### ABSTRACT

# THE DISCLOSURE OF CAPITALIZED LEASE INFORMATION AND STOCK PRICE

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The purpose of this research was to empirically examine whether or not the SEC's recent decision requiring the public disclosure of capitalized lease accounting data had any impact on the pricing of securities.

In October 1973 the SEC issued ASR No. 147 (effective as of November 1973) calling for the disclosure of capitalized lease information which was not previously required by any accounting regulatory agency. The important items of disclosure are: (1) the present value (PV) of noncapitalized future financing leases and (2) the impact on net income (income effect: IE) if such leases were capitalized.

The SEC believes that the capitalized lease data are considered "essential to investors" in evaluating the risk-return prospects of the firms which have long-term lease commitments. If the SEC's belief is true, the disclosure of the PV and IE numbers under ASR No. 147 will affect the investors' assessments of the risk-return prospects of the firms and hence the equilibrium pricing of securities.

The present study assessed an effect of capitalized lease information upon equilibrium rates of security returns by comparing the return distribution functions conditional upon the lease information with the unconditional return distributions. In making this assessment, it was assumed that a vector of returns  $(\underline{\hat{R}})$  on all assets has a multivariate normal distribution. Under this assumption, the condition for lease information effect is  $F(\underline{R}/\underline{\theta}) \neq F(\underline{R})$  where  $\underline{\theta}$  = the capitalized lease information vector and F = the distribution functions of returns. The above condition is equivalent to  $E(\underline{\hat{R}}/\underline{\theta}) \neq E(\underline{\hat{R}})$  and/or  $Var(\underline{\hat{R}}/\underline{\theta}) \neq$  $Var(\underline{R})$ . Either of these two conditions (or both) is sufficient for  $\underline{\theta}$ to have information content.

Since the two types of return data, conditional on  $\underline{\theta}$  and unconditional, cannot be observed for a firm for the same time period, the present study employed control firms, the returns of which were used as unconditional returns, while the returns of treatment firms were utilized as conditional returns. There were two control groups in the present study: non-lease firms (Group 1) and non-disclosure firms (Group 2). The treatment firms (Group 3) were those firms which disclosed the capitalized lease data according to ASR No. 147 for 1973 and 1974. All return data were obtained from a 1975 edition of the CRSP tape. The names of both treatment and control firms were obtained by a reading of 10-K reports and annual reports for the three years, 1972 through 1974.

Depending upon types of the capitalized lease disclosure, the treatment firms were classified into two subgroups: the PV disclosure firms and the firms with both PV and IE disclosure. No single firm was found to disclose the IE alone. Then, each of these subgroups was again divided into two risk classes, high and low, according to its relative risks. The control firms of Group 1 (and Group 2) were individually paired with the treatment firms in Group 3 according to their Beta estimates. Thus, they were classified into the same subgroups and risk classes as were the treatment firms.

All statistical tests were conducted by comparing the high and low risk firms of Group 3 with the high and low risk firms of Group 1 (and Group 2). The tests were aimed at seeing whether the two-component (high and low risk) mean return vector (and the 2 x 2 variancecovariance matrix of returns) of the treatment group was equal to the corresponding mean vector (and the variance-covariance matrix) of the control group. The equality of the two mean return vectors was statistically tested using Hotelling's  $T^2$  statistic, while the equality of the variance-covariance matrices was evaluated by employing Box's generalized test of homoscedasticity of variances and covariances.

The test period covered 21 months, January 1973 through September 1974. In addition to a test for the 21-month period, this entire period was divided into five sub-periods for which separate tests were also conducted. The test results showed that the mean (expected) values of return distributions for the treatment firms changed significantly as a result of the SEC lease decision. However, no evidence was found for significant changes in the variability of returns. Since a significant change in the mean of return distribution is sufficient, by definition, for the hypothesized lease information effect to exist, it was concluded that the SEC lease disclosure decision had an impact upon the pricing of securities. This conclusion is consistent with the SEC's belief that capitalized lease information is important to investors. Also, the empirical evidence found here supports the traditional view that maintains the existence of information content in capitalized lease data.

## THE DISCLOSURE OF CAPITALIZED LEASE INFORMATION AND STOCK PRICE

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Byung - Tak Ro

### A DISSERTATION

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Accounting and Financial Administration

To my parents, wife, and two sons.

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### CHAPTER I

### INTRODUCTION

The purpose of this research was to examine empirically whether or not the recent decision of the Securities and Exchange Commission (SEC) requiring disclosure of capitalized accounting data for noncapitalized financing leases had any impact on the pricing of securities. This research, then, is viewed as being important as well as timely because such information may be relevant to the recently formed Advisory Committee on Corporate Disclosure of the SEC and the Financial Accounting Standards Board (FASB) in their deliberations concerning the lease disclosure issue. Moreover, the results of the study may provide a basis for evaluating the continuing controversies for and against the public disclosure of capitalized lease information. Indeed, if captialized lease disclosure as required by the SEC does have an impact upon the pricing of securities, this would support the argument proposing disclosure of capitalized lease information. On the other hand, if there is no such impact, the counter-argument against capitalized lease disclosure will have a sounder foundation in that it is supported by empirical evidence.

The philosophy of disclosure, from the standpoint of the SEC, is to provide information that will facilitate rational decision making by investors and speculators in a free and competitive capital market.<sup>1</sup> In light of this disclosure philosophy, the SEC believes

that a proper role of a regulatory agency is to monitor the accuracy and availability of such information.

In a move to further implement this philosophy, the SEC proposed in June 1973 to amend Rule 3-16<sup>2</sup> of Regulation S-X calling for improved disclosure of lease information by lessees in their 10-K reports filed with the Commission.<sup>3</sup> After evaluating many letters of comment received in response to the proposal, the SEC eventually adopted the extended lease disclosure requirements in Accounting Series Release (ASR) No. 147 in October 1973.<sup>4</sup> The Release was effective as of November 30, 1973.

In general, ASR No. 147 requires increased disclosure of noncapitalized lease commitments by lessees in a footnote to the financial statements in the 10-K reports. Specifically, the Release calls for the disclosure of certain lease information which was not previously required by either the SEC or other accounting regulatory agencies. The new mandatory items of disclosure concern noncapitalized financing leases. For leases of this type, registrants are required to disclose: a) the present values (PV) of the minimum future lease commitments in the aggregate and by major categories of properties, b) the interest rate(s) used in computing the PV, and c) the impact on net income (income effect: IE) if such leases were capitalized.<sup>5</sup>

Two reasons for the extended lease disclosure are specifically pointed out in the Release.<sup>6</sup> First, the disclosure of both the PV and IE is considered "essential to investors" since this information is felt to be "necessary to enable investors to compare meaningfully the capital and asset structures and the operating results of companies" that have such leases. Second, the existing lease disclosure requirements, including APB Opinions No. 5 and 31, are not sufficient to provide lease

information "as needed by investors." Thus, these statements suggest that the lease data of the type called for in the Release will convey new information (important to investors) about the risk-return prospects of those firms which did not previously report such data through accounting sources. And this suggestion in turn implies that security prices of these firms would be affected by the disclosure of such information through its impact on investors' assessments of the riskreturn prospects of the firms.

The SEC's view on the importance (to investors) of capitalized lease information is not new. Rather, it can be regarded as a reinforcement of the traditional arguments that insist on disclosure of such information in financial reports. For instance, Myers in Accounting Research Study No. 4 recommends extended disclosure of capitalized lease information.<sup>7</sup> He claims that, since lease commitments create property rights (assets) and liabilities on the part of the lessee, "the present value of contracted lease payments should be placed among the assets and liabilities on a balance sheet<sup>8</sup> and, therefore, that there should be "a periodic charge to income both for the interest element of each rental payment and for the periodic amortization of the asset value".<sup>9</sup> It is implied in this argument that the existence of property rights and obligation for those rights will affect the financial ratios which may be used by investors in assessing the risk-return prospects of the firms with lease commitments. Therefore, disclosure of capitalized lease data is important to investors.

In addition to the above arguments, both APB Opinion No. 31 and the FASB Exposure Draft on accounting for leases agree that sufficient information regarding lease commitments can help users of the financial

statements in assessing the financial conditions and operating results of lessees.<sup>10</sup> Similarly, the Subcommittee on Leases of the AAA Committee on Financial Accounting Standards states that disclosure of captialized lease information will improve "the information content of the financial statements."<sup>11</sup> In addition, Vatter (1966), Buff (1971), and Huefner (1970) all agree that a lease contract creates a liability so that reporting leases in the financial statements should be treated as such; that is, capitalized lease disclosure is a correct approach to accounting for leases.<sup>12</sup>

In contrast to the view that capitalized lease disclosure is needed to improve the information content of the financial statements, however, a counter-view asserts that disclosure of capitalized lease information would confuse investors and convey no new information about the value of a disclosing firm.<sup>13</sup> According to this view, disclosure of such information will not improve the information content of the financial statements. This counter-view can be divided into three broad argument categories.

The first argument category focuses on the nature of lease commitments. According to Cook (1963) and Zises (1961 and 1973), for example, a lease commitment creates neither an asset nor a liability because ordinary financing leases are "executory" contracts which are in essence incomplete transactions and the reporting company has no ownership right in the leased asset.<sup>14</sup> It is also argued that, since the nature of lease commitments is so divergent, capitalization reduces the amount of information conveyed and uniform disclosure will mask the unique aspects of specific types of leases.<sup>15</sup> Those who hold this view further maintain that the primary use by investors and

creditors of information about lease commitments is in the projection of cash flows and in the analysis of a company's ability to meet its fixed charges. The only item of lease information that is useful for that purpose is the amount of gross rentals payable; the capitalized value of these rentals is meaningless. Therefore, any requirement to disclose both is unnecessary and misleading.<sup>16</sup>

Thus, these arguments suggest that the disclosure of capitalized lease data, such as the PV and IE, of noncapitalized financing leases, as if they did give rise to assets and related liabilities and without consideration of the diversity of lease commitments, would be potentially misleading to investors. Accordingly, to the proponents of these arguments the capitalized lease information of the type called for in ASR No. 147 is considered to be of little value to investors in evaluating the risk-return prospects of the firms.

A second category of arguments that question the information content of lease disclosure focuses on the practical implementation problems associated with lease capitalization and disclosure. For example, what criteria should be used to identify leases that are to be capitalized? What interest rate(s) should be utilized in determining the PV of lease commitments? Should the amount of rentals used in capitalization be net or gross? Should renewal or purchase options and contingent payments be considered? What information about capitalized leases should be presented in the body of the financial statements and what information disclosed in the footnotes thereto?

These are only partial examples of the implementation problems involved in lease capitalization and disclosure.<sup>17</sup> Focusing on implementation problems of these types, Defliese warns "..., it would

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seem inadvisable to require the capitalization of finance-type leases by lessees" and "... it appears most inadvisable to require disclosure of an alternative net income amount on an 'as if' captialized basis" until the complexities of capitalizing leases are satisfactorily resolved.<sup>18</sup> For similar reasons, Donaldson (1962) and Axelson (1971) also suggest that a footnoting of the annual rental payments without their capitalization is adequate.<sup>19</sup>

Thus, it is implied in this second set of arguments that disclosure of capitalized lease information may be meaningless until satisfactory solutions to these complex problems are found. Although the SEC provides guidelines on some of the implementation problems, $^{20}$ the validity of these guidelines still remains untested. For example, the Release requires disclosure of the PV and IE of noncapitalized financing leases in the footnotes rather than in the body of financial statements. However, as the FASB Discussion Memorandum (1974) points out,<sup>21</sup> this footnote disclosure requirement may not be meaningful in an efficient capital market in which all available information is fully reflected in security prices. Indeed, security price formation should be unaffected by lease disclosure in the body of financial statements as opposed to disclosure in footnotes. Furthermore, other potential implementation problems, such as how to present information about capitalized leases in the body of the financial statements, are not explicitly dealt with by the SEC. As a result, the SEC's failure to deal adequately with the practical implementation problems associated with disclosing the PV and IE numbers may severely restrict the information content of the capitalized lease data.

A final argument category which questions the information content

of capitalized lease data focuses on the possible consequences of disclosure. This argument maintains that the underlying economic realities (such as economic resources and real liabilities, cash flows, and the like) of a reporting company are not affected by the disclosure of capitalized lease data. Accordingly, the disclosure of such data in financial reports will not convey any new information about a firm's market value to users of the financial statements. Representing this view, Nurnberg argues:

...the underlying economic realities are unaffected [by lease disclosure]; firms still have the same resources and obligations regardless of whether they [leases] are reported as assets and liabilities and regardless of their impact on financial ratios. ...the recognition of leases... as assets and liabilities...necessitates educating financial statements users to evaluate firms on the basis of the underlying economic realities, not on the basis of how these realities are reported in the financial statements.<sup>22</sup>

Given the above outlined conflicting views concerning the alleged information effect of capitalized lease data, it is considered appropriate to evaluate empirically which of the two views is more consistent with observed empirical phenomena. If capitalized lease data convey useful information to investors in evaluating a firm's market value, as both the SEC and proponents of lease disclosure believe, then there should be an observable market reaction to the disclosure of capitalized lease data (the PV and IE) under ASR No. 147. And the extent to which such market reaction exists can be utilized as a means of assessing the information content of the capitalized lease data and the effect of the SEC lease disclosure decision on the pricing of securities. However, if capitalized lease data convey no new information about a firm's risk-return prospects, as the counter-view asserts, then there should be no empirically observable market reaction to the event of capitalized lease disclosure as required under ASR No. 147. No market reaction implies no information content of capitalized lease data and this, in turn, implies that the SEC decision had no impact upon the pricing of securities.

As Gonedes and Dopuch (1974) note, an empirical assessment of the effects of accounting regulations such as the SEC lease disclosure decision can be justified on the following grounds:

Since assertions about effects are important parts of the justifications offered for recommendations and prescriptions, we can assess the strength of these justifications by evaluating the theoretical or empirical support for the assertions about effects...In short, assessments of the effects of alternative accounting procedures and regulations can be useful to accounting policy-making bodies in making their decisions and to their constituencies in evaluating those decisions.<sup>23</sup>

Nevertheless, very little empirical research has been done to assess the information effect (upon security pricing) of capitalized lease data or lease disclosure regulations by regulatory agencies, especially in the context of a market-based approach.

This study consists of six chapters. A detailed examination of the SEC's extended lease disclosure requirements set forth in ASR No. 147 is provided in the first part of the next chapter. The latter part of the chapter discusses the possible effects on financial ratios of the capitalized lease data disclosed according to the Release and their potential relationship with security prices. Chapter III describes how the impact of capitalized lease data upon the pricing of securities can be evaluated both theoretically and empirically. The first section of this third chapter will develop an analytical framework for evaluating the information effect of lease disclosure, while the remaining sections will describe how the information effect can be investigated empirically. The investigation method employed in the present study was a multivariate approach. Chapter IV provides descriptions of the sampling design used for selecting sample firms and for collecting stock price data, and an analysis of all test results is presented in Chapter V. Finally, the concluding chapter will investigate the implications of the findings and suggest avenues of further research.<sup>24</sup>

### CHAPTER II

## THE NEW LEASE DISCLOSURE REQUIREMENTS AND EFFECTS ON ACCOUNTING VARIABLES

This chapter begins with a brief historical review of accounting regulations for disclosing leases in financial reports. Hopefully, this review will facilitate an understanding of the motivation underlying the SEC's new lease disclosure decision of 1973 (ASR No. 147). The second section describes the new extended lease disclosure requirements set forth in ASR No. 147 and notes in particular the incremental lease information (the PV and IE) over and above the disclosure called for in APB Opinion Nos. 5 and 31. The final section examines the possible effect that the PV and IE disclosure will have on various financial ratios used in traditional financial analysis and on the pricing of securities through its impact on the financial ratios.

### Historical Review of Accounting Regulations for Reporting Leases

### The AICPA Pronouncements

The first official pronouncement designed to improve disclosure by lessees of long-term leases in financial reports was initiated in 1949 when the Committee on Accounting Procedure of the American Institute of CPAs issued Accounting Research Bulletin (ARB) No. 38, "Disclosure of Long-Term Leases in Financial Statements of Lessees."<sup>1</sup> A

primary recommendation in the Bulletin was that a lease which is in substance a purchase should be capitalized.<sup>2</sup> However, a general consensus was that the relatively simple lease disclosure requirements<sup>3</sup> set forth in the Bulletin were considered inadequate to meet the need for more information concerning increasingly complex lease commitments.

In 1962 the AICPA published Accounting Research Study (ARS) No. 4, "Reporting of Leases in Financial Statements," in which Myers recommended more lease capitalization and extensive disclosure, including those leases which may not be in substance purchases.<sup>4</sup> Myers' recommendation was rejected by the Accounting Principles Board of the AICPA.

In its Opinion No. 5<sup>5</sup> the Board stated that capitalization should be limited only to those leases which are in substance purchases<sup>6</sup> and, thus, reinforced the basic position originally stated in ARB No. 38. As a result, the Board's concern centered on specifying the criteria necessary to identify leases which are in effect installment purchases of property. Thus, a basic criterion suggested in the Opinion was whether or not the terms of a lease result in the creation of a material equity in the property.<sup>7</sup>

Despite the Board's effort to improve reporting of leases, a general consensus was that the contents of the Opinion were inadequate; the term "material equity" was ambiguous and did not lend itself to easy practical application. Furthermore, the Opinion failed to provide adequate information about leases that are not in substance purchases. Disclosure (in schedules or notes) of minimum annual rentals of such leases and the related lease periods were recommended.<sup>8</sup> However, the method of disclosing such supplemental lease information, as recommended in the Opinion, was criticized for being too general. For example, the Opinion stated that: "The specific details to be disclosed and the method of disclosure will vary from one situation to another depending upon the circumstances."<sup>9</sup>

In June 1973 the Board issued its Opinion No. 31, "Disclosure of Lease Commitments By Lessees," which was designed to provide more complete information with respect to noncapitalized lease commitments. The new Opinion requires the following major disclosures with respect to a firm's lease commitments: <sup>10</sup>

- Total rental expense (reduced by rentals from subleases) with disclosure of such amounts for each period for which an income statement is presented and with contingent rentals disclosed separately.
- (2) The minimum rental commitments under all noncancelable leases,<sup>11</sup> in the aggregate and by major categories of properties, for a) each of the five succeeding fiscal years,
  b) each of the next three five-year periods, and c) the remainder as a single amount.
- (3) Additional disclosures concerning a) a basis for calculating rental payments if non-time factor is used as the basis, b) renewal and purchase options, escalation clauses, etc., c) related guarantees made or obligations assumed, d) restrictions on paying dividends, incurring additional debt, further leasing, etc., and e) any other necessary information.

In addition to these mandatory disclosure requirements, the new Opinion recommended disclosure of the PV of future minimum noncancelable lease commitments, reduced by the PV of rentals to be received from existing noncancelable subleases and with disclosure of the discount rate(s) used in computing the PV. It should be noted, however, that the PV disclosure is optional rather than mandatory. Because of this negligence in mandating disclosure of such information, APB Opinion No. 31 has been criticized for failure to achieve its stated goal "to disclose sufficient information regarding noncapitalized lease commitments"<sup>12</sup> that investors and other users of financial statements believe to be important. Not surprisingly, there was little change in the general tendency of lease capitalization in practice even after the Opinion went into effect (as of December 31, 1973). According to the AICPA survey, only 7% of 600 sampled firms in 1973 and 8% in 1974 capitalized all of their long-term leases. For the same years, the firms which capitalized only part of their leases comprised 20% and 22%, respectively.<sup>13</sup>

### The SEC Regulations Before ASR No. 147

The SEC has made several official pronouncements concerning lease disclosure in S-X Regulations or in the form of Accounting Series Releases. Basic rules for disclosure of long-term leases and commitments are found in Rule 3-16 of Regulation S-X. Regarding noncancelable leases which are not capitalized, Rule 3-16(i), "Commitments and Contingent Liabilities," requires disclosure of the following information, if annual rentals under such leases are in excess of 1% of total sales and revenues of the most recent fiscal year:

- the minimum annual rentals for the current and each of the five succeeding years;
- (2) the nature and effect of any provisions that would cause the annual rentals to vary from the minimum rentals;
- (3) a description of the types of property leased, important obligations assumed or guarantees made, and any other significant provisions of such leases.

In addition, Rule 12-16 requires disclosure of rent expenses. As

seen above, however, the Rule does not call for disclosure of capitalized information of noncapitalized leases.

In November 1972 the SEC issued ASR No. 132, "Reporting of Leases in Financial Statements of Lessees." However, the Release was limited mainly to clarifying ambiguities in APB Opinion No. 5 so that it was in effect an interpretation of provisions in this Opinion. For example, much of the discussion in the Release was concerned with how to determine economic substance in order to identify leases which should be capitalized and those which should not.

### SEC's Assessment of Previous Regulations

The preceding discussion provides a brief review of the official lease disclosure pronouncements which went into effect prior to the SEC's 1973 extended lease disclosure pronouncement (ASR No. 147). In light of the reasons for this new pronouncement, which were pointed out in the previous chapter, by implication the SEC took the position that the prior pronouncements on lease disclosure failed to achieve their stated objective--to provide sufficient information concerning lease commitments that users of financial statements believe to be important. For example, the SEC stated that:

The Commission has carefully considered the contents of Opinion No. 31 to determine whether it provided for sufficient disclosure to meet the needs of investors and has concluded that it does not,...the Commission believes that disclosure of the present value of financing leases and of the impact on net income of capitalization of such leases, neither of which is required by Opinion No. 31, are essential to investors.<sup>14</sup>

Thus, this statement can be interpreted to mean that disclosure of the capitalized lease data was not mandatory, but optional under those previous disclosure regulations, a situation which was not satisfactory from the standpoint of the SEC. Therefore, the general public had no access to capitalized information (such as the PV and IE) of noncapitalized future lease commitments through accounting sources.

