pet. Corp.	0.0016	1.4073	0.1544
Bow Valley Inds. Ltd.	0.0007	1.1008	0.0770
C & K Pet. Inc.	0.0027	0.7796	0.0220
Canadian Homestead Oils Ltd.	0.0014	1.0993	0.0488
Canadian Merrill Ltd.	0.0019	0.4359	0.0106
Canadian Occidental Pet. Ltd.	0.0005	0.1955	0.0067
Canadian Superior Oil Ltd.	0.0005	0.4119	0.0508
Clark Oil & Refng. Corp.	0.0008	1.5122	0.1340
Consolidated Oil & Gas Inc.	-0.0003	1.1483	0.0790
Crown Cent. Pet. Corp.	0.0003	1.0324	0.0726
Crystal Oil Co.	0.0025	1.0377	0.0539
Damson Oil Corp.	0.0021	1.4466	0.0623
Dome Pet. Ltd.	0.0012	0.8539	0.0857
Falcon Seaboard Inc.	0.0034	1.1581	0.0825
Felmont Oil Corp.	0.0024	1.3214	0.1245
Florida Gas Co.	0.0018	0.7530	0.0926
General Amern. Oil Co. Tex.	0.0012	0.5648	0.0292
Great Basins Pet. Co.	0.0032	0.9798	0.0294
Helmerich & Payne Inc.	0.0015	1.3243	0.2588
Houston Oil & Minerals Corp.	0.0022	1.4269	0.1055

TABLE XII--Continued

Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)			Statistics For Test Period (July 7, 1978 to December 29, 1978)	
S.E.E.	T-Ratio (Beta)	N.O.B.	Auto-Coefficient	Durbin-Watson
0.0234	4.0709	396	-0.0812	2.1273
0.0236	7.3609	396	0.0495	1.8806
0.0182	2.0901	394	-0.1580	2.2821
0.0326	6.0154	396	0.0341	1.9316
0.0282	0.8029	394	0.1197	1.6708
0.0609	1.3163	395	-0.4733	2.9093
0.0204	8.4805	396	-0.1152	2.1306
0.0236	5.7324	396	-0.2007	2.3918
0.0322	2.9788	396	-0.0392	1.8283
0.0301	4.4977	396	-0.0632	2.0312
0.0261	2.0565	396	-0.0291	2.0582
0.0147	1.6334	395	-0.2313	2.4518
0.0110	4.5870	395	-0.1025	2.1949
0.0238	7.8074	396	0.1273	1.7444
0.0243	5.8150	396	0.1641	1.6718
0.0229	5.5545	396	-0.2222	2.3865
0.0270	4.7380	396	-0.1992	2.3681
0.0347	5.0906	392	0.0480	1.7807
0.0173	6.0753	396	0.1437	1.7124
0.0240	5.9516	396	-0.3285	2.6365
0.0217	7.4868	396	0.0501	1.8502
0.0146	6.3426	396	-0.0361	2.0434
0.0201	3.4349	394	0.0881	1.7754
0.0349	3.4575	396	-0.0607	2.1214
0.0139	11.7300	396	-0.1835	2.2701
0.0258	6.8170	396	-0.3694	2.5632