As a result, the SEC felt that there was a need for more extensive and mandatory capitalized lease disclosure. Furthermore, it believed this need to be rather urgent stating that "---it is not in the interest of investors to delay additional disclosure requirements any further."<sup>15</sup> In response to this pressing need for extended lease disclosure, the SEC formally issued ASR No. 147 in October 1973, the contents of which are examined in the next section. However, the SEC has indicated that the disclosure requirements in the Release may be reconsidered if the FASB provides satisfactory guidelines for lease disclosure in the future.<sup>16</sup> Presently, accounting for leases is again under comprehensive examination by the FASB,<sup>17</sup> but no formal statement has been adopted at this time.

#### The Lease Disclosure Requirements in ASR No. 147

The SEC's new lease disclosure requirements are described in section "C. Amendments to Regulation S-X" of ASR No. 147. Part of the disclosure requirements in the Release are reaffirmations of the three categories of disclosure requirements in APB Opinion No. 31 (as noted previously) concerning total rental expense, minimum rental commitments under all noncancelable leases, and five additional disclosures. Also, the Release defines a noncancelable lease as it is defined in the new Opinion.<sup>18</sup>

As compared to APB Opinion No. 31, the Release provides more

refined quidelines regarding the first two disclosure items (total rental expense and minimum rental commitments). First, according to the Release, these two disclosures are required only when gross rental expense exceeds 1% of consolidated revenues.<sup>19</sup> However, no guideline concerning the minimum amount of gross rental expense for disclosure purposes is provided in the Opinion. Second, unlike the Opinion, the Release requires a separate indication of noncapitalized financing leases when the two items, total rental expense and minimum rental commitments, are disclosed.<sup>20</sup> Third, the Release gives a definition of a financing lease which is not found in the Opinion. In the Release a financing lease is defined as one that, during the noncancelable lease period, either (1) covers 75% or more of the economic life of the property or (2) has terms which assure the lessor a full recovery of the fair market value of the property at the inception of the lease plus a reasonable return on the investment in the property.<sup>21</sup>

In addition, ASR No. 147 calls for the disclosure of the following four items concerning noncapitalized financing leases<sup>22</sup> which previously were not required under any official accounting pronouncement:

- the PV of the minimum future noncapitalized financing lease commitments in the aggregate and by major categories of properties;
- (2) either the weighted average interest rate and range of rates or specific interest rates used in computing the PV of such leases;
- (3) the PV of rentals to be received from existing subleases;
- (4) the IE for each period for which an income statement is presented if such leases were capitalized, related assets were amortized on a straight-line basis and interest cost was accrued on the basis of the outstanding lease liablilty.

However, the Release states that, if the PV of the minimum lease commitments is less than 5% of the amount of long-term capitalization<sup>23</sup> and if the IE is less than 3% of average net income for the most recent three years, then the above disclosures are not required. That is, these two cut-off points, 5% for the PV disclosure and 3% for the IE disclosure, are specified by the SEC as criteria for judging the materiality of noncapitalized financing leases for disclosure purposes.

The PV and IE information of noncapitalized financing leases is incremental in that its disclosure was not required until ASR No. 147 went into effect. Apparently, the SEC believed that this information is essential to investors in assessing a firm's market value and, therefore, that its public disclosure should be mandatory. Accordingly, the main question of concern in the present study is whether this incremental lease disclosure provides any new information which is pertinent to investors in evaluating the risk-return attributes of the disclosing firms.

### Effects on Financial Ratios

Appendix A shows the financial statements of a hypothetical firm which is assumed to be materially<sup>24</sup> affected by the SEC's new lease disclosure decision. Notice how the financial statements differ: those statements prepared according to ASR No. 147 compared to those not so prepared.

If one assumes that the PV is part of liabilities and that the IE is an adjustment to reported net income, it is apparent that most financial ratios used in the traditional analysis of the firm will be adversely affected. As shown in Appendix B, for example, the debt-equity ratio for 1974 of the hypothetical firm will be adversely changed from .52 to .66 if the PV of leases is included in long-term debt as a liability. Since the IE results in a reduction of reported net income (which would be the typical case for most of the firms), the net income to stockholders' equity ratio will decrease from .05 to .04 and earnings per share will be reduced from \$2.65 to \$2.36.

In fact, the extent to which the financial ratios are affected will be greater than this simple example suggests. For example, the amount of inventory may change due to depreciation adjustment for the leased property if it is used for a manufacturing purpose. Consequently, the magnitude of current assets as well as net income will change. Also, the amount of current liabilities as well as long-term debt will be affected if part of the lease payments is due by the end of the next fiscal year. A periodic charge to income both for the interest factor on the outstanding lease obligations and for the depreciation of the leased assets will change net income. Similarly, many other items in the financial statements will change, and a series of such changes will eventually lead to an associated change in almost every financial ratio.

The effects on financial ratios illustrated in this simplified case are representative of the sort of impact that lease capitalization has upon firms' financial ratios. In a study of the effects of lease capitalization on financial ratios, Nelson (1963) found that capitalization of leases generally affects financial ratios in an adverse manner. He examined fifteen financial ratios of eleven lessee sample firms before and after lease capitalization. Those ratios that

he examined included current ratio, debt to equity, debt to total capital, return on total capital, fixed assets to tangible net worth, inventory to net working capital, net working capital to net plant, net plant to sales, and seven other ratios. In the case of certain sample firms, the change in the debt to equity ratio ranged from 8.32% (75.7% before lease capitalization to 82.0% after capitalization) to 416.45% (15.8% to 65.8%). The change in the debt to total capital ratio varied from 0.99% (80.7% to 81.5%) to 289.78% (13.7% to 39.7%). As compared to these two ratios, the current ratio was shown to be relatively less affected by lease capitalization with a range from 0.88% (1.14 times before capitalization to 1.15 times after capitalization) to 37.90% (3.43 times to 2.13 times). On the other hand, ten out of eleven sample firms experienced a favorable change in the ratio of net profit to net working capital ranging from .69% (14.5% to 14.6%) to 61.92% (32.3% to 52.3%). However, the returns on total capital of six sample firms declined from approximately 8% to 7% as a result of lease capitalization, while the returns for the remaining five firms increased from about 4% to 5%.

The final result was that twelve financial ratios, including current ratio, debt to equity, and debt to total capital, were adversely affected as a result of capitalization, while two ratios (times interest charges earned and net profits to net working capital) improved. The effect of capitalization on the return on total capital was mixed.

Thus, Nelson concluded that, in general, lease capitalization adversely affects a firm's financial position. He concluded that with capitalization the financial ratios become more meaningful because the ratios meet their "objectives"<sup>25</sup> more effectively. He argues that "the financial analyst could easily have made faulty decisions--if he had based his analysis on ratios"<sup>26</sup> which do not incorporate lease capitalization. This inference was based upon changes in the ranking of firms according to the magnitude of each of the financial ratios as a result of capitalization. According to Nelson, therefore, capitalized lease data have information content since such data are believed to improve the information content of the financial ratios.

However, there is counter-evidence that lease capitalization does not improve the information content of financial ratios when the information content is measured by some other event. Elam (1975) examined the effect of lease capitalization upon the ability to predict firms' bankruptcy using financial ratios computed after incorporating capitalized lease data. He selected forty-eight bankrupt firms as a treatment group for the period 1966 through 1972 and matched them with non-bankrupt firms individually. Then, he compared twentyeight financial ratios of the two types of firms over five years prior to bankruptcy and found that the inclusion of capitalized lease data in a firm's financial statements did not increase the power of financial ratios to predict bankruptcy.

Given the above evidence, the next question is whether the effect of lease capitalization upon financial ratios will in fact affect investors' perceptions of the firm. As seen earlier in Chapter I, a priori arguments by the proponents (including the SEC) of capitalized lease disclosure suggest that investors' perceptions will be affected by disclosure of capitalized lease data such as the PV and IE. However, the counter-arguments by those who question information content of capitalized lease data suggest that investors will

not reassess the value of the firm on the basis of the financial ratios affected by lease capitalization because the underlying economic realities of the firm have not changed or because many unresolved implementation problems cause capitalization to be meaningless.

If there is an association between the financial ratios and a measure of the riskiness of a firm's security and if investors use these ratios as instrumental variables (i.e., as surrogates for the risk measure through which the riskiness of the firm can be assessed), then capitalized lease disclosure will affect investors' perceptions about the riskiness of the firm. The reason for this predicted reassessment of risk is obvious: the financial ratios after lease capitalization will differ from such ratios before capitalization. A change in investors' perceptions will in turn lead to a readjustment of equilibrium security prices.

Beaver, Kettler, and Scholes (1970) argue that accounting risk measures can be viewed as surrogates for the systematic (market) risk measures, and they found empirical evidence to support this argument. They selected 307 sample firms for the years 1947 through 1965 and examined an association between seven accounting risk measures (dividend payout, growth, leverage, liquidity, asset size, variability of earnings, and covariability of earnings) and a market risk measure (Beta). Among the seven accounting risk measures, earnings variability appeared to have the highest rank correlation (.90 for 1947-56 and .82 for 1957-65) with the market-determined risk measure. The next highest correlation was present between payout ratio and the same market risk measure (-.79 for 1947-56 and -.50 for 1957-65). Such ratios as growth, liquidity, and size had relatively low

correlations with the market risk measure. Regarding the direction of correlation, three ratios (growth, leverage, and earnings variability) were found to have positive correlations, while two ratios (payout and size) had negative correlations. A conclusion on the liquidity ratio was indeterminate because the sign of its correlation coefficient was negative for the period 1947-56 and then positive for 1957-65. As a result of these findings, they concluded that "accounting measures of risk are impounded in the market based risk measure"<sup>27</sup> and, therefore, that there is a high degree of association between the accounting and market risk measures.

A similar study was conducted by Hamada (1972) who examined the effects of changes in the firms' capital structures upon the systematic risk of common stocks by the use of 304 sample firms selected for the years 1948-1967. He utilized leverage (debt-equity) ratio as a capital structure variable and found that approximately 21 to 24% of the observed systematic risk of common stocks can be explained by the leverage variable.

As seen earlier in this section, lease capitalization will apparently affect those financial ratios which were used in the above two studies. Thus, the results of these studies suggest that capitalized lease data, such as the PV and IE disclosed under ASR No. 147, may have a relationship with the systematic risk of a firm through the effect of such data on the financial ratios. The existence of this relationship further implies that there could be a relationship between the capitalized lease data and security prices. And to the extent that such a relationship exists, security prices can be used as a means to evaluate the information effect of the SEC lease disclosure decision.

### CHAPTER III

# ANALYTICAL FRAMEWORK AND METHODOLOGY FOR EVALUATING THE EFFECT OF CAPITALIZED LEASE DISCLOSURE

This chapter consists of three sections. The first section describes an analytical framework for evaluating the effect of capitalized lease disclosure upon the pricing of securities. The second section is devoted to discussions about the testing hypotheses and the multivariate test design used to investigate the hypothesized lease information effects. And in the final section, a description of the test procedures is provided.

## Assessment of the Effects of Lease Information on Equilibrium Rates of Return

Effects of Lease Information

The effect of new information upon equilibrium rates of security return can be assessed by comparing the return distribution functions conditional upon new information with the corresponding unconditional return distribution functions. If new information has an effect upon equilibrium rates of return, the two distribution functions will not be equal. Other things being equal, the inequality of these two functions can then be attributed to the effect of new information.

In making the assessment of information effect on the pricing of securities, the present study assumed that: (1) the vector of rates of return on all assets has a multivariate normal distribution and (2) investors agree upon the multivariate normal distribution of returns (i.e., investors make their investment decisions on the basis of the prediction of the mean and variance of this distribution). With these assumptions made, the effect of new information was evaluated within the context of a multivariate framework.<sup>1</sup>

The capitalized lease information (the PV and IE) disclosed under ASR No. 147 is viewed as one type of potentially new information available to investors. Thus, the effect of the capitalized lease information upon equilibrium pricing of securities can be evaluated by a comparison of the return distribution functions conditional upon the lease information with the unconditional return distribution functions.

Let  $\hat{R}_{jt}$  be the rate of return on asset j at time t where j = 1, 2, ..., n and t = 1, 2, ..., N. Further, let  $\hat{\theta}_{jt}$  be a random variable representing the capitalized lease information generated by a materially<sup>2</sup> affected firm j at time t (affected by the SEC lease disclosure decision). Suppose that  $\hat{R}_t$  and  $\hat{\theta}_t$  are n-component column vectors as given by

$$\frac{\hat{R}_{t}}{\hat{\theta}_{t}} = (\hat{R}_{1t}, \hat{R}_{2t}, \dots, \hat{R}_{jt}, \dots, \hat{R}_{nt})^{T}$$

$$\frac{\hat{\theta}_{t}}{\hat{\theta}_{t}} = (\hat{\theta}_{1t}, \hat{\theta}_{2t}, \dots, \hat{\theta}_{jt}, \dots, \hat{\theta}_{nt})^{T}$$

Then, given some realization  $(\underline{\theta})$  of  $\underline{\check{\theta}}$  (with time subscript t omitted), lease information  $\underline{\theta}$  is said to have information content if  $F(\underline{R}/\underline{\theta}) \neq F(\underline{R})$ where "F" stands for the distribution functions of  $\underline{\check{R}}$ .

Under the multivariate normality assumption, the above condition

for an information effect is equivalent to  $E(\tilde{R}/\theta) \neq E(\tilde{R})$  and/or Var $(\tilde{R}/\theta) \neq Var(\tilde{R})$ ; that is, the mean and/or variance of the return distribution conditional upon the capitalized lease information disclosed under the Release will not be equal to the mean and/or variance of the unconditional return distribution if lease information  $\theta$ has information content. The reason for investigating a change in mean and/or variance is that a normal distribution can be fully described by these two parameters.<sup>3</sup> Therefore, if one or both of these parameters have changed as a result of lease information effect, then either the means or variances (or both) for the two return distribution functions will not be equal to each other. Any such inequality is sufficient, by definition, for a lease information effect to exist.

The mechanism by which lease information  $\underline{\theta}$  affects equilibrium rates of return can be explained by the two-factor capital asset pricing model (CAPM). This model was originally developed by Black (1972) on the basis of the works of Sharpe (1964), Lintner (1965), Mossin (1966), and Fama (1968). The descriptive validity of the model is well documented by Black, Jensen, and Scholes (1972), Miller and Scholes (1972), and Fama and MacBeth (1973). The form of the model is given by

$$E(\hat{R} / E(\hat{R}_{z}), E(\hat{R}_{M}), \beta) = E(\hat{R}_{z}) I + (E(\hat{R}_{M}) - E(\hat{R}_{z})) \beta$$
 (3-1)

where  $E(\hat{R}_{z})$  = expected return on a "zero Beta" asset with

$$Cov(\hat{R}_{z}\hat{R}_{M}) = 0$$

I = an n-component unit column vector

 $E(\hat{R}_{M})$  = expected return on the market portfolio which consists of all securities in the market

 $\underline{\beta}$  = an n-component column vector defined by  $Cov(\underline{\hat{R}} \ \hat{R}_{M})/Var(\hat{R}_{M})$ which measure the relative risks of the assets.

According to the model, equilibrium expected rates of return  $E(\underline{\hat{R}})$  are determined by three factors:  $E(\underline{\hat{R}}_{Z})$ ,  $E(\underline{\hat{R}}_{M})$ , and  $\underline{\beta}$ . If lease information  $\underline{\theta}$  has an effect on  $E(\underline{\hat{R}})$  through its impact on either  $\beta$  or residual returns ( $\underline{\hat{\epsilon}}$ ) (or both),

$$E(\hat{R} / E(\hat{R}_{z}), E(\hat{R}_{M}), \underline{\beta}, \underline{\theta}) \neq E(\hat{R} / E(\hat{R}_{z}), E(\hat{R}_{M}), \underline{\beta})$$
(3-2)

which is one sufficient condition for a lease information effect to exist.

If  $E(\hat{\underline{R}})$  is affected by  $\underline{\theta}$ , then  $Var(\hat{\underline{R}})$  may also be affected because, by definition,  $Var(\hat{\underline{R}}) = E(\hat{\underline{R}}, \hat{\underline{R}}) - (E(\hat{\underline{R}}))^2$ , and thus, lease information  $\underline{\theta}$  may affect the variability of returns through its impact on  $E(\hat{\underline{R}}, \hat{\underline{R}})$  and/or  $(E(\hat{\underline{R}}))^2$ . Then, the result will be an inequality between the variance of  $\hat{\underline{R}}$  conditional upon  $\underline{\theta}$  and the unconditional variance:  $Var(\hat{\underline{R}}/\underline{\theta}) \neq Var(\hat{\underline{R}})$  where  $Var(\hat{\underline{R}}/\underline{\theta}) = E(\hat{\underline{R}}, \hat{\underline{R}}/\underline{\theta}) - (E(\hat{\underline{R}}/\underline{\theta}))^2$ . This inequality is another condition for the existence of a lease information effect.

Figure 3-1 explains how the disclosure of the PV and IE accounting numbers in financial reports may have an effect on the distribution of security returns through the impact of such disclosure on financial ratios and thus investors' assessments of the firms' riskreturn prospects. Equilibrium rates of return ( $\underline{R}/\underline{\theta}$ ) are dependent upon investors' actions ( $\underline{a}/\underline{\theta}$ ) which in turn depend upon their perceptions  $F(\underline{S}/\underline{\theta})$  about the firms' risk-return prospects  $\underline{S}$ . Again, these perceptions could be affected by the disclosure of the capitalized lease data ( $\underline{\theta}$ ) generated through accounting system ( $\underline{n}$ ) that is required under ASR No. 147.


Figure 3-1. A Possible Impact of Lease Capitalization on the Pricing of Securities

Thus, if  $\underline{\theta}$  has an information effect, investors' predictions  $F(\underline{S})$ of the affected firms'  $\underline{S}$  prior to the release of  $\underline{\theta}$  will differ from the corresponding predictions of  $\underline{S}$  after the release of  $\underline{\theta}$ . That is,  $F(\underline{S}/\underline{\theta})$  $\neq$   $F(\underline{S})$ . This inequality condition, then, allows for the possibility that investors' actions conditional on  $\underline{\theta}(\underline{a}/\underline{\theta})$  will differ from those actions  $\underline{a}$  that would otherwise have taken place. The SEC's assertion that  $\underline{\theta}$  is essential to investors implies, in fact, that  $\underline{a}/\underline{\theta} \neq \underline{a}$ . Furthermore, if action differences do occur as a result of  $\underline{\theta}$ , then differences in equilibrium rates of return may also result in the sense that equilibrium returns prior to  $\underline{\theta}$  are not the same as equilibrium rates after the release of  $\underline{\theta}$ .

#### Control by Matching

In conducting a test for the information effect of  $\underline{\theta}$ , one would ideally like to have two types of return data for the same firm for the same time period: return data generated conditional on  $\underline{\theta}$  and unconditional return data. However, it is impossible to obtain such data since only one return observation is available for a firm for a given time period. One approach in attacking this data problem is to use control firms.

In the present study two types of control firms were used: (1) non-lease firms (Group 1) that had no long-term leases and therefore were unaffected by the SEC lease disclosure decision and (2) nondisclosure firms (Group 2) that indicated they had noncapitalized financing leases but which did not meet the SEC's two materiality criteria (5% for the PV disclosure and 3% for the IE disclosure) and therefore did not disclose the PV and/or IE numbers in their financial reports. Thus, there were three different groups of firms used (See Figure 3-2), including the lease disclosure (treatment) firms (Group 3) that met the materiality criteria and therefore disclosed the PV and/or IE numbers in their 10-K reports for 1973 and 1974.

In order to see how the introduction of control firms operates in evaluating lease information effects, let the treatment and control firms be denoted by T and C, respectively. Suppose that the control firms in Group 1 and Group 2 are selected according to their relative risks such that, in the pre-test period,  $\underline{\beta}_{T} = \underline{\beta}_{C}$  at the individual firm level and  $\beta_{T} = \beta_{C}$  at the group level. The reason for equating



Figure 3-2. Lease Classification and Grouping of Firms

Betas is that, as described by the CAPM, the relative risk is the only factor that can be different in the pricing of securities between the treatment and control firms since  $E(\tilde{R}_{Z})$  and  $E(\tilde{R}_{M})$  are common to all firms. Then, the first moments of return distributions between the two types of firms will be the same before any effects of lease information are incorporated into equilibrium returns, if it is assumed that return observations are taken from the same time period so that  $\tilde{R}_{Z}$  and  $\tilde{R}_{M}$  are controlled for the two types of firms. Since  $\underline{\beta}_{T} = \underline{\beta}_{C}$  by construction, all return-determining factors as defined in the CAPM are the same between the two groups of firms prior to the disclosure of  $\theta$ . Thus,

$$E(\underline{\hat{R}}_{T} / E(\underline{\hat{R}}_{z}), E(\underline{\hat{R}}_{M}), \underline{\beta}_{T}) = E(\underline{\hat{R}}_{C} / E(\underline{\hat{R}}_{z}), E(\underline{\hat{R}}_{M}), \underline{\beta}_{C})$$
 (3-3)

Now, suppose that new lease information  $\underline{\theta}$  is disclosed to market agents and that this information is pertinent to a valuation of the expected returns of the treatment firms. Then, the conditional expected returns for these firms will become (3-4) and the relation between  $E(\underline{\hat{R}}_{T})$  and  $E(\underline{\hat{R}}_{C})$  in (3-3) will hold as an inequality as shown in (3-5) below if  $\underline{\theta}$  has an effect on the conditional expected returns through its impact on  $\underline{\beta}_T$  or residual returns  $\begin{pmatrix} \ddots \\ \underline{\epsilon}_T \end{pmatrix}$  (or both).

$$E(\hat{\underline{R}}_{T} / \underline{\theta}_{T}) = E(\hat{\underline{R}}_{T} / E(\hat{\overline{R}}_{Z}), E(\hat{\overline{R}}_{M}), \underline{\beta}_{T}, \underline{\theta}_{T})$$
(3-4)

$$E(\underline{\hat{R}}_{T}/\underline{\theta}_{T}) \neq E(\underline{\hat{R}}_{C})$$
(3-5)

Likewise, one can expect to observe the following inequality between the two conditional and unconditional variances of returns if the information effects exist:

$$Var \left(\underline{\widetilde{R}}_{T}/\underline{\theta}_{T}\right) = E(\underline{\widetilde{R}}' \ \underline{\widetilde{R}}_{T}/\underline{\theta}_{T}) - \left(E(\underline{\widetilde{R}}_{T}/\underline{\theta}_{T})\right)^{2} \neq Var(\underline{\widetilde{R}}_{C}) = E(\underline{\widetilde{R}}' \ \underline{\widetilde{R}}_{C}) - \left(E(\underline{\widetilde{R}}_{C})\right)^{2}$$
(3-6)

The existence of the hypothesized lease information effect does not require the inequality conditions, (3-5) and (3-6), to hold at the same time; either one of them is sufficient.

# **Two-Asset Assumption**

As Gonedes (1975) points out,<sup>5</sup> some previous studies<sup>6</sup> assumed that the equilibrium prices of all types of assets are affected by a given type of information in the same way. Thus, they treated all assets as one single sample (asset) and postulated that individual return observations drawn from this single sample were independent. And, under the assumption of a univariate return distribution effect, tests for an information effect were conducted on the returns on one selected asset. The test results on the selected single asset were then generalized to all assets.

However, as Gonedes (1975) argues,<sup>7</sup> the distributions of returns on different types of assets may be affected differently by the same source of information. Also, return observations may not be independent of each other. Under this situation, a univariate test based on a single sample is inappropriate. The reason for this inappropriateness is that, if the sample is not independent, the return observations must be drawn from at least two different return distributions. Thus, conducting a univariate test under such circumstances is equivalent to trying to make inferences about a single return distribution on the basis of return observations from at least two different distributions. In addition, a single-sample test may cause the hypothesized information effects on different assets to average out to no effect. Therefore, the results from a single-sample test could conceal information effects that are in fact significant. Furthermore, the covariability of returns (if not independent) may mask the unique effect of new information since a univariate test based on a single sample does not take into consideration the cross-sectional correlations of individual returns.

Based on the assumptions that the SEC lease disclosure decision might affect firms in different risk classes differently and that returns on individual assets might be dependent, the present study dealt with two different types of assets. This is equivalent to saying that there are only two types of assets in the market and that all assets in the market can be classified into the two types. The main reason for this present study's assumption of only two types of assets was to gain degrees of freedom with a relatively small number of sample firms.<sup>8</sup>

Given that the CAPM holds, the relative risks ( $\underline{\beta}$ ) of the assets were used as an attribute on which the assets were classified into two types, high and low risk. The classification of all assets into the two risk classes is a simplification, but it was believed that

tests on the two assets are sufficient to detect any risk dependency of lease information effect.<sup>9</sup> Moreover, if firms (or assets) are divided into two (or more) groups based on an attribute such as the relative risk, firms within a group are more homogeneous with respect to this attribute, while firms in different groups become more heterogeneous. This grouping of firms will improve the power of a test when the test is designed to detect a between-group difference to the extent that there is a risk dependency of lease information effect.

Gonedes and Dopuch (1974) and Gonedes (1975) note that classifying firms according to their relative risks is appropriate in investigating the effect of new information on the values of firms because this attribute is generally determined by firms' production-investment and financing decisions.<sup>10</sup> The theoretical discussion about how the relative risk is related to firms' production-investment and financing decisions can be found in Fama and Miller (1972: Chapter 7) and Hamada (1972).

For example, the relationship between a firm's production decisions and its relative risk can be explained by the facts that each of the firm's productive activities has some probability distribution of future market value, and that the market value of the firm is simply the sum of the market values of its separate production activities. The existence of such a distribution implies that there exist the expected returns on individual activities and the related risks. In an equilibrium market, the risk is measured by its contribution to the dispersion in the market value of the market portfolio, and not to the firm itself. The risk of the firm is the weighted sum of the risks of the individual activities, the values of which are to be maximized through the optimal production decision on the basis of the equilibrium relationship between their expected returns and risks. This optimal production will then lead to the maximization of the market value of the firm as a whole.

Based upon the two-asset market assumption, the PV (and IE) disclosure firms of Group 3 were ranked on the basis of their estimated Betas ( $\hat{\beta}$ ) and then equally divided into two subgroups, high and low risk. Firms of Group 1 and Group 2 were individually matched with the disclosure firms in Group 3 according to their Beta estimates and then divided into the same two risk groups (not on the basis of their own ranked  $\hat{\beta}$  but on the basis of their original matching with the disclosure firms). The Beta estimates were available from <u>Security Risk Evaluation</u> (September 1973) published by Merrill Lynch, Pierce, Fenner and Smith, Inc. The Betas were estimated as of the end of August 1973<sup>11</sup> by using past sixty monthly returns with the single factor market model.<sup>12</sup>

After the two risk groups were constructed, a two-component return (column) vector,  $(\hat{R}_{t}^{H} \hat{R}_{t}^{L})$  where H and L denote the high and low risk groups, was computed by taking the arithmetic (equally-weighted) average of the component individual returns in each of the two risk groups. Thus, each monthly average return was used as a sample unit, and it was assumed that monthly average returns are independent over time.<sup>13</sup> Under the multivariate normality assumption, the return vector is a normally distributed random vector so that the investigation of a change in the mean return vector and the variance-covariance matrix of returns is sufficient in order to evaluate the effect of lease information.

### Testing Hypotheses and Evaluation Methods

# Testing Hypotheses

Given the assumption of two-asset market, the return vector  $(\hat{R}^{H} \ \hat{R}^{L})$  has a bivariate normal distribution with the two-component mean return (column) vector U and the 2 x 2 covariance matrix  $\Sigma$ , each defined as

$$U = (U^{H} \quad U^{L}) \text{ and } \Sigma = \begin{pmatrix} Var(\hat{R}^{H}) & Cov(\hat{R}^{H} \quad \hat{R}^{L}) \\ Cov(\hat{R}^{H} \quad \hat{R}^{L}) & Var(\hat{R}^{L}) \end{pmatrix}$$

Then, the effects of lease information can be assessed by a comparison of the conditional mean return vector and covariance matrix for the treatment firms with the unconditional mean return vector and covariance matrix for the control firms. Thus, the conditions for lease information effects are  $U_T \neq U_C$  and/or  $\Sigma_T \neq \Sigma_C$ .

The test for the equality of the two mean return vectors was conducted by the use of return differences defined as

$$\overline{\mathbf{g}} = \begin{pmatrix} \mathbf{g}_{\mathsf{H}} \\ \mathbf{g}_{\mathsf{H}} \end{pmatrix} = \begin{pmatrix} \mathbf{g}_{\mathsf{H}} \\ \mathbf{g}_{\mathsf{H}} \end{pmatrix}^{\mathsf{L}} - \begin{pmatrix} \mathbf{g}_{\mathsf{H}} \\ \mathbf{g}_{\mathsf{H}} \end{pmatrix}^{\mathsf{L}}^{\mathsf{L}}$$

since the treatment and control firms are individually matched and thus not independent of each other: that is, the firms are matched on the basis of  $\hat{\underline{\beta}}$  and return observations are taken from the same time period with  $\hat{R}_z$  and  $\hat{R}_M$  common to all firms. The multivariate normality assumption implies that, if  $\hat{R}$ 's are normally distributed,  $\hat{d}$ 's are also normally distributed.

Thus, the null hypothesis for the mean return difference vector test is given by

$$H_{01}: \quad \underline{a} = (U_{T} - U_{C}) = \begin{pmatrix} U^{H} \\ U^{L} \end{pmatrix}_{T} - \begin{pmatrix} U^{H} \\ U^{L} \end{pmatrix}_{C} = \underline{0}$$

Testing for the equality of the two covariance matrices is equivalent to evaluating the ratio of two covariance matrices using two dependent samples.<sup>14</sup> In this case it is assumed that each of the dependent samples is drawn from its own normal population with its own variance,  $\Sigma_{\rm T}$  and  $\Sigma_{\rm C}$ . The values of their means,  $U_{\rm T}$  and  $U_{\rm C}$ , are not of interest. Then, the null hypothesis for the covariance matrix test can be written as:

$$\begin{array}{l} {}^{H}_{02} \colon & \Sigma_{T} = \Sigma_{C} \text{ or} \\ & \left( \begin{array}{c} {}^{Var}(\hat{R}^{H}) & Cov(\hat{R}^{H} \ \hat{R}^{L}) \\ {}^{Cov}(\hat{R}^{H} \ \hat{R}^{L}) & Var(\hat{R}^{L}) \end{array} \right)_{T} = \left( \begin{array}{c} {}^{Var}(\hat{R}^{H}) & Cov(\hat{R}^{H} \ \hat{R}^{L}) \\ {}^{Cov}(\hat{R}^{H} \ \hat{R}^{L}) & Var(\hat{R}^{L}) \end{array} \right)_{C} \end{array}$$

As indicated earlier, the existence of lease information effect does not require the inequality of all component means of the two mean vectors and/or all component variances and covariances of the two covariance matrices. The inequality of any one component of the two mean vectors and/or the two covariance matrices is sufficient.

Given the null hypotheses stated in terms of the mean vectors and the covariance matrices, one may test the equality of each paired component separately using a univariate test method. However, one problem with a univariate approach is that the joint level of significance (or confidence interval) which is desired cannot be determined exactly by the repeated use of a univariate test.<sup>15</sup> Thus, to ensure a desired joint level of significance, one needs a multivariate test method which examines the equality of all the component means (or component variances and covariances) simultaneously. Moreover, a multivariate approach is consistent with the multivariate normality assumption which was introduced earlier in this chapter.

As a multivariate test method, the present study used Hotelling's

 $T^2$  statistic for the mean vector test (H<sub>01</sub>) and Box's modified M statistic for the covariance matrix test (H<sub>02</sub>).

### Tests on Mean Vectors

The objective of tests on mean return vectors is to see if the first moment (mean) of the security return distribution for the treatment firms has shifted as a result of the capitalized lease disclosure. With the introduction of a control group, testing for a shift in the first moment of return distribution is equivalent to testing for whether or not the mean return difference vector is equal to the null vector (with zero components) as stated in  $H_{01}$ .

The null hypothesis for the mean vector test was tested by using Hotelling's  $T^2$  statistic<sup>16</sup> which is essentially the squared standard t-statistic computed on the basis of a weight vector which maximizes the value of the squared t-statistic.

In order to see how the process of maximizing the squared t-value leads to the derivation of the  $T^2$  statistic, let  $\underline{W}$  be a weight (nonull column) vector such that  $\underline{W} = [W^H W^L]'$  where  $W^H$  and  $W^L$  are weights of the high and low risk assets, respectively. Suppose that this weight vector is utilized in generating a weighted sum of two components of the return vector. Then,  $\underline{W}' \stackrel{\alpha}{\underline{d}}$  has a univariate normal distribution<sup>17</sup> with mean  $\underline{W}' \stackrel{\alpha}{\underline{d}}$  and variance-covariance  $\underline{W}' S_d \stackrel{W}{\underline{W}}$  where  $S_d$  is a covariance matrix computed on  $\stackrel{\alpha}{\underline{d}}$  (not on  $\stackrel{\alpha}{\underline{K}}$ ). Since  $\underline{W} \neq \underline{0}$  by construction, the null hypothesis  $H_{01}$  can be restated as

 $H_{OA}: \underline{W}' \underline{\overline{d}} = \underline{W}' (U_{T} - U_{C}) = 0$ 

For a given value of the weight vector, the null hypothesis  $H_{OA}$  is a univariate hypothesis. The acceptance region for testing this

hypothesis is given by

if

$$t^{2}(\underline{W}) \leq t_{h}$$
 (3-7)  
where  $t^{2}(\underline{W})$  = the squared t-statistic conditional for  $\underline{W}$  and  $t_{h}$  = a  
critical value. This relation is satisfied for all  $\underline{W} \neq \underline{0}$  if and only

$$\max_{\underline{W}} t^2 (\underline{W}) \le t_h$$
(3-8)

Maximizing (3-8) subject to the constraint  $\underline{W}^{'}S_{d}\underline{W} = c$  where c is some prespecified constant (usually unity) yields the T<sup>2</sup> statistic<sup>18</sup> that is called Hotelling's T<sup>2</sup>. In the computation of the value of the T<sup>2</sup> statistic, all possible values of  $\underline{W}$  are checked and its one value which maximizes t<sup>2</sup> is selected. Thus, except for the distinction of the maximization process, the multivariate T<sup>2</sup> test is similar to the standard univariate t-test.<sup>19</sup>

The form of Hotelling's T<sup>2</sup> statistic is given by  

$$T^{2} = \max_{\underline{W}} t^{2}(\underline{W}) = N (\overline{\underline{X}}_{T} - \overline{\underline{X}}_{C})' S_{d}^{-1} (\overline{\underline{X}}_{T} - \overline{\underline{X}}_{C})$$

$$= (|S_{d} + N (\overline{\underline{X}}_{T} - \overline{\underline{X}}_{C}) (\overline{\underline{X}}_{T} - \overline{\underline{X}}_{C})'| / |S_{d}|) - 1$$

$$t(W) = W'(\overline{\underline{X}}_{T} - \overline{\underline{X}}_{C}) (\sqrt{W'} S_{T} W) (\sqrt{W} S_{T} W) (N which is the standard t to$$

where  $t(\underline{W}) = \underline{W}'(\overline{X}_T - \overline{X}) / \sqrt{(\underline{W}' S_d \underline{W})} / N$  which is the standard t-test statistic with a weight vector  $\underline{W}$ 

$$\overline{X} = \text{sample mean vector defined as } \overline{X} = (\overline{X}^{H} \quad \overline{X}^{L})$$

$$S_{d} = \text{the 2 x 2 covariance matrix defined as}$$

$$S_{d} = \begin{pmatrix} \text{Var}(\widehat{d}^{H}) & \text{Cov}(\widehat{d}^{H} \quad \widehat{d}^{L}) \\ \text{Cov}(\widehat{d}^{H} \quad \widehat{d}^{L}) & \text{Var}(\widehat{d}^{L}) \end{pmatrix}$$

$$"| \quad |" = "determinant"$$

It should be noted, however, that the null hypothesis  $H_{O1}$  (or  $H_{OA}$ ) is an overall hypothesis expressed in terms of a vector and that the significance of the  $T^2$  statistic does not indicate which component of

this vector has led to the rejection of the overall hypothesis. In order to see which component mean return difference, high or low, has contributed to the rejection of the null hypothesis, the simultaneous confidence intervals of the two-component mean return differences can be evaluated. This evaluation is equivalent to making simultaneous inferences about a finite number of linear functions  $\underline{W}'\underline{d}$ at a given joint level of significance. Thus, for example, if the confidence interval of the high risk mean return difference does not contain zero, while that of the low risk mean return difference does, then it is meant that the rejection of the overall null hypothesis is caused by the significance of mean return difference for the high risk group.<sup>20</sup>

In order to evaluate which component mean return difference contributes to the rejection of the null hypothesis, the present study used three different weight vectors: the weights  $(\underline{W}_1)$  implicit in computing the value of  $T^2$  (or maximizing the value of  $t^2$ ),  $\underline{W}_2 = [1 \ 0]'$ for the high risk group, and  $\underline{W}_3 = [0 \ 1]'$  for the low risk group. The weight vector  $\underline{W}_2$  was employed to see if the high risk mean return difference is significantly different from zero, while the weight vector  $\underline{W}_3$  was utilized to determine if the low risk mean return difference is significant. According to Gonedes (1975), a value of the weight vector can be viewed as the proportions of investments in different types of assets.<sup>21</sup> For example, the weight vector  $\underline{W}_2$  gives rise to the high risk assets under the hypothetical situation in which one places his entire investment in the high risk securities. Likewise,  $\underline{W}_3$  yields the low risk assets which is equivalent to an entire investment in the low risk securities. When the null hypothesis is true, the  $T^2$  has the following F distribution with p (=2, H and L for the present study) and (N - p) degrees of freedom:

$$F_{p, N-p} = \frac{N-p}{p(N-1)} T^{2}$$
(3-10)

For a decision as to whether the null hypothesis is rejected or not, the computed F value is compared with the critical F value at a given significance level. If the computed F exceeds the critical value, then the null hypothesis is rejected and it can be inferred that the SEC lease disclosure decision had an impact upon the pricing of securities. Otherwise, the null hypothesis is accepted as stated.

## Tests on Covariance Matrices

The purpose of the tests on the covariance matrices was to determine if all paired components of the two covariance matrices compared between treatment and control firms were simultaneously equal. Any significant difference between one or more paired components is sufficient to reject the null hypothesis for the homogeneity of variances and covariances.

The tests for the equality of covariance matrices were conducted by using one of the likelihood ratio criteria, known as the "generalized" test of homoscedasticity of variances and covariances suggested in Box (1949). Box modified Bartlett's M statistic<sup>22</sup> so that it can be utilized in testing for the homogeneity of variance-covariance matrices.

The form of Box's modified M statistic is given by  $^{23}$ 

$$M = V \ln |S_a| - \sum_{k}^{G} v_k \ln |S_k| \qquad (3-11)$$

where  $V = \sum_{k} v_{k}$  where  $v_{k}$  = degrees of freedom ( $n_{k}$  - 1) and k is a group (G = 2 for T and C)

$$S_{k} = \begin{pmatrix} Var(\hat{R}^{H}) & Cov(\hat{R}^{H} & \hat{R}^{L}) \\ Cov(\hat{R}^{H} & \hat{R}^{L}) & Var(\hat{R}^{L}) \end{pmatrix}$$

which is the sample covariance matrix for group k

 $S_a = (\Sigma v_k S_k)/V$  which is the average of the sample covariance. Notice that  $S_k$  here is computed on raw return data,  $(\hat{R}^H \text{ and } \hat{R}^L)$ , while  $S_d$  in testing the equality of mean vectors is calculated on return differences  $(\hat{d}^H \text{ and } \hat{d}^L)$ .

By introducing a scale factor C, Box showed that, if  $\rm A_2$  is near to or greater than  $\rm A_1^2,$ 

$$M / C = x^2$$
 (3-12)

with degrees of freedom f = (G - 1) p (p + 1) / 2, where C = 1 / (1 -  $A_1$ )

$$A_{1} = (2p^{2} + 3p - 1) (G + 1) / 6 (p + 1) G v \qquad (v_{1} = v_{2} = v)$$
$$A_{2} = (p - 1) (p + 2) (G^{2} + G + 1) / 6 G^{2} v^{2}.$$

According to Box, if p and G  $\leq$  5 and v  $\geq$  20, the chi-square approximation agrees well with the exact value of the chi-square distribution. However, when p and G are large and v is small (less than 20), the F approximation must be used. In this case the forms of this F approximation differ depending upon the sign of  $(A_2 - A_1^2)$ . If the sign is positive,

$$M / b = F$$
 (3-13)

with  $f_1 = f$  and  $f_2 = (f_1 + 2) / (A_2 - A_1^2)$  as degrees of freedom. Here, b =  $f_1 / (1 - A_1 - (f_1 / f_2))$ . On the other hand, if the sign is negative,  $f_{2} M / f_{1} (B - M) = F$ (3-14) with  $f_{1} = f$  and  $f_{2} = (f_{1} + 2) / (A_{1}^{2} - A_{2})$ . Here,  $B = f_{2} / (1 - A_{1}) + (2 / f_{2}))$ .

The present study used (3-12) for a test period with  $v \ge 20$  and (3-13) or (3-14) for all other selected test periods.<sup>24</sup>

As a decision rule, the computed F or  $X^2$  values are compared with their corresponding critical values at a given level of significance. If the former exceeds the latter at a given level of significance, the null hypothesis is rejected. This rejection implies that at least one pair of corresponding components of the two covariance matrices are significantly different from each other. Hence, it can be concluded that the SEC lease disclosure decision had an impact upon the variability of security returns.

### Testing Procedures

#### Test Periods

As mentioned in Chapter I, there were a series of events that took place during the course of the SEC lease disclosure decision. They were: (1) the publication of the ASR No. 147 proposal; (2) the adoption of the proposal; (3) the effective date of the Release; and (4) the first public disclosure of the actual PV and IE numbers for individual firms according to the Release.

To investigate the effect, if any, of the SEC lease disclosure decision upon the pricing of securities, it is important to know when the market reaction to the SEC decision could have taken place. One could conjecture that the market would begin to anticipate the possible effect of the lease disclosure as early as the preliminary discussion of the SEC decision. Alternatively, an intensive market reaction might have occurred around the time of the acutal release of the PV and IE numbers.