TABLE XII--Continued

Company Name	Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)		
	Alpha	Beta	R-Squared
Hudsons Bay Oil & Gas Ltd.	0.0003	0.3108	0.0346
Husky Oil Ltd.	0.0009	0.9577	0.1085
Inexco Oil Co.	0.0020	1.6914	0.1038
Juniper Pet. Corp.	0.0005	0.9372	0.0164
Louisiana Ld. & Expl. Co.	0.0001	1.3407	0.2960
McCulloch Oil Corp.	-0.0003	1.1119	0.0309
Mesa Pet. Co.	0.0008	1.4280	0.2267
Mitchell Energy & Dev. Corp.	0.0024	1.8590	0.1682
Natomas Co.	0.0018	1.5262	0.1464
North Amern. Rtys. Inc.	0.0011	1.0474	0.0605
North Canadian Oils Ltd.	0.0008	0.8753	0.0435
Pacific Pets. Ltd.	0.0007	0.5154	0.0659
Panhandle Eastn. Pipe Line Co.	0.0013	0.5778	0.1037
Petro Lewis Corp.	0.0038	0.8184	0.0340
Prairie Oil Rtys. Ltd.	0.0036	1.1466	0.0484
Sabine Corp.	0.0010	0.8217	0.0908
Scurry Rainbow Oil Ltd.	0.0000	0.2016	0.0045
Southern Nat. Res. Ltd.	0.0007	0.6353	0.1051
Southland Rty. Co.	0.0012	0.8571	0.0949
Superior Oil Co.	0.0010	1.0071	0.1614
Texas Gas Transmission Corp.	0.0011	0.8258	0.1787
Texas Oil & Gas Corp.	0.0017	1.2457	0.1571
Total Pet. North Amern. Ltd.	0.0023	1.7189	0.1454
Universal Res. Corp.	0.0023	1.1793	0.0602
Wainoco Oil Corp.	0.0042	1.1164	0.0330
Wilshire Oil Co. Tex.	0.0008	0.9609	0.0475

TABLE XII--Continued

Statistics for The Estimation Period (March 29, 1976 to March 29, 1977)			Statistics For Test Period (July 7, 1978 to December 29, 1978)	
S.E.E.	T-Ratio (Beta)	N.O.B.	Auto-Coefficient	Durbin-Watson
0.0102	3.7433	393	0.3376	1.3169
0.0170	6.9254	396	0.1351	1.7276
0.0308	6.7568	396	0.1814	1.6076
0.0450	2.5562	395	-0.5394	3.0275
0.0162	12.8699	396	-0.1264	2.2524
0.0386	3.5434	396	0.0424	1.8084
0.0164	10.7461	396	0.1423	1.7150
0.0256	8.9258	396	-0.2595	2.5171
0.0229	8.2207	396	-0.0335	2.0627
0.0256	5.0380	396	-0.0148	2.0295
0.0255	4.2311	396	0.0119	1.9524
0.0120	5.2739	396	0.0608	1.8782
0.0105	6.7510	396	-0.1034	1.9206
0.0271	3.7212	396	0.0029	1.8776
0.0316	4.4643	394	-0.1425	2.2670
0.0162	6.2428	392	-0.1629	2.1927
0.0187	1.3228	392	-0.1425	2.0915
0.0115	6.8039	396	-0.1758	2.3376
0.0164	6.4267	396	0.0403	1.8922
0.0142	8.7094	396	0.0010	1.9813
0.0110	9.2605	396	0.1835	1.6044
0.0179	8.5693	396	0.2009	1.5919
0.0289	8.1879	396	0.0552	1.8823
0.0289	5.0217	396	-0.3208	2.6403
0.0375	3.6679	396	-0.2626	2.4062
0.0267	4.4307	396	-0.4032	2.7147