The market reaction to the various events of the SEC decision could be anticipatory, immediate, or lagged (or some combination of these three types). In order to investigate all possible market reactions, a 21-month test period (January 1973 through September 1974) was selected. This period covers six months before the first event (the publication of the proposal) to six months after the first actual disclosure (March 1974)<sup>25</sup> of the PV and IE accounting numbers in the 10-K reports as required in ASR No. 147. It was believed that including these six additional months would provide a period long enough to capture all possible market reactions to the events of the SEC decision.

For purposes of trying to identify more precisely when the most intensive market reaction took place, the 21-month test period was divided into five subperiods on the basis of the critical events identified above. Both the events and selected test periods are summarized in Figure 3-3 below.<sup>26</sup> However, the effective date (November 30, 1973) of ASR No. 147 was deleted from consideration for testing on the grounds that there is little to differentiate it from the adoption date in terms of potential significance to investors; that is, if there is to be any market reaction, it would seem logical to assume that it would occur around the time of the initial proposal or its adoption rather than the effective date. The actual effects on financial ratios could not be determined until sometime after the effective date when the capitalized lease figures were first disclosed.

The first test period (TP1) covered the entire twenty-one months

beginning January 1973 through September 1974. Therefore, the test results should reflect the effects of all of the events surrounding the SEC lease disclosure requirement upon security pricing. If there existed any reaction to the SEC decision and/or the actual disclosure of the first financial statements containing the PV and IE numbers, it should be incorporated in the test results for this time period.<sup>27</sup>



Figure 3-3. Test Periods Based on Critical Events

The second test (TP2) covered the period from the proposal date (June 1973) through September 1974. All possible effects, except anticipatory market reaction to the publication of the proposal, should be detected by this test.

The third test (TP3) was for the period October 1973 through September 1974. This test was performed mainly to investigate the effects of the adoption of the proposal and of the first actual disclosure.

The fourth test (TP4) focused on only one special event, the first actual disclosure of the PV and IE numbers as required in ASR No. 147. The test period included two months before the first disclosure month. Thus, the test results here should reflect both anticipatory and  $\underline{ex post}$  market reaction to the event of the actual disclosure.

The fifth test (TP5) covered the fourteen months from January 1973 through February 1974. This period was selected to detect the effects of all events prior to the first actual disclosure.

The last test (TP6) was conducted to ascertain immediate and lagged market reactions to the event of the first actual disclosure alone. All previous test designs were not pertinent to this purpose. However, the test period ran only from March through September 1974 so that the sample size (= seven) was relatively small. Therefore, the power of the test may be questioned and the interpretation of the results will have to take this fact into account.

### Comparisons of Groups

Depending upon the types of the capitalized lease information (PV or IE) that they reported, the firms in Group 3 were divided into two subgroups for conducting tests, the PV disclosure firms and the PV and IE disclosure firms. The final data collection shows that sixty firms belonged to the first subgroup, while there were thirtynine firms in the second. No single firm was found which reported the IE numbers alone. Each of the two subgroups was subsequently divided into the two risk classes, high and low risk, according to their Beta estimates. Likewise, the firms in Group 1 and Group 2 were classified consistently with the firms in Group 3. The final results are summarized in Figure 3-4.



Figure 3-4. Grouping of Firms

Based upon the groups formed, all statistical tests were conducted for each of the six different test periods by comparing the PV disclosure firms (and the PV and IE disclosure firms) of Group 3 with the corresponding paired firms of Group 1 and Group 2, respectively. A comparison of the firms in Group 2 with the firms in Group 1 was ignored since the former firms were treated as control firms rather than as treatment firms. Also, it was believed that a comparison between Group 3 and Group 1 would be sufficient to evaluate an effect of the SEC lease disclosure decision on the pricing of securities. It was considered more relevant to compare Group 3 with Group 1 than to compare Group 2 with Group 1.<sup>28</sup> Given the two null hypotheses  $(H_{01} \text{ and } H_{02})$  and the design of test periods and groupings, all statistical tests were conducted with a special focus on the evaluation of the following questions: (1) Did the SEC lease disclosure requirement have any effect on the pricing of securities as measured by changes in the means and variances of return distribution? (2) If an effect was present, did investors react differently to the PV disclosure alone than they did to the situation where both PV and IE numbers were disclosed? (3) At what point in time were the information effects, if any, of the SEC decision revealed in the stock price adjustments? And to which specific event(s) of the SEC decision was market reaction most intensive? (4) Were the lease information effects (if any) risk-dependent? (5) If the disclosure firms were affected by the SEC decision, were they affected in an adverse manner?

In addressing the above questions, one would ideally like to make a comparative study of the effects of three kinds of disclosure: PV numbers only, IE numbers only, and both PV and IE numbers. However, as indicated before, it was impossible to find a sufficient number of firms that reported the IE numbers alone. As a result, the present study concentrated on the two disclosure situations: the PV disclosure alone and the PV and IE disclosure. Nevertheless, a comparative study of the effects of these two disclosure situations would enable one not only to address the above five questions directly, but also, indirectly, to evaluate the effects of the IE disclosure only. In addition, a comparative analysis of this sort would be quite useful in addressing the question of the relative information content of the balance sheet vs. income statement effects of lease commitments,

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that is, whether the effects of the capitalized lease disclosure are on the firms' capital structures or on their earnings record.

### CHAPTER IV

# SAMPLING DESIGN FOR DATA COLLECTION

This chapter consists of two sections. The first section describes the selection of sample firms and their pairwise matching between treatment and control groups. The second section explains how return (stock price) data were collected.

# Sample Firms

The present study employed three different groups of firms, one treatment group (disclosure firms) and two control groups (nonlease and non-disclosure firms).<sup>1</sup>

# **Disclosure Firms**

The disclosure firms (Group 3) were those which reported the PV and/or IE numbers of noncapitalized financing leases in their 10-K reports according to ASR No. 147 for 1973 and 1974. The names of 324 firms meeting one and/or both of these conditions were initially obtained from <u>Disclosure Journal</u> (1973 and 1974).<sup>2</sup> Then, the following additional criteria were used to further restrict the sample firms within this initial group:

- Firms must be registered on the New York Stock Exchange (NYSE).
- (2) Stock price data must be available while they were traded on NYSE during the period from September 1968 through September 1974.<sup>3</sup>

- (3) No capitalized lease data were reported on the 10-K or annual reports prior to ASR No. 147.
- (4) Fiscal year must end December 31.

These criteria, except for (2), were checked by a reading of the 10-K and annual reports for the three years, 1972 through 1974.

The final data collection showed that sixty firms met the above three conditions and disclosed the PV numbers for 1973 and 1974, while thirty-nine firms were found to meet the three conditions and report both PV and IE data for the same two years. It was found that no firm disclosed the IE numbers alone. Therefore, the primary treatment group (Group 3) consisted of ninety-nine firms in total, the sum of the sixty PV disclosure firms and the thirty-nine PV and IE disclosure firms. As Table 4-1 shows below, these treatment firms included some firms which did not meet the two materiality criteria, 5% for the PV disclosure and 3% for the IE disclosure. For example, there were four such firms in 1973 and seven in 1974 which disclosed their PV numbers, even if these numbers did not neet the 5% materiality criterion. The firms of this type were also found in the case of the PV and IE disclosure group.<sup>4</sup>

Table 4-1 also provides various ranges of both PV and IE ratios and the number of sample firms in each range not only by the type of lease disclosure, but also by the relative risk level. For the sixty PV disclosure firms, the PV ratio ranges from  $-102.7\%^5$  to 61.4% for 1974 with a median value between .05 and .10. The range of this PV ratio for the thirty-nine PV and IE disclosure firms is from .83% to 61.4% with a much higher median value between .20 and .30. For the same year the IE ratio varies from -220% to 43.7%, and a median value

PV Firms			PV and IE Firms					
Range of Ratio	PV / L-TC <sup>a</sup>		Range of Ratio	PV / L-TC <sup>a</sup>		Range of Ratio	IE / ANI <sup>b</sup>	
	197	3 1974		197	3 1974		1973	1974
-1.027 - (001)	1	1	-1.027 - (001)	0	0	-2.200 - (500)	2	2
.000049	4	7	.000049	5	4	499 - (200)	4	2
.050099	35	32	.050099	4	4	199 - (100)	8	9
.100199	15	14	.100199	8	9	099 - (050)	8	9
.200299	3	2	.200299	10	8	049 - (030)	9	10
.300399	1	4	.300399	6	8	029000	5	3
.400499	1	0	.400499	4	2	.001029	0	1
.500614	0	0	.500614	2	4	.030437	3	3
Total	60	60	Total	39	39	Total	39	39
Mean Ratio	.091	.082	Mean Ratio	.233	.245	Mean Ratio	121 -	.158
s. d. <sup>c</sup>	.132	.165	S. D. <sup>C</sup>	.155	.163	S. D. <sup>C</sup>	. 195	. 340
High ß (30 Firms)			High ß (20 Firms)			High B (20 Firms)		
Mean Ratio	.091	.091	Mean Ratio	.203	.210	Mean Ratio	178 -	.119
S. D.	.051	.061	S. D.	.131	.132	S. D.	.265	.177
Low β (30 Firms)			Low B (19 Firms)			Low B (19 Firms)		
Mean Ratio	.090	.074	Mean Ratio	.264	.282	Mean Ratio	062 -	.158
S. D.	.180	.227	S. D.	.176	.189	S. D.	.121	.512

Table 4-1 Firms by Ranges of the PV and IE Ratios

 $^{\rm a} {\rm The}$  amount of the long-term capitalization (L-TC) is the sum of long-term debt, stockholders' equity, and the PV itself.

 $^{\rm b}{\rm The}$  average net income (ANI) implies average of reported net income for the most recent three years.

<sup>C</sup>Standard Deviation.

of this ratio falls within the range between -.05 and -.10. On the other hand, a mean of the PV ratio for the PV disclosure firms is .091 for 1973 and .082 for 1974, respectively, while means of this ratio for the PV and IE disclosure firms is .233 and .245 and the IE ratios have mean values of -.121 and -.158 for the same two years.

Two interesting facts can be found in the table. First, the mean of the PV ratios in each year is much greater for the firms with both PV and IE disclosure than for the firms with PV disclosure alone (due to immaterial IE). Notice that the former firms also have larger IE ratios than the latter firms whose IE numbers were not material, which implies that the firms which disclosed both PV and IE numbers might be evaluated by investors as being potentially more risky than the firms which reported only the PV numbers. Such an evaluation may be due to the fact that the greater PV and IE ratios mean a greater impact on the financial ratios which might be used by investors as instrumental variables in assessing the riskiness of individual securities.

Second, for the PV and IE disclosure firms the mean and standard deviations of the PV ratios are far greater for the low risk group than for the high risk group, although this is not true for the PV firms. This finding implies that, for those low risk PV and IE firms, the balance-sheet-based financial ratios (such as debtequity ratio, current ratio, asset growth, and so forth) and also other financial ratios like accounting return on total capital might be more affected by the capitalized lease disclosure than the same ratios for the high risk PV and IE firms. As a result, there is a possibility that the security prices of the low risk PV and IE disclosure firms were affected more by the SEC lease

of this ratio falls within the range between -.05 and -.10. On the other hand, a mean of the PV ratio for the PV disclosure firms is .091 for 1973 and .082 for 1974, respectively, while means of this ratio for the PV and IE disclosure firms is .233 and .245 and the IE ratios have mean values of -.121 and -.153 for the same two years.

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Second, for the PV and IE disclosure firms the mean and standard deviations of the PV ratios are far greater for the low risk group than for the high risk group, although this is not true for the PV firms. This finding implies that, for those low risk PV and IE firms, the balance-sheet-based financial ratios (such as debtequity ratio, current ratio, asset growth, and so forth) and also other financial ratios like accounting return on total capital might be more affected by the capitalized lease disclosure than the same ratios for the high risk PV and IE firms. As a result, there is a possibility that the security prices of the low risk PV and IE disclosure firms were affected more by the SEC lease

disclosure decision for a certain time period than the security prices of the corresponding high risk firms.

On the other hand, Table 4-1 also suggests that the directions of change in the two ratios, PV and IE, are highly consistent between the two types of firms; all the PV firms, except one, experienced a positive change in the PV ratios, while most of the IE firms revealed a negative change in the IE ratios. It should be noted, however, that such a consistent directional change in those ratios does not necessarily imply a similar directional change in the distribution of security returns. The reason is that, as Nelson (1963) found, some financial ratios (for example, net profits to net working capital and return on total capital) were not negatively correlated with the magnitude of the capitalized amount of lease commitments. Furthermore, as Beaver, et. al. (1970) noted, the financial ratios, such as earnings variability, leverage, and growth, vary in the same direction as the relative risks, while other financial ratios, such as payout, size, and liquidity, change in the opposite direction. This two-way directional change implies that a larger PV (or IE) may have both larger positive and negative effects on the financial ratios at the same time. Therefore, the final direction of the net effect upon the distribution of returns may differ, depending upon which financial ratio(s) investors use in making their investment decisions.

### Non-Disclosure and Non-Lease Firms

The names of potential firms for the two control groups were initially obtained from <u>Disclosure Journal</u> (1973 and 1974). Then, they were narrowed down according to the same four criteria that were

used in selecting the treatment firms. This restriction was accomplished by a reading of the footnotes on leases and other background information, such as "Summary of Significant Accounting Policies" and "Supplementary Income Statement Information" in the 10-K and annual reports of 1973 through 1974.

In addition to the above criteria applied, each firm in Group 1 (non-lease firms) and Group 2 (non-disclosure firms) was paired with every firm in Group 3 (disclosure firms) on the basis of published Beta estimates and with a consideration of the standard industrial classification (SIC) code. The individual Beta estimates were available from the September 1973 issue of Security Risk Evaluation published by Merrill Lynch, Pierce, Fenner and Smith, Inc. The Beta estimates were computed on the simple market model<sup>6</sup> using monthly individual returns and the S & P 500 Index as a market index ( $\hat{R}_{M}).$ The estimation covered the 60-month period ending August 31, 1973.<sup>7</sup> The Beta book provides two kinds of Beta estimates: the unadjusted (raw) Beta estimates and the adjusted ones. The present study used the adjusted Beta estimates. This adjusted Beta estimate<sup>8</sup> is a relative risk measure that takes account of the regression phenomenon reported by Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973), the phenomenon of the overestimation of  $\beta_i$  of high risk stock and the underestimation of  $\boldsymbol{\beta}_j$  of low risk stock.

In the matching of two individual firms, the SIC code was taken into account as much as possible. The rationale for giving some consideration to the SIC code was based upon the fact that an industry factor explains a fairly significant portion of security return behavior. According to King (1966), about 10% of the variance

in returns could be explained by an industry factor. However, Fertuck (1975) found that King's finding was true only for certain industries and that it could not be generalized to all industries. "In some industries, the industry effect is trivial and can be safely ignored. In others, it can be as large as a third of the market effect."<sup>9</sup> The implication of this statement is that the industry effect exists in some industries but it is not as important as the market effect. Based upon this evidence, the present study sacrificed the industry classification in favor of the general market effect (measured by  $\beta_j$ ) when there was a conflict between the matching of firms on the SIC code and the matching of firms on  $\hat{\beta}_j$ . Such a sacrifice of industry classification was inevitable because it was difficult to find enough control firms so that every pair of firms could be in the same industry, while meeting the condition,  $\hat{\beta}_{jT} = \hat{\beta}_{jC}$ , as well as the four selection criteria described before.

#### Results of Sample Selection

Because of the matching at the individual firm level, the number of firms in each of the two control groups is equal to the number of firms in Group 3. Thus, there are 297 sample firms in total with ninety-nine firms in each group. 10

The result of matching firms on  $\hat{\beta}_j$  is given in Table 4-2. A careful review of this table shows that, for seventy-three matchings out of ninety-nine pairs between Group 3 and Group 1, differences in the magnitudes of two matched Betas fall within the range of less than 5% of  $\hat{\beta}_{jT}$ , while the number of matchings with less than 5% of deviation in two Betas is seventy-four out of ninety-nine between

No.	Group 3	Group 2	Group 1
1	1.40	1.40	1.40
3	1.48	1.47	1.46
4	1.78	1.77	1.65
5	.83	.83	.83
б 7	.87	.84	.87
8	1.06	1.09	1.02
9	1.48	1.46	1.47
10	1.39	1.39	1.37
12	1.40	1.40	1.41
12	1.04	1.12	1.08
14	1.29	1,29	1.30
15	2.06	2.01	1.92
16	1.40	1.35	1.34
17	1.80	1.83	1.74
19	1.03	1.03	1.03
20	1.22	1.24	1.23
21	1.01	.99	1.00
22	1.84	1.81	1./1
24	1.15	1.15	1.13
25	1.40	1.40	1.36
26	1.21	1.21	1.20
27	1.65	1.56	1.58
29	1.03	1.01	1.02
30	1.46	1.45	1.43
31	1.28	1.29	1.25
32	1.65	1.61	1.48
34	1.79	1.79	1.68
35	1.45	1.44	1.42
36	.93	.95	.93
3/	1.37	1.32	1.30
30 39	1.33	1.33	1.04
40	1.30	1.30	1.31
41	1.10	1.11	1.09
42	1.56	1.49	1.54
43 44	1.4/	1.45 ] <u>4</u> 1	1.4/
45	1.03	1.01	1.04
46	1.06	1.05	1.04
47	1.16	1.15	1.16

Table 4-2 Matching of Firms on Beta Estimates  $(\hat{\beta})$ 

No.	Group 3	Group 2	Group 1
48	.91	.93	.92
49	1.80	1.79	1.69
50	1.62	1.52	1.50
51	.99	1.00	.99
52	.98	.99	.98
53	1.94	1.95	1.88
54	.94	.94	.94
55	1.28	1.28	1.27
56	1.28	1.28	1.25
57	1.78	1.77	1.65
58	1.66	1.58	1.58
59	2.11	2.01	1.98
60	1.12	1.11	1.11
61	1.16	1.18	1.13
62	1.42	1.44	1.42
63	1.76	1.71	1.64
64	1.39	1.34	1.33
65	1.14	1.14	1.13
66	1.26	1.27	1.24
67	1.21	1.22	1.20
68	1.66	1.66	1.51
70	.76	.76	.75
71	1.50	1.50	1.46
72	1.17	1.20	1.16
73	1.36	1.31	1.31
74	1.03	1.02	1.04
75	1.24	1.25	1.20
76	.95	.95	.96
77	.99	.99	1.00
78	.87	.89	.87
79	1.71	1.58	1.59
80	1.92	1.88	1.80
81	1.26	1.26	1.23
82	2.25	2.21	2.67
83	1.76	1.70	1.65
84	1.64	1.54	1.52
85	1.94	1.92	1.86
86	1.53	1.49	1.48
87	1.13	1.15	1.13
88	1.30	1.30	1.30
89	1.24	1.25	1.24
90	1.06	1.08	1.07
91	1.65	1.58	1.51
92	1.42	1.43	1.41
93	.89	.89	.89
94	1.41	1.40	1.38

Table 4-2 (continued)

ı,

No.	Group 3	Group 2	Group 1
95 96 97 98 99	1.74 1.39 1.74 1.74 1.74 1.75	1.67 1.33 1.59 1.67 1.77	1.64 1.37 1.62 1.50 1.66
$ \underset{\beta}{\text{Mean of}} $	1.366	1.348	1.328
Variance of $\beta$ =	.105	.095	.092

Table 4-2 (continued)

Group 3 and Group 2. In terms of magnitude the greatest absolute difference in two matched Betas is .42 which is found in the  $82^{nd}$  pair between Group 3 and Group 1. (See Table 4-2.) However, the relative ratio of this difference is only 18.7% ( = ( 2.67 - 2.25) / 2.25).

Table 4-3 gives some summary statistics of individual Betas in the previous table. This summary table shows that, between the overall groups, the mean values of Beta estimates are close to each other. For example, the mean Beta (1.366) of Group 3 is fairly close to the mean Beta (1.348) of Group 2 and the mean Beta (1.328) of Group 1. The variances, associated with these mean values, are relatively small.

The equality of mean Betas is shown to have been maintained even when each of the three overall groups was broken down into two subgroups by the types of lease disclosure. For the PV disclosure firms the greatest deviation in mean Beta is found when Group 3 is compared with Group 1. However, the absolute value of this deviation

	Overall			Group 3		Group 2		Group 1	
	G3	G2	G1	PV	PV-IE	P۷	PV-IE	PV	PV-IE
Min. (H) (L)	.76	.76	.75	.76 (1.28) (.76)	.83 (1.41) (.83)	.76 (1.28) (.76)	.83 (1.40) (.83)	.75 (1.27) (.75)	.83 (1.36) (.83)
Max. (H) (L)	2.25	2.21	2.67	2.06 (2.06) (1.28)	2.25 (2.25) (1.40)	2.01 (2.01) (1.28)	2.21 (2.21) (1.40)	1.92 (1.92) (1.25)	2.67 (2.67) (1.37)
Mean (H) (L)	1.366	1.348	1.328	1.309 (1.535) (1.082)	1.453 (1.755) (1.135)	1.294 (1.501) (1.086)	1.432 (1.720) (1.128)	1.276 (1.477) (1.075)	1.409 (1.678) (1.126)
Var. (H) (L)	.105	.095	.092	.077 (.035) (.016)	.139 (.049) (.034)	.067 (.030) (.017)	.129 (.046) (.033)	.059 (.022) (.015)	.134 (.083) (.029)
No. <sup>β</sup> (  j (	99 H) L)	99	99	60 (30) (30)	39 (20) (19)	60 (30) (30)	39 (20) (19)	60 (30) (30)	39 (20) (19)

Table 4-3 Statistics of Beta Estimates Used for Matching

Note: H = High risk and L = Low risk.

is only .033 (= 1.309 - 1.276). Likewise, the largest deviation in mean Beta in the case of the PV and IE disclosure firms is observed again when Group 3 is compared with Group 1 and its magnitude is no more than .044 (= 1.453 - 1.409). In the variances of the estimated Betas, there is also little difference between Group 3 and Group 1 (or Group 2), both when these two groups are compared at the aggregate group level and when each overall group is divided into two subgroups. For the PV disclosure firms, for example, difference in the variances of estimated Betas is only .018 (= .077 - .059) between Group 3 and Group 1 and .10 (=.077 - .067) between Group 3 and Group 2. The corresponding differences for the PV and IE disclosure firms are even smaller .005 (= .139 - .134) and .010 (= .139 - .129). However, the tendency is observed that the PV and IE disclosure firms have higher means and variances of Beta estimates, as compared to the PV disclosure firms. This tendency is consistent with the previous fact that the PV and IE firms have relatively higher PV and IE ratios and, therefore, higher chances to be evaluated as being potentially more risky.

The closeness of means and variances of Beta estimates between the treatment and control groups and a tendency for the PV and IE disclosure to have a relatively higher mean and variance of Beta estimates are also observed when each subgroup (by the types of lease disclosure) is again divided into two risk groups, high and low.

The results of the matching suggest that the purpose of matching firms was reasonably satisfied in the sense that the firms in the treatment and control groups were in the same homogeneous risk class and had the same first moments of return distributions during the pre-test (Beta estimation) period. In an effort to evaluate this fact, a statistical test was conducted for the period of one year (1972) selected as part of the pre-test period. The results from this test suggest that there was no statistically significant difference either in mean return vectors or in covariance matrices between the treatment and control groups.<sup>11</sup> Thus, it is now believed that the conditions,  $U_T = U_C$  and  $\Sigma_T = \Sigma_C$ , were met for the 12-month period immediately before the entire 21-month test period.

As mentioned before, the Betas were estimated over five years. About 93% of all firms' Betas were computed by using monthly return

observations over the 60-month period or the period close to it as shown in Table 4-4. However, there were some firms for which a relatively small number of return observations were available for estimating their Betas. For example, the numbers of the firms whose return observations available totaled less than forty-four were four in Group 3, one in Group 2, and three in Group 1. Nevertheless, the inclusion of these small numbers of firms in the sample was not considered to be critical.

No. of Months	Group 3	Group 2	Group 1
15 - 44	4	1	3
45 - 54	3	5	4
55 - 60	92	93	92
(60) <sup>a</sup>	<u>(81)</u> b	<u>(85)</u> b	<u>(84)</u> <sup>b</sup>
Total	99	99	99

Table 4-4 Firms by the Number of Months Covered in Estimating  $\boldsymbol{\beta}_i$ 

<sup>a</sup>sixty months.

<sup>b</sup>the number of firms for which the sixty monthly return observations were available in estimating Betas.

Because of the difficulty of finding enough control firms so that every pair of firms could be in the same industry, the matching of firms on the basis of the SIC code was not as successful as intended. Table 4-5 provides some insight into this fact.

SIC (	Code	Industry	No. of Pairs <sup>a</sup>		
		indus er y	G3 - G2	G3 - G1	
1		Mining and construction	-	1	
2&	3 211 23	Manufacturing Cigarettes Apparrel and other finished products made from fabrics and similar mater-	25 1	19 -	
	27	ials Printing, publishing, and allied	1	-	
	28 281	industries Chemicals and allied products Industrial inorganic chemicals	- 1 4	1 1 1	
	29 291	Petroleum refining and related in- dustries Petroleum refining	- 4	1	
	324 33	Cement and hydraulic Primary metal industries	-1	1 1	
	343	rolling and finishing mills Heating equipment	-	1 1	
	35 366 367	Machinery except electrical Communication equipment	] - 1	4 1 1	
	371 39	Motor vehicles and equipment Miscellaneous manufacturing industrs.	- 2	2 1	
	394	loys and amusement, sporting, and athletic goods	-	1	
4	401 48	Transportation and public utilities Railroads Communication	4 1 -	2 1 1	
5		Retail trade	0	2	
6	602	Finance, insurance, and real estate Commercial and stock savings banks	- 1	- 2	
		Others <sup>b</sup>	<u>52</u>	<u>53</u>	
		Total	99	99	

Table 4-5 Sample Firms Matched by Industries

<sup>a</sup>G1, G2, and G3 stand for Group 1, 2, and 3.

 $^{\rm b}{\rm The\ consideration\ of\ the\ SIC\ code\ in\ matching\ firms\ was\ impossible\ for\ these\ numbers\ of\ firms.$
#### Security Return Data

Monthly returns, used as a stock price variable for this study, are continuously compounded rates of return computed as follows:

$$R_{t} = \log_{e} \frac{(P_{t} + D_{t})}{P_{t-1}}$$
(4-1)

where D denotes dividends and t denotes a month. All return data were obtained from a 1975 edition of the CRSP tape<sup>12</sup> available at Michigan State University.

Since the test design of the present study was based upon the pairwise matching of firms, an unexpectedly high percentage of missing return data was observed. Even if only one of the matched firms missed return data for some month, the paired return observation (i.e., return difference) for this month was deleted as missing data. As a result, a few missing data were observed for some months of the test period, although the exact number of firms for which return data were missing varied from month to month. The main reason for the data missing was that there were some companies which had just stopped or started trading on the NYSE during the time period covered by this study. This fact could be identified by checking the names of such companies in the daily stock market news section of the <u>Wall</u> <u>Street Journal</u>. Despite the missing data, however, the sample size of returns did not change since a sample unit is a monthly average of component returns in each risk class, high and low.

#### CHAPTER V

## ANALYSIS OF TEST RESULTS

An analysis of the statistical test results is presented in this chapter which consists of four sections. The test results on mean return vectors and covariance matrices are analyzed in the first two sections. In the third section the relevance of the SEC's two materiality criteria<sup>1</sup> for the PV and IE disclosure are empirically evaluated by comparing the security prices of firms that met the SEC's materiality criteria to those of firms whose lease commitments failed to meet these criteria. In the final section of this chapter general comments concerning the empirical findings are provided.

Since the rejection of any or both of the null hypotheses ( $H_{01}$  and  $H_{02}$ ) concerning the mean vectors and covariance matrices is a sufficient condition for a capitalized lease information effect to be present, the only situation that leads to no information effect is the case where both of the null hypotheses are not rejected.

The evidence from the test results suggests that the lease information effects were present when the effects were measured by changes in expected returns. However, when the effects were measured by changes in variability of returns, no sign of information effects was observed.

#### Test Results on Mean Return Vectors

The objective of conducting tests on mean return vectors is to see if the null hypothesis  $(H_{01})$  of no return difference is rejected. That is, the goal is to see if the disclosure of capitalized lease data under ASR No. 147 caused investors to reassess the expected returns of the firms affected by the SEC disclosure requirement. Statistically, this is equivalent to testing for a difference between the first moments of the conditional and unconditional return distributions. The rejection of the null hypothesis of no difference is consistent with the alternative hypothesis of information content of the capitalized lease data.

According to the test results discussed in detail below, it appears that the information effects measured by changes in conditional expected returns existed for the case of both the PV firms and the firms with both PV and IE disclosure when these disclosure firms were compared with non-lease firms (Group 1). However, when the same disclosure firms were compared with non-disclosure firms (Group 2), no sign of information effects was observed.

## Test Results on Mean Vectors: Disclosure Firms (Group 3) vs. Non-Lease Firms (Group 1)

Table 5-1 summarizes the test results on mean return vectors when the disclosure firms were compared with non-lease firms. Columns 2 through 7 reveal the test results for the firms differentiated on the basis of the PV numbers of noncapitalized future financing leases, while columns 8 through 13 provide summary results for the groups of firms differentiated on the basis of both PV and IE numbers.

		PV	Disclos	sure Firms				PV ar	nd IE Dis	sclosure Fin	ms	
Months	Ave Return [	erage Difference	T <sup>2</sup>	Computed	Weigt	nts <sup>b</sup>	Aver Return Di	age ifference	т <sup>2</sup>	Computed	Wei	ghts <sup>b</sup>
	High	Low		F-Value <sup>a</sup>	High	Low	High	Low		F-Value <sup>a</sup>	High	Low
TP1: 21	0059	0035	3.357	1.595	. 767	.233	0180 ( 0320) c	0065	6.378	3.030*	.872	.128
21 21	(.0159)	(.0222)	2.847 .515	1.352 .245	1 0	0	(.0329)	(.0310)	6.268 .876	2.978 <sup>*</sup> .416	1 0	0
TP2: 16	0058	0054	3.050	1.423	. 728	.272	0186	.0011	7.081	3.304*	1.412	412
16 16	(.0155)	(.0240)	2.248 .765	1.049 .357	1	0 1	(.0294)	(.0302)	6.445 .021	3.007 <sup>*</sup> .010	1 0	0
TP3: 12	0102	0047	7.023	3.192*	1.013	013	0194	.0094	8.192	3.724*	2.356	-1.356
12 12	(.0133)	(.0240)	7.019 .466	3.191 <sup>*</sup> .212	1 0	0 1	(.0272)	(.0203)	6.111 1.531	2.778 .696	1 0	0
TP4: 9	0095	005 <b>4</b>	5.663	2.477	.801	. 199	0177	.0142	5.173	2.263	10.704	-9.704
9	(.0131)	(.0213)	4.829 .572	2.113 .250	1 0	0 1	(.0505)	(.0203)	3.048 2.227	1.334 .975	1 0	0
TP5: 14	0029	0041	. 852	. 393	.600	. 400	0130	0178	7.074	3.265*	095	1.095
14 14	(.0104)	(.0230)	.449 .422	.207 .195	1 0	0 1	(.0502)	(.0251)	1.799 6.992	.830 <u>.</u> 3.227	1 0	0
TP6: 7	0117	0022	4.848	2.020	.911	.089	0280	.0161	11.768	4.903*	1.610	610
7 7	(.0142)	(.0204)	4.753 .080	1.981 .033	1 0	0 1	(.0244)	(.0320)	9.195 1.714	3.832 <sup>*</sup> .714	1 0	0

Table 5-1 Test Results on Mean Vectors: Group 3 vs. Group 1

Note (1) \*: Significant at .10 level.
a: Degrees of freedom for the F-values are (2, 19) for TP1, (2, 14) for TP2, (2, 10) for TP3, (2, 7) for TP4, (2, 12) for TP5, and (2, 5) for TP6.
b: The first line of the weight vector column in each test period stands for the implicit weights (implicit in computing the value of T<sup>2</sup>).
c: Standard deviation.

Note (2) Selected fractiles of the F distribution and the exact F values are:

<u>d. f.</u>	Fractiles	F-Value	<u>d. f.</u>	Fractiles	F-Value
(2, 19)	.800	1.75	(2, 10)	.800	1.90
	.900	2.61		.900	2.92
	.950	3.52		.950	4.10
	. 990	5.93		. 990	7.56
(2, 14)	.800	1.81	(2,7)	.800	2.04
(-,,	.900	2.73		.900	3.26
	.950	3.74		.950	4.74
	. 990	6.51		. 990	9.55
(2, 12)	.800	1.85	(2, 5)	.800	2.26
(-,)	900	2.81		.900	3.78
	950	3 88		950	5.79
	. 990	6.93		.990	13.27

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#### PV Disclosure Firms: Group 3 vs. Group 1

For the PV firms the means of return differences  $(\hat{R}_T^H - \hat{R}_C^H)$ , for example, between the two groups), computed over the number of months in each of the test periods, are shown in the second and third columns by the risk classes, high and low. Along with the average return differences, the associated standard deviations of return differences are indicated in parentheses. The values of  $T^2$  were computed according to Equation (3-9) by using different weight vectors shown in columns 6 and 7. The weights in the first line of the weight vector column for each test period are the weights that yield the maximum value of  $t^2$ . The computed  $T^2$  values are given in the fourth column and the associated F-values are shown in column 5. The degrees of freedom and related exact F values for various fractiles are found in the footnote to the table. Thus, a final decision as to whether or not the null hypothesis on mean vectors should be accepted can be made by comparing the computed F values with the associated exact values at a given significance level.

A glance at the F-value column reveals that the only test period yielding significant test results is the 12-month period (TP3) covering October 1973 (the month in which the SEC lease disclosure decision was formally announced) to September 1974 (six months after the first public disclosure of the PV and IE numbers according to ASR No. 147). For this period the computed F value (3.192), based on the implicit weight vector<sup>2</sup> [1.013 - .013], exceeds the critical value (2.92) at the .10 significance level.<sup>3</sup> Therefore, the null hypothesis of no return difference is rejected for this test period.

Furthermore, the evidence from the observed F values associated

with different risk groups indicates that this rejection of the null hypothesis is mainly attributable to a significant difference in mean returns of the high risk firms compared between Group 3 and Group 1. This is evidenced by the fact that for the 12-month period the observed F value (3.191) associated with the weight vector [1 0] for the high risk group is significant and far greater than the F value (.212) associated with the weight vector [0 1] for the low risk group. This fact implies that the conditional expected returns on the high risk assets were affected more by the SEC lease disclosure decision than were the conditional expected returns on the low risk assets.

The rejection of the null hypothesis for the 12-month period and the greater contribution to this rejection by the high risk group can also be explained in terms of the magnitudes of return differences. For this period the return difference for the high risk group is -.0102 which is the largest difference next to -.0117 for the 7-month period. With the high and low risk groups combined, the 12-month period yields the largest difference, -.0149 (= -.0102 + (-.0047)). Despite the large values of return difference both for the 9-month period (the high and low groups combined) and for the high risk group for the 7-month period, the test results for those two periods did not appear to be significant, although the fairly large differences in returns for these two periods imply that there was some degree of market reaction to the disclosure of the PV and IE numbers.

The reason for this lack of significance seems to be due to relatively small sample sizes (i.e., small degrees of freedom), only nine for the 9-month period and seven for the 7-month period. The test results for the other five periods, including the entire 21-month period,

did not lead to the rejection of the null hypothesis at the significance level of either .05 or .10. Thus, it can be maintained that either the event of the announcement of the ASR No. 147 proposal or that of the first public disclosure of the PV and IE numbers in the financial reports by itself did not induce a significant market reaction. Rather the significance of the test results for the 12-month period suggests that a significant market reaction took place as a joint effect of the following two events: the announcement of the adoption of the proposal and the first public disclosure of the PV and IE numbers according to ASR No. 147.

The above results are supported by the cumulative average return difference (CARD) curve<sup>4</sup> in Figure 5-1A and 1B. Notice that the CARD curves were constructed with cumulative average return "differences" so that they should be compared with the horizontal zero return difference line for interpretation. As seen in Figure 5-1A, the overall CARD curve begins to deviate from the horizontal zero return difference line around September 1973 (just before the announcement of the adoption of the proposal), and this tendency of deviation continues up to September 1974. The pattern of this deviation over the time period is consistent with the significance of the test results for the 12-month test period. Moreover, Figure 5-1B suggests that for the same 12-month period the CARD curve of the high risk group experienced a greater change than did the CARD curve of the low risk group. Therefore, it appears that the high risk firms contributed more to the rejection of the null hypothesis for this test period.

In fact, the evidence from the test results of the other five periods, except the 12-month period, also suggests that the high risk firms were generally more sensitive to the various events of the SEC



Figure 5-1A Cumulative Average Return Difference: PV Firms (Group 3 vs. Group 1)



Figure 5-1B Cumulative Average Return Difference: PV Firms (Group 3 vs. Group 1)

Note: All = all firms, High = high risk firms and Low = low risk firms.

lease disclosure decision than were the low risk firms. (Compare the F values associated with the weight vector [1 0] for the high risk group and [0 1] for the low risk group in Table 5-1 for each test period.) This finding is consistent with the fact that the high risk firms on the average had higher PV ratios (with a mean value of .091 for 1973, for example) than the low risk firms (.074 for 1973).<sup>5</sup> The higher PV ratios indicate the greater extent to which the financial ratios were affected by the disclosure of the capitalized lease data, which in turn suggests that the firms were likely to be evaluated by investors as being more risky.

According to the test results, both the high and low risk groups of the PV firms were affected in the same way (adversely) by the SEC lease disclosure decision. The evidence for this effect is found in columns 2 and 3 of Table 5-1 (and Figure 5-1B) where the signs of average return differences for all the six test periods are negative. This negativity implies that security prices of both the high and low risk PV firms, as compared with their counter-part non-lease firms, were adversely affected by the SEC lease disclosure decision. This finding seems to support not only the <u>a priori</u> claims made by management and others who have tended to resist disclosing capitalized lease information, but also Nelson's finding that lease capitalization adversely affected the financial ratios of the firms.

The adverse effect on security prices of both the high and low risk firms is also supported by Figure 5-1B wherein the CARD curves of the two risk groups remain below the horizontal zero return difference line over most of the entire 21-month test period. The difference in the degree of the adverse effect between the two risk groups appears to

show up more remarkably in the last four months, June through September 1974. The above fact is consistent with the evidence that the absolute value of average return difference between the two risk groups is greater for the 7-month period (.0117 - .0022 = .0095) than for any other test period. (See columns 2 and 3 of Table 5-1.)

To summarize, the evidence obtained by comparing the PV disclosure firms with the corresponding non-lease firms suggests that there was a lease information effect when the effect was measured by changes in expected returns. Therefore, it can be inferred that the SEC lease disclosure decision significantly affected the security prices of the PV disclosure firms. The existence of lease information effect is consistent with the a priori arguments, including those of the SEC, that capitalized lease information is important to investors. Conversely, the counter-arguments which question the information content of capitalized lease data are contradicted by the evidence presented here. In addition, the evidence indicates that the degree to which the security prices of the PV disclosure firms were affected by the SEC decision was in general higher for the high risk firms than for the low risk firms. Furthermore, the security prices were affected in an adverse manner, which is consistent with Nelson's conclusion that lease capitalization generally affected the financial ratios adversely. The observed lease information effect appears to have existed mainly during the 12-month period which includes both the formal announcement of the SEC decision (i.e., the announcement of ASR No. 147) and the disclosure of the PV numbers in financial reports. The evidence (especially the average return difference for the 7-month period) indicates that some degree of market reaction was present with respect to the disclosure of the PV numbers; but

this reaction was not sufficient to reject the null hypothesis.

# PV and IE Disclosure Firms: Group 3 vs. Group 1

The test results on mean vectors for the PV-IE disclosure firms are also summarized in Table 5-1, columns 8 through 13. Unlike the case of the PV firms, however, the test results for all periods, except TP4 (the 9-month period), were found to be significant at the .10 level. (Compare the computed F-values in column 11 with their corresponding critical values provided in footnotes.)

This finding suggests that the hypothesized information effect on expected returns was not only present, but also spread throughout the entire time period from the initial proposal publication to the disclosure of the actual PV and IE numbers in the 10-K reports. This finding is also supported by both the magnitudes of average return differences in columns 8 and 9 of Table 5-1 and Figure 5-2A. The absolute values of average return differences for the PV-IE firms tend to be in general much higher than those for the firms with disclosure of PV numbers alone. This tendency is consistent with the fact that the mean PV ratios (for example, .210 for the high risk group for 1974 and .282 for the low risk group) for the PV-IE firms are much greater than the mean PV ratios (for example, .091 for the high risk group for 1974 and .074 for the low risk group) for the PV firms.<sup>6</sup>

Figure 5-2A also suggests that the overall CARD curve deviates considerably from the horizontal zero return difference line during almost all of the entire 21-month period. However, the major declines of this curve took place in approximately March 1973 and around the time of the PV and IE disclosure in the 10-K reports. Therefore, it is implied



Figure 5-2A Cumulative Average Return Difference: PV and IE Firms (Group 3 vs. Group 1)



Figure 5-2B Cumulative Average Return Difference: PV and IE Firms (Group 3 vs. Group 1)

that the major market reaction to the SEC lease disclosure decision took place three months prior to the initial publication of the ASR No. 147 proposal. Moreover, there was a further market reaction upon the disclosure of the PV and IE numbers.

The above finding leads to the conclusion that the joint effect of both PV and IE disclosure on expected returns is far greater than the singular effect of PV numbers. This conclusion is based on the fact that in the previous case of the PV firms there was only one test period (the 12-month period) for which a lease information effect on mean returns was found to be present.

The evidence from Table 5-1 and Figure 5-2B indicates that the security prices of the firms in different risk classes were not affected to the same degree by the SEC lease disclosure decision. As seen in column 11 of Table 5-1, the observed F values of the high risk group associated with the weight vector [1 0] for all test periods except the 14-month period tend to be greater than the observed F values of the low risk group associated with the weight vector  $\begin{bmatrix} 0 & 1 \end{bmatrix}$ . This tendency is also found for the  $T^2$  values computed on the basis of the same weight vectors. Therefore, the interpretation is that the security prices of the high risk PV-IE disclosure firms were in general more sensitive to the events of the SEC lease disclosure decision than were the security prices of the low risk PV-IE disclosure firms. This fact is also supported by Figure 5-2B wherein the directional deviation of the CARD curve for the high risk group from the zero line is observed during almost all of the 21-month period, while such a directional deviation of the CARD curve is not present for the low risk group.