TABLE XIII

REGRESSION STATISTICS FOR STOCKS AGAINST THE NASDAQ INDEX
FOR THE STUDY OF THE IMPACT OF THE
SEC PROPOSAL: SAMPLE B

Company Name	Statistics for the Estimation Period (March 29, 1976 to March 29, 1977)			
	Alpha	Beta	R-Squared	S.E.E.
Altex Oil	0.0072	-0.4104	0.0017	0.1355
Amarex Inc.	0.0063	0.7800	0.0238	0.0670
Argo Pet.	0.0043	0.9123	0.0213	0.0831
Argonaut Engy.	0.0159	0.8235	0.0116	0.1019
Arkansas W. Gas	0.0066	1.3635	0.1944	0.0373
Beard Oil	0.0102	0.2187	0.0017	0.0730
Brock Exp.	0.0086	0.9687	0.0155	0.1038
Burns, R. L.	. .	. .	. .	. .
Callon Pet.	0.0035	0.9490	0.0317	0.0704
Echo Oil	-0.0069	0.7193	0.0098	0.0996
Equity Oil	0.0044	0.4495	0.0107	0.0595
Flynn Engy.	. .	. .	. .	. .
Forest Oil	-0.0032	1.2114	0.1286	0.0424
Galaxy Oil	0.0009	1.1158	0.0480	0.0668
Gulf Engy.	0.0057	-0.1000	0.0004	0.0707
Hamilton Bros. Pet.	0.0021	1.2453	0.0715	0.0602
Helmet Pet.	0.0052	-0.5959	0.0100	0.0796
Intercont'l Engy.	0.0014	0.7651	0.0237	0.0677
KRM Pet.	0.0043	1.3174	0.0514	0.0761
MGF Oil	0.0070	0.0231	0.0000	0.0584
May Pet.	0.0011	0.5490	0.0112	0.0711
Maynard Oil	0.0071	-0.2034	0.0021	0.0609
McMoran Exp.	. .	. .	. .	. .
Noble Aff.	0.0064	0.6966	0.0403	0.0468
Ocean Oil & Gas	0.0035	0.3646	0.0153	0.0403
Pauley Pet.	0.0026	0.5857	0.0154	0.0645
Petrox Inc.	-0.0004	1.2855	0.0492	0.0779
Statex Pet.	0.0073	-0.4547	0.0071	0.0741
Summit Engy.	0.0033	0.8844	0.0155	0.0947
Supron Engy.	. .	. .	. .	. .
Tx. Am. Oil & Gas	0.0054	0.4398	0.0131	0.0526
Tomlinson Oil	0.0064	0.7692	0.0260	0.0649
Triton Oil & Gas	0.0051	2.2865	0.1126	0.0862
Weatherford Int.	-0.0037	1.6225	0.0889	0.0698
Webb Resources	0.0058	0.7455	0.0193	0.0715
Westcoast Pet.	0.0003	0.9644	0.0865	0.0421
Wiser Oil	0.0006	0.4360	0.0163	0.0467

TABLE XIII--Continued

Estimation Period (continued)		Statistics for Test Period (July 7, 1978 to December 29, 1978)	
T-Ratio (Beta)	N.O.B.	Auto-Coefficient	Durbin-Watson
-0.4256	105	-0.1261	2.2522
1.5937	105	-0.0709	2.0858
1.5039	105	-0.3347	2.6562
1.1072	105	-0.0475	2.0762
5.0099	105	0.2049	1.5680
0.4210	105	-0.0167	2.0044
1.2784	105	-0.3873	2.7029
. .	. .	. .	. .
1.8453	105	-0.1865	2.3684
1.0150	105	-0.0790	2.0583
1.0612	105	-0.3894	2.7557
. .	. .	. .	. .
3.9171	105	-0.3608	2.6272
2.2888	105	-0.0733	2.1351
-0.1989	105	-0.0146	2.0224
2.8302	105	-0.1272	2.2264
-1.0257	105	-0.0253	1.9252
1.5873	105	-0.5826	2.6573
2.3729	105	-0.2728	2.5038
0.0554	105	-0.0323	1.9199
1.0857	105	-0.2187	2.2900
-0.4691	105	0.4824	1.0351
. .	. .	. .	. .
2.0886	105	0.0537	1.8682
1.2708	105	0.1794	1.6109
1.2753	105	-0.0863	2.1432
2.3189	105	-0.0658	2.1297
-0.8624	105	0.2455	1.4728
1.2791	105	-0.1031	2.1718
. .	. .	. .	. .
1.1741	105	-0.4589	2.8072
1.6666	105	-0.2132	2.4260
3.6326	105	-0.1901	2.3557
3.1859	105	0.0242	1.9040
1.4290	105	0.0268	1.8883
3.1381	105	0.0674	1.8629
1.3126	105	-0.2875	2.5202