However, it is interesting to note that, in contrast to the PV

disclosure firms analyzed previously, the contribution of the high risk firms here to the observed lease information effect of both PV and IE disclosure is not consistently greater for all test periods than that of the low risk firms. For the 14-month period (TP5), for example, the computed F value (3.227) associated with the weight vector [0 1] for the low risk group is significant and far larger than the F value (.830) associated with [1 0] for the high risk group. This finding is consistent with the larger magnitude of average return difference for the low risk group. For the 14-month period the magnitude of average return difference (-.0178) of the low risk group (with a relatively smaller standard deviation of .0251) is larger than the difference (-.0130) of the high risk group (with a relatively larger standard deviation of .0362). But this is not true for the other five periods.

The larger return difference for the low risk group is supported by Figure 5-2B wherein the CARD curve for the low risk group tends to show a larger deviation from the horizontal zero return difference line than does the CARD curve for the high risk group during the 14month period (January 1973 through February 1974). However, this tendency was reversed after March 1974.

This seems to suggest that the high risk PV-IE disclosure firms were more affected by the actual disclosure of both PV and IE numbers, while the low risk firms were more affected by the pre-disclosure events of the SEC lease disclosure decision. A possible reason for the latter case is that these low risk disclosure firms had a greater variance of Beta estimates (.034) than did their counter-part non-lease firms (.029), while the high risk disclosure firms had a smaller variance of Beta estimates (.049) than did their counter-part non-lease firms (.083).<sup>7</sup> And a combination of this relatively high variability of the relative risks with investors' <u>a priori</u> pessimistic expectations about the burden of lease commitments by the low risk disclosure firms might have resulted in the greater impact on the security prices of these firms during the 14-month pre-disclosure period. However, when the actual PV and IE numbers (especially the latter) were revealed in March 1974, the investors might have revised their <u>a priori</u> pessimistic expectations about these low risk firms since they might have realized that the burden of lease commitments on these firms turned out to be much less than what they had previously assumed. For example, the mean IE ratio was only -.062 for the low risk firms for 1973, while the same ratio was -.178 for the high risk firms.<sup>8</sup>

This interpretation is consistent with the signs of average return differences for the 14-month and 7-month periods in columns 9 and 10 of Table 5-1. Notice that there is a negative sign of average return difference for the 14-month period for the low risk firms, while a positive sign of average return difference for the 7-month period is observed. The positive sign of average return difference for this latter period implies that the low risk disclosure firms experienced rather moderate evaluation, relative to non-lease firms, by investors or a reversion of previous adverse reaction once the true effects of leasing were made known.

Finally, one interesting point is that the market reaction to the preliminary discussion of the SEC extended lease disclosure regulation appeared to begin as early as March 1973, three months prior to the publication of the SEC's lease disclosure proposal. The evidence for this timing is found in Figures 5-2A and 2B from which it is clear

that the adverse price reaction began around March 1973. This implies that the market reaction in the case of the PV and IE disclosure firms took place about six months earlier than in the case of the PV disclosure firms. For the PV firms it was previously noted that the market reaction began around September 1973.

To summarize, the evidence obtained by comparing the PV and IE disclosure firms with non-lease firms suggests that the information effects of the various events related to the SEC lease disclosure decision were present when the effects were measured by the degree of changes in expected returns. This evidence is consistent with the traditional arguments which maintain the existence of information content of capitalized lease data. The evidence for the information effects is much stronger here than in the previous case of the firms with disclosure of the PV numbers alone. The test results also suggest that the market reaction began as early as March 1973, three months prior to the publication of the ASR No. 147 proposal. It has been further noted that, in general, the high risk disclosure firms appeared to be more adversely affected by the SEC lease disclosure requirement than were the low risk disclosure firms. The evidence also indicates that, over-all, capitalized lease disclosure did have an adverse effect on the valuation of the firms, although a slight upward readjustment of the security prices upon the disclosure of the capitalized lease data was observed for the low risk firms. This may indicate that negative effects of such lease data on various financial ratios were not as bad as investors had originally anticipated.

Test Results on Mean Vectors: Disclosure Firms (Group 3) vs. Non-Disclosure Firms (Group 2)

Tests for the equality of mean return vectors between disclosure firms (Group 3) and non-disclosure firms (Group 2) are interesting because firms in both groups had noncapitalized financing leases but the firms in the disclosure group disclosed the PV and/or IE numbers, while the firms in the non-disclosure group did not report such numbers presumably because the numbers did not meet the materiality criteria set forth by the SEC. Therefore, disclosure based on the materiality of noncapitalized financing leases is the main differentiating factor between the two groups.

If the hypothesized lease information effects exist, the expected returns of the disclosure firms should differ from the expected returns of the non-disclosure firms provided that the SEC's materiality guidelines are meaningful. Alternatively, one might expect to observe similar price behavior for the two groups of firms (disclosure and non-disclosure) if investors perceive the SEC materiality criteria to be of little consequence.<sup>9</sup>

The evidence from the test results here suggests that when the two groups were compared, no effects on conditional expected returns were observed for either the PV firms or the PV-IE disclosure firms. This is different from the finding when the same disclosure firms were compared with the firms with no lease commitments.

#### PV Disclosure Firms: Group 3 vs. Group 2

The test results for the PV disclosure firms, as compared with non-disclosure firms (Group 2), are given in columns 5 through 7 of Table 5-2. Since this table is parallel to Table 5-1, all the terms

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Table

		۸d	Disclos	ure Firms				PV and	IE Discl	losure Firms		
Months	Ave Return D	:rage )ifference	T <sup>2</sup>	Computed F-Value <sup>a</sup>	Wei	ghts <sup>b</sup>	Aver Return Di	rage ifference	۲²	Computed	Weigh	tsb
	High	Low			High	Low	High	Low		- 1410	High	Low
TP1: 21	0063	.0048 ,00048	2.253	1.070	-1.882	2.882	0061	0054 , , , , , , , , , , , , , , , , , , ,	1.008	.479	. 328	.672
21 21	(0620.)	(0020-)	.968	.460	-0	0-	(0440)	(8620.)	.396 .683	.188 .32 <b>4</b>	-0	0-
TP2: 16	0107	.0012	2.799	1.306	1.083	083	0053	.0002	.224	.105	1.262	262
16 16	(9620.)	( +020.)	2.789	1.301 .025	-0	0-	(2640.)	(+/20.)	.220	.103	-0	0-
TP3: 12	0097	.0051	3.169	1.441	7.870	-6.870	.0004	0017	.063	.029	.065	.934
12	(.023/)	(5610.)	1.995.844	.907 .384	-0	0-	(.043/)	(.02.38)	.001 .062	.001 .028	-0	0-
TP4: 9	.1110	0005	1.595	.698	1.136	136	.0016	0001	.015	.006	.727	.273
66	(6920.)	(6810.)	1.584	.693	-0	0-	(.0406)	(7/70.)	.014	.000 000	-0	0-
TP5: 14	0035	.0054	1.027	.474	661	1.661	0040	0074	.854	. 394	.023	776.
14	(1000.)	(0770.)	.192	. 089	-0	0-	(*040.)	(1000.)	.093	.043	-0	0-
TP6: 7	0120	.0035	1.566	.652	-67.713	68.713 <sup>d</sup>	0104	0013	.854	.356	.579	.421
	(0000.)	(6/10.)	1.125 .286	.119	-0	0-	(2/00.)	(1100.)	.542 .012	.226 .005	-0	0-
Note (1	) See Not	es (1) and	(2) of	Table 5-1 f	for a, b,	c, and s	selected fr	actiles of	the F di	istribution.		

Note (2) d: These unusually large values of the weight vector were recomputed and found to be correct.

are as defined previously.

When the F values in column 5 are compared with the corresponding exact values,  $^{10}$  it is found that none of the observed F values exceeds the associated critical value. This finding is consistent with the implications of the relatively small magnitudes of average return differences. As seen in columns 2 and 3 of the table, the average return differences for the high risk group are relatively small, ranging from -.0035 to -.0120, while those of the low risk group vary from -.0005 to .0054. This fact is also supported by Figure 5-3A wherein the over-all CARD curve shows very little deviation from the horizontal zero return difference line.

It follows that the various events of the SEC lease disclosure decision, either taken together or separately, did not significantly differentiate the PV firms (with material lease commitments) from the non-disclosure firms (with immaterial lease commitments). Expected returns of the two groups of firms appeared to behave in essentially the same way over the entire 21-month period as well as for the various sub-periods. It should be noted, too, that this result is somewhat different from the prior finding where the same PV firms were compared with non-lease firms (Group 1). There, the information effect was shown to be present for the 12-month test period.

Also, unlike the previous case, the general tendency for the security prices of the high risk firms to be more affected by the events of the SEC decision is not observed here. In the case of the 21-month (TP1) and 14-month (TP5) periods, for example, the low risk firms are shown to have been more affected than the high risk firms.

(Compare the  $T^2$  and F values in columns 4 and 5 of Table 5-2 associated with the weight vectors, [1 0] and [0 1], respectively.)

The evidence from Table 5-2 indicates that the high risk firms were adversely affected by the events of the SEC lease disclosure decision, while the low risk firms were generally not. This result is inconsistent with the previous case where both the high and low risk PV firms were shown to be adversely affected. The evidence for this fact is given in columns 2 and 3 of the table. As seen in the columns, the signs of average return differences are negative for the high risk group for each of the six test periods, while the signs of average return differences are positive for the low risk firms for all of the test periods except the 9-month period (TP4).

These comparative behaviors of average return differences for the two risk groups are also supported by the CARD curves in Figure 5-3B. The CARD curve of the high risk group lies below the horizontal zero return line during almost all of the entire 21-month period, while the CARD curve of the low risk group lies above the zero line throughout the period. However, the computed F values associated with the weight vectors, [1 0] and [0 1], are all far less than the corresponding critical values. Therefore, although a systematic pattern of deviation between the two CARD curves is present, this should not be intrepreted as evidence that the hypothesized lease information effect is significantly risk-dependent.

In summary, no sign of lease information effect is present either for the various events taken together of the SEC lease disclosure decision or for any single event evaluated separately, when the information effect is evaluated by comparing the conditional



Figure 5-3A Cumulative Average Return Difference: PV Firms (Group 3 vs. Group 2)



Figure 5-3B Cumulative Average Return Difference: PV Firms (Group 3 vs. Group 2)

expected returns of the PV disclosure firms with the unconditional expected returns of non-dosclosure firms. This finding is somewhat in contrast to the previous case where the same PV firms were compared with non-lease firms (Group 1). Therefore, it can be inferred that the materiality of lease commitments (as defined by the SEC) is not a critical factor on which the market differentiates the security prices of the firms with material lease commitments from the security prices of the firms with immaterial leases. Rather, a more important factor seems to be whether or not the firms have noncapitalized lease commitments. Prior to disclosure of actual numbers, investors probably did not know which firm would be material in lease commitments (in Group 3) and which firm would not be material (in Group 2). Even after disclosure of such numbers, investors might also have suspected that a disclosure firm would be a member of Group 3 for one year, while this same firm could become a member of Group 2 for another year. Any (or both) of these situations could cause no difference between the two types of firms.

In addition to the above, no evidence was found for the tendency that the high risk firms were more affected by the various events of the SEC lease disclosure decision than were the low risk firms. There may be two possible reasons for this finding: First, the PV ratios of the high risk firms were not very different from the PV ratios of the low risk firms so that the effects of the PV numbers on various financial ratios might not significantly differ between the two risk groups. The means of the PV ratios for the high risk firms were .091 for 1973 and .091 for 1974, while the mean PV ratios for the low risk firms were .090 for 1973 and .074 for

1974. Second, the means and variances of Beta estimates were fairly close between the high and low risk PV disclosure firms and their respective counter-part non-disclosure firms.<sup>11</sup> However, there is evidence that the high risk firms were in general affected in an adverse manner by the SEC lease disclosure decision, while the low risk firms were not.<sup>12</sup> This finding is different from what was discovered when the same PV firms were compared with non-lease firms (Group 1).

# PV and IE Disclosure Firms: Group 3 vs. Group 2

The statistical test results from comparing the PV-IE disclosure firms with non-disclosure firms (Group 2) are summarized in columns 8 through 13 of Table 5-2.

A glance at the F-values in column 11 indicates that none of the test results for any of the six test periods appears to be significant at the significance level of either .05 or .10. The results are consistent with the implications of relatively small magnitudes of average return differences (in columns 8 and 9) ranging from -.0104 to .0016 for the high risk group and from -.0074 to .0002 for the low risk group. In general, the magnitudes of average return differences for the various test periods here are far less than those when the same PV-IE disclosure firms were previously computed with nonlease firms (Group 1). (Compare columns 8 and 9 of Table 5-2 with the corresponding columns of Table 5-1.) The CARD curves in Figure 5-4A and 4B also reveal similar results. Therefore, it can be concluded that none of the events associated with the SEC decision had an effect upon the conditional expected returns for the PV-IE firms as compared



Figure 5-4A Cumulative Average Return Difference: PV and IE Firms (Group 3 vs. Group 2)



Figure 5-4B Cumulative Average Return Difference: PV and IE Firms (Group 3 vs. Group 2)

with those firms which had noncapitalized financing leases but did not report the PV and IE numbers due to the immateriality of such leases.

The tendency for the high-risk group to be more sensitive to the events of the SEC decision that the low-risk group is not revealed here. The evidence for this fact is given by the F-values associated with the two weight vectors, [1 0] and [0 1] for TP1, TP3, and TP5, in column 11 of Table 5-2 and also the CARD curves in Figure 5-4B. The test results suggest that both the high and low risk disclosure firms were adversely affected over-all by the SEC lease disclosure decision but not significantly so. The evidence for this finding is provided by the signs of average return differences for various test periods in columns 8 and 9 of the table.

An over-all summary of all the test results obtained from the mean vector tests is presented in Table 5-3. Based upon the evidence from the test results, it can be concluded that the SEC lease disclosure decision had an information effect as revealed through changes in the equilibrium prices of those securities most affected by the disclosure requirements. The evidence for the information effects appears to be much stronger for the joint disclosure of the PV and IE numbers than for the PV disclosure alone, although the effects were also present in the case of the firms with disclosure of the PV numbers alone. Therefore, it seems that investors adjust their perceptions about return prospects of the firms mainly with respect to the joint disclosure of both PV and IE numbers rather than with respect to the PV disclosure alone. In general, the high risk firms were more adversely affected by the SEC decision than were the low

· · ·	Group 3	vs. Group 1	Group 3	vs. Group 2
Months	PV Firms	PV-IE Firms	PV Firms	PV-IE Firms
TP1: 2	I NS	s*	NS	NS
	H > L	H* > L	H < L	H < L
	(-H -L)	(-H -L)	(-H +L)	(-H -L)
TP2: 1	5 NS	s*	NS	NS
	H > L	H <sup>*</sup> > L	H > L	H > L
	(-H -L)	(-H +L)	(-H +L)	(-H +L)
TP3: 1	2 S*	s*	NS	NS
	H* > L	H > L	H > L	H < L
	(-H -L)	(-H +L)	(-H +L)	(+H -L)
TP4:	) NS	NS	NS	NS
	H > L	H > L	H > L	H > L
	(-H -L)	(-H +L)	(-H -L)	(+H -L)
TP5: 1	1 NS	s*	NS	NS
	H > L	H < L <b>*</b>	H < L	H < L
	(-H -L)	(-H -L)	(-H +L)	(-H -L)
TP6:	7 NS	s*	NS	NS
	H > L	H <sup>*</sup> > L	H > L	H > L
	(-H -L)	(-H +L)	(-H +L)	(-H -L)

Table 5-3 Summary of Mean Vector Test Results

NS:	Not significant at .10 level.
S:	Significant.
*:	Significant at .10 level.
H,L:	High and low risk group.
H > L:	A greater contribution of high risk group to the
*	observed value of the test statistic.
H > L:	The contribution of high risk group is greater and
	significant at .10 level.
+H(L):	Sign of the average return difference is positive for the high (low) risk group.
-H(L):	Sign of the average return difference is negative for the high (low) risk group.
	NS: S: H,L: H > L: H > L: +H(L): -H(L):

risk firms, a finding which is not surprising since the high risk firms are by nature relatively more volatile.

In addition, the evidence suggests that the market reaction began about three months before the initial publication of the ASR No. 147 (twelve months prior to the actual disclosure of the PV and IE numbers). Furthermore, the most intensive market reaction took place with respect to the pre-disclosure events of the SEC decision, although some degree of further reaction was observed upon the disclosure of the PV and IE numbers in the 10-K reports. Thus, it can be interpreted that the information of the SEC lease disclosure decision was largely absorbed by the market before the actual numbers were released.

The above conclusions were valid only when the disclosure firms (Group 3) were compared with non-lease firms (Group 1). However, when the same disclosure firms were compared with non-disclosure firms (Group 2), no sign of information effects was observed either for the PV disclosure firms or for the firms with disclosure of both PV and IE numbers. This lack of information effect implies that Group 3 and Group 2 generated the same market reaction and, hence, that the materiality of lease commitments (as defined by the SEC) did not cause any significant difference in returns between the two groups. This fact is consistent with what was discovered when the same two groups were compared in terms of PV disclosure.

### Test Results on Covariance Matrices

As indicated earlier, the purpose of conducting tests on the covariance matrices of total realized returns,  $\hat{R}^{H}$  and  $\hat{R}^{L}$ , was to

determine if the return variability of disclosure firms changed as a result of the SEC lease disclosure decision. This is equivalent to testing the null hypothesis  $(H_{02})$  of equal covariance matrices for the treatment and control firms. The rejection of this null hypothesis is another sufficient condition for concluding that the SEC lease disclosure decision did have information content in the sense that changes in return variability were associated with the SEC lease disclosure requirement.

As discussed in Chapter II, disclosure of the PV and IE numbers may cause investors to re-assess the riskiness of the securities of the disclosing firms through an impact of such disclosure on the various financial ratios which may be used by investors. For example, including the PV in the long-term liability and treating the IE as an adjustment to the reported net income will affect the financial ratios, such as leverage, payout, liquidity, and earnings variabliity, which Beaver, et. al (1970) found to be highly associated with the relative risk measure (Beta). As discussed earlier, it was discovered that certain financial ratios were inversely related to Beta, while some other financial ratios were positively related. This two-way directional relationship implies that Betas can change in either direction, through the potential impact of capitalized lease disclosure on the financial ratios, since different investors may use different financial ratios for their investment decisions. Changes in Betas in any direction could lead to the possibility of changes in the variability of returns. To the extent that such changes in the variability of returns exist, the information effects of the SEC lease disclosure decision can be evaluated

in terms of such changes.

An inference from the test results in this section suggests that neither the return variability of the PV disclosure firms nor the firms with disclosure of both PV and IE numbers were significantly affected as a result of the SEC lease disclosure decision. Although the results of the covariance matrix test for some test periods revealed significance, an interpretation of these results leads to the conclusion that such significance was not a result of the SEC decision, but due to a random chance which could be expected under the null hypothesis at the .10 level.

## Test Results on Covariance Matrices: Disclosure Firms (Group 3) vs. Non-Lease Firms (Group 1)

The objective of conducting tests for the equality of covariance matrices was to see if the return variability of disclosure firms is different from the return variability of non-lease firms (Group 1). If this difference is found, then it can be inferred that the disclosure of the PV numbers affected the variance-covariance structure of returns.

The test results reported in this section suggest that hypothesized variance-covariance effect was not present either for the PV disclosure firms or for the PV-IE disclosure firms.

## PV Disclosure Firms: Group 3 vs. Group 1

The test results on covariance matrices for the PV disclosure firms, compared with non-lease firms, are given in columns 2 through 6 of Table 5-4. The values of the M statistic in column 4 were

		PV Di	sclosure Firms				PV and	IE Disclosure	Firms	
Number of Months	Vari	iance <sup>b</sup>		Computed	Values <sup>a</sup>	Var	iance <sup>b</sup>		Computed	Values <sup>a</sup>
nonens	Treat.	Control	M Statistic	x <sup>2</sup>	F	Treat.	Control	M Statistic	x <sup>2</sup>	F
TP1: 21	.0088 .0044 .0055	.0060 .0045 .0050	10.727	10.146**	3.382**	.0117 .0073 .0073	.0064 .0067 .0045	2.237	2.116	. 705
TP2: 16	.0093 .0051 .0063	.00 <b>74</b> .0056 .0062	5.464	NA <sup>C</sup>	1.670	.0114 .0083 .0075	.0076 .0083 .0057	. 882	NAC	.273
TP3: 12	.0083 .0050 .0060	.0073 .0057 .0063	4.490	NA	1.349	.0113 .0081 .0067	.0070 .0074 .0052	. 996	NA	. 299
TP4: 9	.0062 .0033 .0039	.0034 .0028 .0029	3.206	NA	.924	.0094 .0062 .0041	.0043 .0082 .0047	3.856	NA	1.111
TP5: 14	.0104 .0051 .0066	.0076 .0058 .0065	7.919	NA	2.420*	.0153 .0088 .0104	.0087 .0061 .0049	2.828	NA	. 864
TP6: 7	.0067 .0037 .0042	.0035 .0024 .0027	2.803	NA	.766	.0061 .0053 .0017	.0027 .0091 .0042	6.142	NA	1.678

#### Table 5-4 Test Results on Covariance Matrices: Group 3 vs.Group 1

Note (1) \*\*: Significant at .05 level.
\*: Significant at .10 level.
a: Degrees of freedom for the chi-square value are 3 for TP1 and the F-values have degrees of freedom of (3, 2888000) for TP1, (3, 162000) for TP2, (3, 87120) for TP3, (3, 46080) for TP4,(3, 121680) for TP5, and (3, 25920) for TP6.
b: The first line of this column for each test period stands for the variances of the high risk treatment and control firms, the second line for the variances of the low risk treatment and control firms, the second line for the high and low risk groups within each of the treatment and control groups.
c: NA implies "Not Applicable."