APPENDIX D

TABLE XIV

THE RISK-ADJUSTED RETURNS FOR THE STUDY OF THE IMPACT OF THE FASB EXPOSURE DRAFT: SAMPLE A

Week of Test Period	Full-cost Companies		Successful-efforts Companies	
	Unstandardized Returns	Standardized Returns	Unstandardized Returns	Standardized Returns
1	0.015	0.488	0.011	0.570
2	-0.015	-0.526	0.009	0.564
3	0.006	0.132	-0.003	-0.237
4	0.007	0.223	-0.005	-0.151
5	0.006	0.472	0.015	1.492
6	0.029	1.306	0.011	0.868
7	0.020	0.813	0.027	1.444
8	0.023	1.049	0.031	1.830
9	0.022	0.952	0.016	0.796
10	-0.034	-1.256	-0.020	-0.760
11	-0.028	-1.198	-0.002	-0.251
12	0.005	0.202	-0.005	-0.109
13	-0.008	-0.382	-0.002	-0.147
14	-0.024	-1.014	-0.004	-0.177
15	-0.003	-0.207	-0.007	-0.669
16	0.022	0.897	0.009	0.195
17	-0.002	-0.087	-0.015	-0.664
18	0.012	0.646	0.013	0.848
19	-0.005	-0.251	0.005	0.437
20	0.023	0.932	0.007	0.570
21	-0.012	-0.513	0.009	0.644
22	-0.005	-0.241	-0.017	-0.847
23	-0.037	-1.500	-0.011	-0.426
24	0.023	0.917	0.023	0.434
25	0.019	0.801	0.000	0.135
26	0.021	1.034	0.013	0.977
27	0.008	0.411	-0.007	0.068
28	0.020	0.926	0.040	2.169
29	0.034	1.360	0.014	0.329
30	0.012	0.619	0.016	1.116
31	0.006	0.162	0.002	0.255
32	-0.001	0.066	-0.009	-0.314

TABLE XV

THE RISK-ADJUSTED RETURNS FOR THE STUDY OF THE IMPACT OF THE FASB EXPOSURE DRAFT: SAMPLE B

Week of Test Period	Full-cost Companies		Successful-efforts Companies	
	Unstandardized Returns	Standardized Returns	Unstandardized Returns	Standardized Returns
1	0.006	0.041	-0.005	-0.063
2	-0.022	-0.347	-0.001	-0.124
3	0.003	0.036	-0.005	-0.013
4	-0.002	-0.014	0.004	0.102
5	-0.006	-0.253	0.009	0.200
6	0.033	0.547	0.010	0.075
7	0.024	0.368	0.037	0.390
8	0.015	0.429	0.023	0.302
9	-0.005	-0.078	0.009	0.247
10	-0.031	-0.567	0.000	0.012
11	-0.002	-0.151	-0.035	-0.552
12	0.000	0.136	-0.001	-0.056
13	0.006	0.180	-0.026	-0.270
14	-0.012	-0.165	0.005	0.067
15	-0.005	-0.084	-0.006	-0.145
16	0.009	0.228	0.005	0.054
17	-0.002	-0.045	-0.000	-0.025
18	-0.012	-0.142	-0.010	-0.128
19	-0.006	-0.052	0.018	0.300
20	-0.020	-0.307	0.027	0.361
21	0.007	0.053	0.004	0.077
22	-0.010	-0.176	-0.008	-0.129
23	0.000	0.033	-0.004	-0.165
24	0.016	0.250	-0.025	-0.315
25	-0.003	-0.077	0.026	0.400
26	0.017	0.199	0.017	0.309
27	-0.009	-0.120	-0.007	-0.053
28	-0.007	-0.157	0.011	0.209
29	-0.016	-0.180	0.017	0.222
30	0.011	0.144	0.013	0.262
31	-0.008	-0.169	-0.014	-0.186
32	-0.003	-0.098	-0.013	-0.014

TABLE XVI

THE RISK-ADJUSTED RETURNS FOR THE STUDY OF THE IMPACT OF THE SEC PROPOSAL: SAMPLE A

Week of Test Period	Full-cost Companies		Successful-efforts Companies	
	Unstandardized Returns	Standardized Returns	Unstandardized Returns	Standardized Returns
1	0.028	0.499	0.006	0.067
2	-0.002	-0.016	0.004	0.076
3	0.002	-0.043	-0.006	-0.082
4	-0.014	-0.331	-0.004	-0.158
5	-0.042	-0.805	-0.037	-0.966
6	0.024	0.372	0.011	0.177
7	0.004	0.101	-0.000	-0.022
8	-0.013	-0.233	0.002	0.078
9	0.041	0.648	0.001	0.044
10	-0.000	0.010	-0.010	-0.222
11	0.009	0.238	0.028	0.605
12	-0.013	-0.232	-0.017	-0.384
13	0.010	0.149	0.019	0.559
14	-0.010	-0.159	-0.002	-0.029
15	-0.020	-0.352	0.005	0.098
16	-0.054	-0.859	-0.007	-0.197
17	-0.072	-1.302	-0.036	-0.931
18	0.021	0.266	-0.006	-0.096
19	0.013	0.252	0.021	0.451
20	0.038	0.640	0.030	0.717
21	0.024	0.475	0.025	0.533
22	-0.010	-0.207	0.000	-0.010
23	0.005	0.176	0.011	0.233
24	-0.016	-0.301	0.004	0.178
25	0.023	0.404	0.034	0.815
26	-0.020	-0.287	-0.013	-0.251

TABLE XVII

THE RISK-ADJUSTED RETURNS FOR THE STUDY OF THE IMPACT OF THE SEC PROPOSAL: SAMPLE B

Week of Test Period	Full-cost Companies		Successful-efforts Companies	
	Unstandardized Returns	Standardized Returns	Unstandardized Returns	Standardized Returns
1	0.006	0.141	0.002	0.044
2	0.020	0.351	-0.003	0.083
3	-0.028	-0.404	0.036	0.630
4	-0.011	-0.142	0.009	0.150
5	-0.056	-0.800	0.048	0.592
6	0.009	0.108	0.039	0.663
7	-0.023	-0.221	0.008	0.114
8	0.002	-0.108	-0.001	0.053
9	0.026	0.338	0.003	0.100
10	-0.019	-0.204	0.028	0.383
11	-0.011	-0.156	0.012	0.138
12	-0.029	-0.327	-0.052	-0.883
13	0.019	0.262	0.017	0.359
14	-0.032	-0.454	-0.031	-0.518
15	-0.015	-0.245	0.003	0.044
16	-0.020	-0.223	-0.048	-0.675
17	-0.068	-0.745	-0.101	-1.348
18	0.016	0.244	0.016	0.301
19	-0.000	-0.062	0.000	0.010
20	0.020	0.463	-0.006	-0.054
21	-0.012	-0.133	-0.020	-0.339
22	0.001	-0.005	0.019	0.313
23	0.011	0.130	-0.033	-0.415
24	-0.037	-0.510	0.018	0.148
25	-0.003	0.018	0.008	0.258
26	0.004	0.035	-0.004	-0.076