Note (2)

Selected fractiles of the  $X^2$  and F distributions and the exact values are:

Distribution	Fractiles	<u>d. f.</u>	Values	Distribution	Fractiles	<u>d. f.</u>	Values
x <sup>2</sup>	.800	3	4.642	F	.800	(3∞)	1.55
	.900	3	6.251		.900	(3∞)	2.08
	.950	3	7.815		.950	(3∞)	2.60
	.990	3	11.345		.990	(́3∞)́	3.78

computed according to Eq. (3-11) by using the variances and covariances in columns 2 and 3. The observed chi-square  $(X^2)$  and F values in columns 5 and 6 were calculated as defined in Eq. (3-12) through (3-14). As discussed in Chapter III, the choice of  $X^2$  or F statistic depends upon the number of degrees of freedom. Box (1949) suggests the use of  $X^2$  if the number of observations is greater than or equal to twenty and the F statistic if it is less than twenty. Accordingly, the  $X^2$  statistic was chosen for the all-inclusive 21-month test period. In addition, the observed F value is also presented as supplementary information. For the other five test periods the use of the F statistic is relevant due to their small sample sizes. The selected fractiles of both  $X^2$  and F distributions and the associated critical values are given in the footnote to the table.

An examination of the observed  $X^2$  and F values in columns 3 and 4 indicates that the observed  $X^2$  value (10.146) for the entire 21month period far exceeds its critical value (7.815) at the significance level of .05. Also, the test result for the 14-month period (TP5) is shown to be significant at the .10 level. For all other periods the test results were not significant at the significance level of either .05 or .10.

However, it is not clear why the observed variance-covariance effect for the PV disclosure firms is so high, as compared with the firms with disclosure of both PV and IE numbers for which no variancecovariance effect was found to be present. The observed effect for the PV disclosure firms is inconsistent with the implications of some other related evidence. First, as seen in Table 4-1 previously, the mean and standard deviation of the PV ratios for the PV disclosure

firms were far less than the mean and standard deviation of the PV ratios for the PV and IE disclosure firms, regardless of the risk class of these firms. Moreover, the IE ratios for the PV disclosure firms were all shown to be immaterial (by the definition of this group), while the IE ratios for the PV and IE disclosure firms were presented as being material. Conceptually, therefore, the financial ratios of the PV firms should be affected less by the disclosure of the capitalized lease data than the financial ratios of the PV and IE disclosure firms. Consequently, the extent to which investors reassessed the riskiness of the PV firms' securities by using the financial ratios incorporating the PV numbers should be less than the degree to which investors re-evaluated the riskiness of the securities of the firms by using the financial ratios incorporating disclosure of both PV and IE numbers.

Second, in terms of the mean and variance of the Beta estimates used in the matching of firms, there was little difference (in a relative sense) between the PV firms and the PV and IE firms during the pre-test period when these disclosure firms were compared with nonlease firms. The evidence for this was given in Table 4-3 of Chapter IV. Little difference in the variance of the Beta estimates implies that a variance-covariance effect should not be present unless the SEC decision did cause a significant change in the variability of Betas during the test periods, a change which is not known.

Third, for the 21-month and 14-month periods, the magnitudes of variances and covariances for the treatment firms, as shown in column 2 of Table 5-4, are not very different from those for the treatment firms in column 3 for the case of the PV disclosure firms. This lack

of difference is even more clear when one comparatively looks at the magnitudes of variances and covariances in columns 7 and 8 for the same two periods in the case of the PV and IE disclosure firms.

For these reasons, it would seem more appropriate to conclude that the observed variance-covariance effects for the two test periods were present by random chance rather than as a result of the SEC lease disclosure decision. This random chance could be expected under the null hypothesis with the probability of 10 out of 100.

#### PV and IE Disclosure Firms: Group 3 vs. Group 1

The last five columns of Table 5-4 summarize the results of statistical tests for the firms with both PV and IE disclosure when these firms were compared with non-lease firms (Group 1). The values of the M statistic and the computed  $X^2$  and F values were all obtained in the same fashion as described earlier.

Unlike the case of the PV disclosure firms, however, the comparison of the observed  $X^2$  and F values with the associated exact values suggests that none of the test results for any test period was significant at .05 or .10 significance level. A glance at columns 7 and 8 of Table 5-4 implies that there exist some differences in the magnitudes of variances and covariances between the treatment and control firms. But such differences were not sufficient to reject the null hypothesis of equal variance and covariance matrices.

Therefore, it can be concluded that the SEC lease disclosure decision had no effect on the variance-covariance structure of returns when the effect was measured by comparing the PV-IE disclosure firms with non-lease firms. As far as the variance-covariance effect

is concerned, this evidence is not suggestive of the traditional arguments, including those of the SEC, that capitalized lease data are important to investors in assessing the riskiness of securities. Rather, the evidence here is consistent with the counter-view that capitalized lease data convey no new information about the risk prospects of the firms.

## Test Results on Covariance Matrices: Disclosure Firms (Group 3) vs. Non-Disclosure Firms (Group 2)

The tests on covariance matrices were also conducted by comparing the lease disclosure firms with non-disclosure firms (Group 2). Recall that the non-disclosure firms, like the disclosure firms, had noncapitalized future financing leases but did not report the capitalized data of such leases because of the immateriality (as defined by the SEC) of their lease commitments. Therefore, disclosure based upon the materiality of the leases is a major difference between the two groups of firms.

The objective of the tests here was to see if the SEC lease disclosure decision had any differential effect on the return variability of the firms with "material" amounts of noncapitalized financing leases vis-a-vis the return variability of the firms with "immaterial" amounts of such leases.

The covariance tests conducted by comparing the disclosure firms with the non-disclosure firms suggest that the SEC lease disclosure requirements had no effect on the variance-covariance structure of security returns. All observed values of the test statistic were far less than their corresponding critical values, not only for the entire 21-month period but also for the various sub-periods.

## PV Disclosure Firms: Group 3 vs. Group 2

The test results for the PV firms are given in columns 2 through 6 of Table 5-5. Since this table parallels Table 5-4, the definitions of all terms are exactly the same as before.

Again, the evidence suggests that the various events associated with the SEC decision, including the actual disclosure of PV numbers, had no impact upon the dispersion of returns for the PV firms when the impact was measured by comparing the PV disclosure firms with nondisclosure firms. None of the observed  $X^2$  and F values exceeded its critical value at the .10 significance level. Therefore, the materiality of non-capitalized future lease commitments (as defined by the SEC) was not a critical factor in differentiating the market reaction to the PV disclosure firms from the market reaction to the non-disclosure firms compared here.

## PV and IE Disclosure Firms: Group 3 vs. Group 2

The covariance test results for the firms with both PV and IE disclosure, as compared with non-disclosure firms, are summarized in the last five columns of Table 5-5.

As in the previous case where the same disclosure firms were compared with non-lease firms (Group 1), there is no sign of a variance-covariance effect for any of the selected test periods. All the observed  $X^2$  and F values in columns 10 and 11 fail to reach their corresponding critical values at the .10 level.

As a result, the null hypothesis of equal covariance matrices

		D V D	isclosure Firms				PV and	IE Disclosure	Firms	I
Numbel of Months	A Va	riance <sup>b</sup>		Computed	Values <sup>a</sup>	Var	i ance <sup>b</sup>		Computed	Values <sup>a</sup>
	Treat	Control		x <sup>2</sup>	Ŀ	Treat.	Control		x <sup>2</sup>	Ŀ
TP1: 2	21 .0096 .0044 .0052	.0058	1.408	1.332	.444	.0122 .0080 .0082	.0083 .0065 .0048	1.571	1.486	. 495
TP2: 1	16 .0100 .0051 .0059	.0106 .0074 .0066	1.931	NAC	.597	.0127 .0086 .0086	.0102 .0063 .0055	. 795	NA <sup>C</sup>	.246
TP3: 1	12 .0092 .0047 .0052	.012 <b>4</b> .0050 .0067	. 380	N	.114	.0120 .0088 .0079	.0093 .0067 .0059	. 322	NA	.097
TP4:	9 .0075 .0035 .0035	.0045 .0038 .0035	2.493	R	617.	.0098 .0061 .0045	.0085 .0073 .0062	1.014	NA	.292
TP5: 1	.0110 .0052 .0065	.0121 .0070 .0067	2.369	N	.724	.0137 .0088 .0092	.0090 .0064 .0054	4.935	NA	1.508
тр6:	7 .0081	.0037 .0042 .0032	2.790	N	. 762	.0080 .0057 .0040	.0056 .0082 .0053	.670	N	.183
Note:	See Not and F d	es (1) and ( istributions	(2) of Table 5-4 s and their exact	about the t values.	explanati	ion of a, l	b, c, and	the selected 1	fractiles (	of the X <sup>2</sup>

Table 5-5 Test Results on Covariance Matrices: Group 3 vs. Group 2
between the treatment and control firms is not rejected. Accordingly, it appears that the SEC lease disclosure decision provided no new information about the risk attributes of the PV-IE disclosure firms. This conclusion is consistent with the conclusion reached previously when the same disclosure firms were compared with non-lease firms. There it was found that the variability of returns for the former firms was essentially the same as the variability of returns for the latter firms.

An over-all summary of all the test results on covariance matrices is given in Table 5-6. As seen in the table, the only case

Months		Group 3	vs. Group 1	Group 3 vs. Group 2		
montn	2	PV Firms	PV-IE Firms	PV Firms	PV-IE Firms	
TP1:	21	s**	NS	NS	NS	
TP2:	16	NS	NS	NS	NS	
TP3:	12	NS	NS	NS	NS	
TP4:	9	NS	NS	NS	NS	
TP5:	14	s*	NS	NS	NS	
TP6:	7	NS	NS	NS	NS	

Table 5-6 Summary of Covariance Matrix Test Results

Note (1) S<sup>\*\*</sup>: Significant at .05 level. But an interpretation of the test results for both the 21-month and the 14-month period suggests that such a significance was a result of random chance rather than that of the SEC lease disclosure decision.

(2) See the footnotes to Table 5-3 for the explanation of NS and  $S^*$ .

where the test results appeared to be significant was that involving the PV disclosure firms when these firms were compared with non-lease firms. As discussed before, however, this significance should not be interpreted as a result of the SEC lease disclosure decision. For all other cases no evidence was found for significant changes in the variance-covariance structure of returns for either the PV disclosure firms or the firms with both PV and IE disclosure. This finding implies that the SEC lease disclosure decision did not cause investors to reassess the risk prospects of the firms. As a result, the variability of returns remained essentially unaffected by the SEC decision.

# Assessment of the SEC Materiality Criteria for Lease Disclosure

One interesting point is that the test results from the comparison of Group 3 (disclosure firms) with Group 2 (non-disclosure firms) can serve as a basis for evaluating the importance of the two materiality criteria, 5% for the PV disclosure and 3% for the IE disclosure, which are suggested in ASR No. 147. As mentioned before, firms in both groups were similar to each other in that they all had noncapitalized financing leases. Moreover, firms in both groups were matched with each other on the basis of their estimated Beta levels. Thus, it can be assumed that a main difference between the two groups of firms lies in the "materiality" of their lease commitments as defined by the SEC.

In suggesting the two materiality criteria, the SEC seemed to believe that the two groups of firms have a different distribution of lease signals (PV and/or IE) and hence, that investors would assess those two types of firms differently. It was also believed that the two cut-off points were not too "high" to eliminate lease signals that would be useful to investors, while they were not too "low" to cause some useless lease information to be made public. Furthermore, the SEC appeared to believe that the lease information which is important to investors is only those lease signals whose magnitudes meet the materiality crieria; the potential importance of immaterial lease signals is totally ignored for disclosure. In addition, according to the SEC, the lease information which meets the materiality criteria would not be available to the general public unless the disclosure requirements such as those set forth in ASR No. 147 are enforced.

Under this situation and if the lease information effect exists, the behavior of returns for the disclosure firms will be different from the behavior of returns for the non-disclosure firms. This statement is equivalent to saying that mean return vectors and/or covariance matrices should not be equal between the two groups of firms if the two materiality criteria meaningfully differentiate the relative importance of lease commitments for these two groups of firms.

The present test results provide no evidence for difference in return behavior between the two types of firms and thus no sign of the importance of the two materiality guidelines set forth by the SEC. As seen earlier in Table 5-2 and Table 5-5, which summarize the test results on mean return vectors and covariance matrices between Group 3 and Group 2, none of the observed values of the test statistics exceeded its corresponding critical values for either the PV firms or the PV-IE firms for any of the six test periods. A further condensed summary of the two tables is provided in Table 5-3 and Table 5-6.

The CARD curves in Figure 5-3A and Figure 5-4A provide further evidence that the two materiality criteria were not important in distinguishing the market adjustment to the extended lease disclosure requirements between the two types of firms.

No evidence for the importance of the two materiality criteria can be explained with any one (or both) of the following two reasons: First, investors did not know prior to the disclosure of the actual lease numbers which particular firm was going to be in Group 3 and which firm would be in Group 2. Thus, they tended to react the same to these two groups up to the time when the financial reports were released. After the disclosure of actual numbers, investors might have suspected that a firm in Group 3 now could be a member of Group 2 in the future (or vice versa) so that the distinction between the two groups of firms is not important.

Second, the two cut-off points (5% for the PV disclosure and 3% for the IE disclosure) were in fact so "high" that the capitalized lease information which would be useful was eliminated from public disclosure. Alternatively, the SEC's cut-off points were too "low," which might cause some useless lease information to be made public. In either of these two possible situations, one could expect no difference in the distribution of lease signals between the two groups of firms and, similarly, investors perceived in that way.

#### Some Remarks on Test Results

Several brief comments on the test results seem appropriate at this point. The first comment regards a question which may arise as to whether or not the test results obtained for the test periods

were also present during the pre-test period. If, for example, the evidence for significant changes in expected returns for the various test periods were also observed during the pre-test period, it would be difficult to attribute the changes in expected returns solely to the SEC lease disclosure decision.

In order to evaluate this question, separate multivariate tests on mean return vectors and covariance matrices were conducted for a selected 12-month pre-test period (January through December 1972). The results of these tests are summarized in Tables 5-7and 5-8. The evidence from the results suggests that neither mean return vectors nor covariance matrices were significantly different between the treatment and control firms, either Group 3 vs. Group 1 or Group 3 vs. Group 2, during the selected pre-test period. This finding implies that the return distributions of the two types of firms were essentially the same immediately prior to the SEC lease disclosure decision. Thus, it appears that the significant difference in the expected values of their return distributions which was observed during the test periods was mainly contributed by the SEC decision.

The second comment regards the fact that the SEC lease disclosure decision caused the security prices of the disclosure firms to differ more from the security prices of non-lease firms than from the security prices of non-disclosure firms. According to the test results, differences in the expected values and variance-covariance structure of returns between Group 3 and Group 1 were in general greater than differences in the expected values and variance-covariance structure of returns between Group 3 and Group 2. The evidence for this fact is found in Table 5-9 which was constructed by rearranging all of the

1972)
Period (
Pre-Test
r the
'ectors fo
Return V
n Mean
Results o
Test
Table 5-7

.

		٨d	Disclos	ure Firms				PV ar	nd IE Dis	sclosure Fir	SIII	
Groups	Ave Return D	rage ifference	T <sup>2</sup> Value	Computed	Wei	ght	Av Return	erage Difference	T <sup>2</sup> Valuo	Computed E_Value	Weiç	ht
	High	LOW	5	F-Value	High	Low	High	гом			High	Low
Group 3	0086	. 0028	2.373	1.078	1.495	495	0201	0130	6.269	2.849	.545	.455
vs.	(.0255)	(3610.)	1.351	.279	-	0	(.0332)	(.0259)	4.407	2.003	-	0
Group 1			.253	.115	0	-			3.027	1.376	0	-
Group 3	0041	.0055	1.384	.629	072	1.072	0137	0120	6.301	2.864	.470	.530
vs.	(.0265)	(3610.)	162.	.133	-	0	(.0374)	(0330)	1.608	.731	-	0
Group 2			.960	.436	0	-			1.585	121.	0	-
				-					,			

Degrees of freedom for the F-values are (2, 10). See the footnote to Table 5-1 for the critical values of the selected fractiles of the F distribution and for other explanations about this table. Note:

.

		PV Disc	closure Firms			PV and IE	E Disclosure Fi	irms
Groups	Var	iance	0;+0;+0; +0;+0;	Computed	Vari	ance	7:+2:+C+7 M	Computed
	Treat.	Control	ם סרמרו ארו כ	F-Value	Treat.	Control		F-Value
Group 3	.0015	6100.	2.253	.672	.0037	.0027	.827	.247
vs.	.0015	.0008			.0019	.0012		
Group 1	1100.	0100.			.0022	.0014		
Group 3	.0015	.0016	2.208	.659	.0033	.0030	5.060	1.509
vs.	.0015	0100.			.0020	.0008		
Group 2	1100.	.0008			.0022	.0005		

Test Results on Covariance Matrices for the Pre-Test Period (1972) Table 5-8

See the footnote to Table 5-4 for the critical values of the F distribution and for the other explanations about this table. Note:

computed values of the test statistics for both the mean vector and variance-covariance tests. In the case of the mean vectors of the PV-IE firms, for example, the computed F values in column 3 are all larger than the F values in column 5. This finding, which is in general true for the PV firms and also in the case of differences in variance-covariances, is not an unexpected one since, by construction, firms in Group 1 were shown to have no long-term financing leases, while firms in Group 2 were those which had immaterial noncapitalized financing leases.

Table 5-9 Observed Values of Test Statistics by Groups and by Types of Lease Disclosure<sup>a</sup>

		Mean Ve	ectors <sup>b</sup>		Covariance Matrices			
Months	Grou vs. Gi	up 3 roup 1	Grou vs. Gi	up 3 roup 2	Grou vs. Gi	up 3 roup 1	Gra vs. (	oup 3 Group 1
	PV	PV+IE	PV	PV+IE	P۷	PV+IE	PV	PV+IE
TP1: 21	1.595	<b>3.</b> 030 <sup>*</sup>	1.070	. 479	10.146 <sup>**</sup>	2.116 <sub>x</sub>	1.332 <sub>x</sub>	1.486 <sub>x</sub>
TP2: 16	1.423	3.304*	1.306	.105	1.670	.273	.597	.246
TP3: 12	3.192*	3.724*	1.441	.029	1.349	.299	.114	.097
TP <b>4: 9</b>	2.477	2.263	.698	.006	.924	1.111	.719	.292
TP5: 14	. 393	3.265*	.474	. 394	2.420*	.864	.724	1.508
TP6: 7	2.020	4.903*	.652	. 356	.766	1.678	.762	.183

Note a: Prepared from Tables 5-1, 5-2, 5-4, and 5-5. b: Observed values of the F statistic associated with the implicit weight vectors only.

x: Chi-square values.

- \*\*: Significant at .05 level.
- \*: Significant at .10 level.

The third comment here concerns the appropriateness of the multivariate design for the covariance matrix test. In an effort to assess this appropriateness, correlation coefficients between the high- and low-risk assets within each primary group can be evaluated. If the correlation coefficients are significantly high, the covariability of returns of the two types of assets is also expected to be high. In this case, for example, the return variability of the high risk assets may change as a result of a change in return variability of the low risk assets or vice versa (because of covariability) even when there is in fact no information effect upon the variance structure of the high risk assets. This covariability problem is completely ignored in a univariate test design so that the unique effect, if any, of lease information upon the variability of returns of the high risk assets cannot be properly detected. The multivariate covariance test method of the sort used in the present study can incorporate such a covariability problem in its test design by evaluating the equality of the off-diagonal elements (covariances) as well as the diagonal elements (variances) of the two covariance matrices compared between the treatment and control groups. In a univariate test design, however, these off-diagonal elements are assumed to be zero.

Table 5-10 shows the sample product-moment correlation coefficients of returns between the two risk groups of firms within each primary group for two selected test periods (as an example). A significance test indicates that these coefficients (except .530) are all significant at the .10 level. Since the within-group covariability of the two asset returns appears to be significantly high, this high covariability must be incorporated into statistical tests. Hence, the choice of the multivariate test design in the present

study is considered to be appropriate rather than the use of a univariate design, for example.

Disclosure	Months	Group 3 <sup>a</sup>	Group 2	Group 1
ΡV	21	.797 .890	.735	.965
	9	.662 .870	.839	.934
PV and IE	21	.834 .785	.664	.686
	9	.588 .530 <sup>b</sup>	.788	.784

Table 5-10 Correlation Coefficients Between High- and Low-Risk Assets Within Groups

Note a: The correlation coefficients in the left-hand column were computed by using return data when Group 3 was compared with Group 2 and those in the right-hand column were calculated by using return data when Group 3 was compared with Group 1. Because of missing return data for some month(s) for certain companies matched, the two related correlation coefficients for each period are somewhat different. Otherwise, both of them must be the same.

b: Not significant at the .10 level.

### CHAPTER VI

### SUMMARY AND CONCLUSIONS

## Summary of Test Results

The present study represents an attempt to determine if the SEC's 1973 decision to extend its lease disclosure requirements for non-financing type lease commitments had an effect on the pricing of securities. The SEC requires its registrants to disclose capitalized lease data in footnotes to their financial statements, with the belief that the capitalized lease disclosure of the sort required under ASR No. 147 is essential to investors in assessing the risk-return attributes of the firms with lease commitments.

This research is considered as being important and timely in the sense that the results of this research may be relevant to the recently formed Advisory Committee on Corporate Disclosure of the SEC whose main charge is to determine what effect some of the SEC's disclosure requirements have had on the pricing of securities. Also, the results may be relevant to the Financial Accounting Standards Board in its deliberation concerning the lease disclosure issue.