TABLE XVIII

THE RISK-ADJUSTED RETURNS FOR SMALL AND LARGE COMPANIES IN ANALYSIS OF THE FASB EXPOSURE DRAFT

Week of Test Period	Listed Companies		OTC-traded Companies	
	Small Size	Large Size	Small Size	Large Size
1	0.009	0.003	0.017	0.006
2	-0.008	-0.038	-0.030	-0.006
3	0.010	-0.004	0.008	0.006
4	-0.012	0.008	0.008	0.009
5	-0.011	-0.001	-0.001	0.010
6	0.049	0.016	0.021	0.034
7	0.037	0.011	0.025	0.014
8	-0.028	0.064	0.024	0.024
9	-0.019	0.010	0.017	0.027
10	-0.019	-0.045	-0.034	-0.038
11	0.019	-0.027	-0.035	-0.024
12	-0.010	0.013	0.008	-0.005
13	0.003	0.009	-0.003	-0.014
14	-0.027	0.004	-0.026	-0.022
15	0.008	-0.019	-0.000	-0.016
16	0.008	0.009	0.034	0.017
17	-0.007	0.003	-0.002	0.003
18	-0.016	-0.006	-0.002	0.005
19	-0.007	-0.006	0.000	-0.003
20	-0.039	0.001	0.033	0.016
21	0.016	-0.001	-0.013	-0.017
22	-0.020	0.001	0.002	-0.024
23	-0.009	0.010	-0.038	-0.028
24	0.022	0.010	0.030	0.019
25	-0.019	0.013	0.024	0.015
26	0.015	0.019	0.012	0.048
27	0.017	-0.039	0.007	0.018
28	-0.006	-0.008	0.021	0.019
29	-0.024	-0.006	0.049	0.011
30	0.008	0.014	0.007	0.026
31	-0.025	0.009	0.017	-0.001
32	0.012	-0.020	-0.005	0.013

BIBLIOGRAPHY

Books

Dyckman, Thomas, David Downes, and Robert Magee, Efficient Capital Markets and Accounting: A Critical Analysis, Englewood Cliffs, New Jersey, Prentice Hall, Inc., 1975.

Francis, Jack C., Investment Analysis and Management, New York, McGraw-Hill Co., 1972.

Kirk, Roger E., Experimental Design: Procedures for the Behavioral Sciences, Belmont, California, Brooks/Cole Publishing Company, 1968.

Levine, Sumner N., Financial Analysts Handbook, I, Homewood, Illinois, Dow Jones-Irwin, Inc., 1975.

Lorie, James H. and Mary T. Hamilton, The Stock Market: Theories and Evidence, Homewood, Illinois, Richard D. Irwin, Inc., 1973.

Sharpe, William F., Portfolio Theory and Capital Markets, New York, McGraw-Hill Co., 1970.

Articles

Beaver, William H., "The Behavior of Security Prices and its Implications for Accounting Research (Methods)," Supplement to The Accounting Review, 47 (1972), 407-432.

Black, Fisher, "Toward a Fully Automated Stock Exchange," Financial Analysts Journal, 27 (July-August, 1971), 28-36.

Collins, Daniel W., Warren T. Dent, and Melvin C. O'Connor, "Market Effects of the Elimination of Full Cost Accounting in the Oil and Gas Industry," Financial Analysts Journal, 34 (November-December, 1978), 48-57.

Conners, Joseph E., "Discovery Value--The Oil Industry's Untried Method," Journal of Accountancy, 139 (May, 1975), 54-63.

Eskew, Robert K., "An Examination of Share Price Data in the Extractive Petroleum Industry," The Accounting Review, 48 (April, 1973), 314-324.

ISL Daily Stock Price Record, Over-the-Counter Market, Standard & Poor's Corporation, New York, New York, 1976-1978.

SEC Directorate of Economic and Policy Research (J. Richard Zecher), "Full Cost vs. Successful Efforts: A Study of a Proposed Accounting Change's Competitive Impact," Securities and Exchange Commission, February, 1978.

Materials of Professional Organizations

Field, Robert E., Accounting Research Study No. 11, "Financial Reporting in the Extractive Industries," (New York, AICPA, 1969).

Financial Accounting Standards Board, "Financial Accounting and Reporting in the Extractive Industries," Discussion Memorandum (Stamford, Connecticut, FASB, December, 1976).

_____, "Financial Accounting and Reporting by Oil and Gas Producing Companies," An Exposure Draft of a Statement of Financial Accounting Standards, (Stamford, Connecticut, FASB, July, 1977).

_____, "Financial Accounting and Reporting by Oil and Gas Producing Companies," Statement of Oil and Gas Accounting Standards No. 19 (Stamford, Connecticut, FASB, December, 1977).

Public Documents

Securities and Exchange Commission, Accounting Series Release No. 150 (39 FR 1260), Washington, Government Printing Office, December, 1973.

_____, "Adoption of Requirements for Financial Accounting and Reporting Practices for Oil and Gas Producing Activities," Releases Nos. 33-5966; 34-15108; 35-20688; IC 10383; AS-253, Washington, Government Printing Office, August, 1978.

_____, "Disclosure of Oil and Gas Reserves and Operations, Proposed Amendments to Regulation S-K," Releases Nos. 33-5967; 34-20691; IC-10385, Washington, Government Printing Office, August, 1978.

_____, "Oil and Gas Producers--Full Cost Accounting Practices," Releases Nos. 33-5968; 34-15110; 35-20689; IC-10383, Washington, Government Printing Office, August, 1978.

Fama, Eugene F., "The Behavior of Stock Prices," Journal of Business, 38 (January, 1965), 34-105.

_____, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, 25 (May, 1979), 383-417.

_____, "What Random Walk Really Means," Institutional Investor, 2 (April, 1968), 38-43.

Foster, George, "Earnings and Stock Prices of Insurance Companies," The Accounting Review, 50 (October, 1975), 686-698.

King, Benjamin F., "Market and Industry Factors in Stock Price Behavior," Journal of Business, 39 (January, 1966), 139-190.

Klingstedt, John P., "Effects of Full Costing in the Petroleum Industry," Financial Analysts Journal, 26 (September-October, 1970), 79-86.

Lintner, John, "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.

Patell, James M., "Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical Tests," Journal of Accounting Research, 14 (Autumn, 1976), 246-276.

Patz, Dennis H. and James R. Boatsman, "Accounting Formulation in an Efficient Markets Environment," Journal of Accounting Research, 10 (Autumn, 1972), 392-405.

Sharpe, William F., "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," Journal of Finance, 33 (September, 1964), 425-442.

Sharpe, William F. and Guy M. Cooper, "Risk-Return Classes of New York Stock Exchange Common Stocks, 1931-1967," Financial Analysts Journal, 28 (March-April, 1972), 46-54.

Reports

Dyckman, Thomas, Report on the Effects of the Exposure Draft on the Returns of Oil and Gas Companies' Securities, Stamford, Connecticut, FASB, October, 1977.

_____, Report 3, on the Effects of Statement No. 19, Financial Accounting and Reporting by Oil and Gas Producing Companies, on Returns of Oil and Gas Company Securities, Stamford, Connecticut, FASB, March, 1978.

_____, "Oil and Gas Producers--Full Cost Accounting Practices," Releases Nos. 33-6007; 34-15417; 35-20837; IC-19531; AS-258, Washington, Government Printing Office, December, 1978.

_____, "Proposed Supplemental Earnings Summary for Oil and Gas Producing Activities," Releases Nos. 33-5969; 34-15111; 35-20690; IC-10382, Washington, Government Printing Office, August, 1978.

Lorie, James H., "Public Policy of American Capital Markets," Washington, U. S. Department of Treasury, 1974.

Unpublished Materials

Brock, Horace and Barry King, "An Analysis of Stock Prices, Earnings, Reserves, Sources and Uses of Funds, and Expenditure Data for a selected Group of Oil and Gas Producers, 1971-1976," An unpublished paper presented at the SEC hearings, Washington, March, 1978.

Collins, Daniel and Warren Dent, "An Assessment of the Stock Market Effects of the Proposed Elimination of Full Cost Accounting in the Extractive Petroleum Industry," International Paper Company, New York, March, 1978.

Messing, Richard F., "Testimony re Impact of Adoption of FASB-19 Standard on the Oil and Gas Industry," Printed transcript of an address presented to the SEC, Washington, D. C., March 30, 1978.