The study measured the hypothesized effects of capitalized lease information in terms of the degree of changes in both expected values (means) and variability (variance-covariance structure) of returns for the firms affected by the SEC decision. The significance of changes in expected returns was statistically tested in a

multivariate context by the use of Hotelling's T<sup>2</sup> statistic, and the significance of changes in variability of returns was tested by using a generalized form of Bartlett's M statistic, proposed by Box (1949) for the multivariate test of homoscedasticity of variances and covariances. The reasons for looking into a change in measures of both central tendency and dispersion of return distribution and the rationale for conducting the multivariate tests were explained in Chapter III.

Based upon the test results on measures of the central tendency of return distributions, the following tentative conclusions appear warranted:

- (1) The price effects of the SEC lease disclosure decision were found to exist when those effects were evaluated by comparing the disclosure firms (primary treatment group) that had "material" lease commitments (as defined by the SEC) with the non-lease firms (control group) which had no long-term lease commitments. However, when the disclosure firms were compared with the non-disclosure firms (control group) with "immaterial" lease commitments, no sign of lease information effect was observed.
- (2) The evidence suggests that the price effect of both PV and IE disclosure was relatively greater than the price effect of disclosing the PV numbers alone. For the firms which disclosed both PV and IE numbers of noncapitalized financing leases, there is strong evidence that both anticipatory and <u>ex post</u> market reaction took place with respect to almost every event of the SEC lease decision, including the

publication of the proposal of ASR No. 147 and the disclosure of actual PV and IE numbers in financial reports. However, for the firms which disclosed the PV numbers alone, the differential market response was observed only for the (12-month) period covering the formal announcement of the SEC decision and the actual disclosure of the PV and IE numbers. There was some indication of further market reaction following the actual disclosure, but this reaction was not sufficient to reject the null hypothesis of no information effect. This failure to reject the null hypothesis was probably caused by the relatively low power of the test.

- (3) Evidence collected in this study suggests that the information effects of the various events of the SEC lease decision were risk-dependent in the sense that the magnitude of the effects varied according to the firms' riskiness. In general, the high risk firms were more sensitive to the events of the SEC decision than were the low risk firms.
- (4) Capitalized lease disclosure did in general have an adverse effect on the valuation of the firms. The high risk firms tended to be more adversely affected than the low risk firms. This finding is consistent with Nelson's results which suggest that lease capitalization generally has an adverse effect on financial ratios.

Somewhat in contrast to the general results observed in the mean vector tests, evidence from the covariance tests suggests that there were no lease information effects on the variance-covariance structure

of returns for either the PV disclosure firms or the firms with both PV and IE disclosure. Although the test results on the covariance matrices for the PV firms appeared to be significant, this significance seemed to be a result of random chance rather than an outcome of the SEC decision.

Regarding the importance of the SEC's two materiality criteria, 5% for the PV disclosure and 3% for the IE disclosure, the test results of the present study suggest that neither of these criteria seems to be important to investors in differentiating the disclosure firms from the non-disclosure firms. All the statistical tests conducted here showed no significant differences in mean returns and variance-covariances between the disclosure firms and the non-disclosure firms. Rather, the most important distinguishing factor seems to be whether or not a firm has lease commitments.

#### Conclusions

Based on the empirical findings of the present study, it can be concluded that the SEC extended lease disclosure decision of 1973 had an effect upon the pricing of securities for those firms which were materially affected by the decision. The information effect appeared to exist only with respect to expected values (means) of security returns, but not with respect to return variability. This implies that the SEC decision contributed to a significant shifting of the entire distribution of security returns of the affected firms without change in dispersion. Notice that a significant change in either central tendency or dispersion (or both) of return distribution is a sufficient condition for the hypothesized information effect to exist. Furthermore, the information effect was present with respect to the earlier events of the SEC decision as well as the actual disclosure of capitalized lease data in financial reports.

These findings tend to support the SEC's contention that capitalized lease information is important to investors. Moreover, the empirical evidence supports the traditional view which asserts that capitalized lease data have information content. Indeed, evidence from the present study indicates that the counter-view claiming no information content of capitalized lease data is rejected.

The conclusion reached here in favor of the existence of the information content of capitalized lease data is consistent with the findings of Hamada (1972) and Beaver, et. al (1970). They discovered that accounting risk measures, including capital structure variables, have a high association with the market (relative)risk which is a determinant of the first moment of return distributions. However, the conclusion of the present study is inconsistent with the findings of Benston (1973) and Hagerman (1975) whose studies suggest that SEC disclosure requirements have had little or no observable effect upon security prices.

#### Study Contributions

The main contribution of this study lies in the fact that it is one of the first attempts to empirically evaluate the information content of capitalized lease data via the assessment of the effects upon security prices of lease disclosure regulations by regulatory agencies. Hopefully, the findings of the present study will provide a useful basis for the evaluation of the lease disclosure issue by the SEC's

Advisory Committee on Corporate Disclosure and the Financial Accounting Standards Board.

In the area of research methodology the present study employed a multivariate testing procedure which was considered most appropriate for evaluating the potential information effect of an accounting event. Another possible contribution of this study is its warning that the use of a single critical time point (like that in the before-after type of test design) at which an event is assumed to take place may not be sufficient to thoroughly detect its hypothesized information effect when that event is a final outcome of a series of related events. In the present study multiple time points were selected on the basis of the various events of the SEC decision, and separate tests for various sub-periods, in addition to an omnibus test for the entire test period, were conducted. The test results for the various sub-periods were found to reveal certain information which could not be obtained through the omnibus test for the entire test period.

### Study Limitations

The conclusions for the present study may be qualified because of the following limitations: the small size of samples, the independent-group assumption in the variance-covariance test,<sup>1</sup> the homogeneity of control group firms, the independence of returns over time, and the sample firm selection criteria (the NYSE firms which have the same fiscal year ending December 31).

The sample size in the present study was the total number of months for which returns  $(\hat{R}^H \ \hat{R}^L)$  of the two risk groups were computed. The largest total number of months for a test period was twenty-one,

while the smallest was only seven. This small sample problem could be alleviated somewhat by choosing a longer test period or using weekly (or daily) return data for the selected test periods for this study.

The independent-group assumption is a difficult one to be met, given the grouping design of this study which employed pairwise matchings of treatment and control firms. An attempt to find a multivariate variance-covariance matrix test technique which can be applied to the dependent-group case was unsuccessful. Also, it is not known what impact the violation of the independence assumption would have on the test results on covariance matrices.

The homogeneity of control group firms employed in the present study was not tested. The study assumed that firms in each of the two control groups came from a homogeneous population which implies that the returns in a given control group were drawn from the same population.

Regarding the independence of returns over time, the present study assumed that monthly return differences,  $(\hat{d}^H \quad \hat{d}^L) = (\hat{R}^H_T - \hat{R}^H_C \quad \hat{R}^L_T - \hat{R}^L_C)$ , in the mean vector tests as well as raw returns,  $(\hat{R}^H \quad \hat{R}^L)$ , in the covariance matrix tests were identically distributed in every month. However, this assumption may be questionable since the behavior of returns in the assumed disclosure month, March 1974, might not have been the same as the behavior of returns in the non-disclosure months during that same year.<sup>2</sup> If return behaviors in different months were not identical, it would be difficult to explain what the summary sample statistics (means and variances) really mean. However, because of the feature of the pairwise matching of the firms and since the sample firms, both treatment and control, had the same fiscal year-end and the same disclosure month, a problem (if any) arising from violating the assumption of independent and identically distributed returns over time was expected to be substantially alleviated in the present study.

The present study used only the NYSE firms having December 31 as a fiscal year-end. Therefore, the findings may not be generalized to the NYSE firms having a different fiscal year-end nor to the firms which are registered on other stock markets.

#### Suggestions for Future Research

The above potential sources of limitation open avenues for future research in the subject area considered by this study. In addition, there are also other possible options for future research. For example an analysis similar to the present study could be conducted on the nondisclosure firms (in Group 2) with "immaterial" lease commitments after they begin disclosing the PV and/or IE numbers. Then it can be evaluated whether or not the market re-evaluates these firms upon the disclosure of such numbers. As another possibility for research, grouping of firms by different risk classes may also be made on the basis of the ratio<sup>3</sup> of the PV to the amount of long-term capitalization and, then, some sort of statistical significance tests can be conducted. Also, the research design of the present study can be refined through a better matching of firms on the estimates of error terms (residual returns), in addition to Beta, and/or on the SIC code, if it is assumed that industry factors can explain a significant portion of security price behavior.

CHAPTER NOTES

### CHAPTER I

### NOTES

- The Disclosure Policy Committee of the Securities and Exchange Commission, <u>Disclosure to Investors: A Reappraisal of Federal</u> <u>Administrative Policies Under the '33 and '34 Acts</u> (The Wheat Report), Chapter II, "B. The Philosophy of Disclosure," Chicago, Illinois: Commerce Clearing House, Inc., 1969.
- 2. Rule 3-16 contains provision about the disclosure of commitments and contingent liabilities including lease commitments.
- 3. The Securities and Exchange Commission, "Securities Act of 1933 Release No. 5401" (June 6, 1972), in SEC Docket, June 19, 1973.
- The Securities and Exchange Commission, <u>ASR No. 147</u> "Notice of Adoption of Amendments to Regulation S-X Requiring Improved Disclosure of Leases" (October 5, 1973), in <u>SEC Docket</u>, October 23, 1973.
- 5. See "C. Amendments to Regulation S-X" of ASR No. 147.
- 6. See "A. Introduction" of ASR No. 147.
- 7. Myers, John H. <u>Accounting Research Study No. 4</u> "Reporting of Leases in Financial Statements," New York: AICPA, 1962, p. 3.
- 8. Ibid., p. 38.
- 9. Ibid., p. 49.
- <u>APB Opinion No. 31</u> "Disclosure of Lease Commitments by Lessees," AICPA, June 1973, Paragraph 7. A similar statement is also found in <u>APB Opinion No. 5</u>, Paragraph 16. <u>FASB Exposure Draft</u> "Accounting for Leases," Stamford, Connecticut: Financial Accounting Standards Board, 1975, Paragraph 81.
- The Subcommittee on Leases of the AAA Committee on Financial Accounting Standards, "Response to Financial Accounting Standards Board Discussion Memorandum on Accounting for Leases," a supplement to <u>The Accounting Review</u>, 1976, p. 229.
- 12. See Vatter (1966), p. 135, Buff (1971), pp. 21-3, and Heufner (1970), pp. 30-6.

(CHAPTER I NOTES, Cont'd.)

- 13. The argument claiming that capitalized lease data provide no information content is not necessarily the same as the argument against the disclosure of such data. For example, management may oppose the disclosure of capitalized lease information because the potential outcome of this disclosure would adversely affect the credit standing of their firm. In this case management assumes that capitalized lease data could have information content. But they oppose disclosure of such data because of a worry about its potential adverse effect.
- Also, see <u>FASB Discussion Memorandum</u> "Accounting for Leases," Stamford, Connecticut: Financial Accounting Standards Board, July 1974, pp. 22-4.
- 15. Ibid., p. 32.
- 16. Ibid., pp. 33-4.
- 17. For further discussion in this context, see Section V of <u>FASB</u> Discussion Memorandum (1974).
- 18. Defliese (1973), p. 24.
- 19. Donaldson (1962), p. 123, and Axelson (1971), p. 52.
- 20. See "B. Interpretations and Comments" of ASR No. 147.
- 21. FASB Discussion Memorandum (1974), pp. 18-9.
- 22. Nurnberg (1973), p. 385.
- 23. Gonedes and Dopuch (1974), p. 80.
- 24. Before turning to the next chapter, it is appropriate for one to note that this study will restrict its scope only to the disclosure issues related to the accounting for leases and to the disclosure of leases by lessees. Thus, issues associated with leases from a valuation point of view or those from the lessors' point of view will not be a concern.

# CHAPTER II

### NOTES

- 1. The full text of this Bulletin was later restated in Chapter 14 of ARB No. 43 (1953).
- 2. Paragraph 7 of Chapter 14 of ARB No. 43.
- 3. The Bulletin requires disclosure, in financial statements or in notes thereto, of:

(1) the amounts of annual rentals to be paid with some indication of the periods for which they are payable and
(2) any other important obligations assumed or guarantees made in connection therewith.
(See Paragraph 5 of Chapter 14 of ARB No. 43.)

- 4. See "Summary and Conclusions: Lessee" of Chapter 1 and "Proposed Lease Presentation - Lessees" of Chapter 4 ASR No. 4.
- 5. <u>APB Opinion No. 5</u> "Reporting of Leases in Financial Statements of Lessee," New York: AICPA, September 1964.
- 6. Paragraph 5 of APB Opinion No. 5.
- 7. Paragraphs 10, 11, and 12 of <u>APB Opinion No. 5</u>. The Board argued that leases covering merely the right to use property in exchange for future rental payments do not create an equity in the property and are thus nothing more than executory contracts. Accordingly, it was recommended that information about leases of this type should be disclosed in schedules or notes rather than in the body of the financial statements (Paragraph 14).
- 8. Paragraphs 14 and 16 of APB Opinion No. 5.
- 9. Paragraph 18 of APB Opinion No. 5.
- 10. Paragraphs 8-10 of APB Opinion No. 31.
- 11. The Opinion defines a noncancelable lease as one that has an initial or remaining term of more than one year and is not cancelable, or is cancelable only upon the occurrence of some remote contingency or upon the payment of a substantial penalty. (See Footnote 2, Paragraph 9 of the Opinion.)

(CHAPTER II NOTES, Cont'd.)

- 12. Paragraphs 1 and 7 of APB Opinion No. 31.
- 13. Of the remaining firms, 50% in 1973 and 52% in 1974 were such firms that had long-term leases but did not capitalize them. And 23% of the 600 firms in 1973 and 18% in 1974 were shown to have no long-term leases. (See Accounting Trends and Techniques (1975), p. 188.)
- 14. See "A. Introduction" of ASR No. 147.
- 15. Securities Act of 1933 Release No. 5401 "Notice of Proposed Amendment to Regulation S-X...," in <u>SEC Docket</u>, June 19, 1973, p. 1.
- 16. See "A. Introduction" of ASR No. 147.
- As preliminary works, the FASB issued a discussion memorandum on accounting for leases in July 1974 and an exposure draft in August 1975.
- See Note 11 of this chapter for the definition of a noncancelable lease.
- See "Rule 3-16(q). Leased assets and lease commitments" in "C. Amendments to Regulation S-X" of ASR No. 147.
- 20. See items (1) and (2) of "C. Amendments to Regulation S-X" of <u>ASR</u> No. 147.
- 21. See Note 19 above.
- 22. See item (4) of "C. Amendments to Regulation S-X" of ASR No. 147.
- 23. The Release defines the amount of long-term capitalization as the sum of long-term debt, stockholders' equity, and the PV of the minimum lease commitments. (See item (4) (i) of "C. Amendments to Regulation S-X" of ASR No. 147.
- 24. The notion of materiality used hereafter is the same as that defined by the SEC.
- 25. By the term "objectives," Nelson means what the financial ratios try to measure. For example, the objective of the current ratio is to measure a firm's liquidity or ability to meet short term obligations and the objective of the return on total capital is to measure the rate of return on investment.
- 26. Nelson (1963), p. 54.
- 27. Beaver, et. al (1970), p. 679.

# CHAPTER III

# NOTES

- 1. An example of using a multivariate analysis for the evaluation of information effect can be found in Gonedes (1975).
- 2. See the second section of Chapter II about the definition of the SEC's two materiality criteria, 5% for the PV disclosure and 3% for the IE disclosure.
- 3. For further discussion about the normality of return distribution, see Fama and Miller (1972), pp. 216-7 and 259-65.
- 4. However, no difference in the first moments of return distributions between groups does not imply that their variances are the same. Since the variance of returns is defined as  $Var(\underline{R}) = E(\underline{R}'\underline{R}) - (E(\underline{R}))^2$ , the condition of  $E(\underline{R}_T) = E(\underline{R}_C)$  alone does not necessarily imply  $Var(\underline{R}_T) = Var(\underline{R}_C)$  unless  $E(\underline{R}'\underline{R}_T) = E(\underline{R}'\underline{R}_C)$ , which is not known.
- 5. Gonedes (1975), p. 222.
- 6. As examples, see Ball and Brown (1968), Fama, Fisher, Jensen, and Roll (1969), and Gonedes (1974).
- 7. Gonedes (1975), p. 223.
- 8. The sample firms in the present study comprised sixty PV disclosure firms and thirty-nine firms with both PV and IE disclosure. Each of these two disclosure groups was again divided into two subgroups, high and low risk. (See Figure 3-4 later in this chapter.) Then, the average monthly return of the individual component returns in each of the two risk groups was used as a sample unit.
- 9. By risk dependency is meant whether or not assets in different risk classes are affected differently in a systematic manner by the same source of information.
- 10. Gonedes and Dopuch (1974), pp. 81-7 and Gonedes (1975), p. 223.
- 11. August 1973 was about two months subsequent to the publication of the ASR No. 147 proposal. Therefore, there is a possibility that the Beta estimates used in matching firms might have already been contaminated by anticipatory market reaction to the proposal.

(CHAPTER III NOTES, Cont'd.)

However, it was thought that the inclusion of only two months in the 60-month Beta estimation period would not be very critical.

Also, August 1973 was six months before the first disclosure month (March 1974) of the PV and IE numbers, according to ASR No. 147, by the December 31 fiscal year-end firms. It was believed that the period of six months would be long enough to avoid any contamination caused by the effect of the PV and IE disclosure. Also, going back further would pick up some additional noise factors which could mask the unique effect of the capitalized lease disclosure. The reason for assuming March 1974 to be the first disclosure month is explained in Note 25 of this chapter.

12. The single-factor market model is given by

 $\begin{array}{l} \hat{R}_{j} = \alpha + \beta_{j} \ \hat{R}_{M} + \hat{\epsilon}_{j} \\ \text{where } \alpha = \text{risk-free rate} \\ R_{M} = \text{return on the market portfolio} \\ \hat{\epsilon}_{j} = \text{error term with } E(\hat{\epsilon}_{j}) = 0 \text{ and } Cov(\hat{\epsilon}_{i} \ \hat{\epsilon}_{j}) = 0 \text{ for } i \neq j. \end{array}$ 

- 13. This independence assumption implies that returns  $(\hat{R}^{H} \text{ and } \hat{R}^{L})$  are identically distributed in every month, although this assumption may be questioned since the behaviors of returns in different months (for example, March and September) may not be same. However, it is believed that, because of the feature of pairwise matching between the treatment and control firms which have the same fiscal year end with the same disclosure month, an impact of a possible violation against the independence assumption could be considerably reduced. Therefore, the test results of the present study would not be critically distorted. (See Chapter VI for further discussion of this problem.)
- 14. The covariance test here is based on the same idea that inferences about the equality of two variances which use n pairs of observations between two dependent samples can be made within the context of a univariate test (for example, the standard t-test). For further explanations and an example of the test for the equality of two variances using two dependent samples, see Lord (1963) and Glass and Stanley (1970), pp. 306-8.
- For further discussion about the joint level of significance in a multivariate context with an example, see Bolch and Huang (1974), pp. 76-77.
- 16. This T<sup>2</sup> statistic was originally suggested by Hotelling (1931) as a generalization of the standard t-test statistic.
- 17. This is because weighted sums of normal variables are themselves normally distributed.
- 18. See Morrison (1976), pp. 129-131 for the derivation of the T<sup>2</sup> from the univariate t-statistic through a maximization process using a weight vector.

(CHAPTER III NOTES, Cont'd.)

- **19.** Also, as in the case of the univariate t-test, the multivariate  $T^2$ -test is known to be robust against violations of the normality assumption. (See Harris (1975), pp. 7 and 87.)
- 20. See Morrison (1976), pp. 134-6 and Bolch and Huang (1974), pp. 86-7 for further discussions and an example of this idea.
- **21**. Gonedes (1975), p. 226.
- 22. Bartlett (1937) developed the following statistic:

 $M = N \ln S - \sum_{k=1}^{G} v_k \ln S_k$ 

where  $S = (\sum_{k} v_{k} S_{k})/N$ ,  $N = \sum_{k} v_{k}$ , and k denotes a group (k = 1,

2,...,G)

- 23. Harris (1975, p. 85) says that this M statistic implicitly assumes independence between groups compared, although neither Bartlett (1937) nor Box (1949) mentioned this assumption explicitly in his original paper. If the independence assumption is critical, the choice of the M statistic will be inappropriate for the present study since groups compared were not independent of each other. It is not exactly clear what impact a violation against the independence assumption would have on the test results obtained. Nevertheless, since it was hard to find a multivariate test statistic that exactly fits the covariance matrix tests of this study, it was decided to use the M statistic as a possible alternative.
- 24. The selected test periods will be explained in the next section of this chapter.
- 25. The data collection for the present study showed that about 95% of the sample firms filed their 10-K reports (containing the PV and/or IE numbers) with the SEC during March every year from 1972 to 1974. Therefore, it seems appropriate to use March 1974 as the critical month in which the incremental lease information was first publicly disclosed under ASR No. 147.

The choice of a critical time point for the evaluation of an information effect is not consistent in several studies. For example, Gonedes (1975) used the actual disclosure month (March for the firms with the December 31 fiscal year-end) as a critical month. On the other hand, Sunder (1973) utilized the end of the accounting period as a critical time point in assessing an effect of annual earnings announcement, rather than the date of the formal announcement of the earnings.

26. One must be cautious in interpreting the test results to be obtained since some of these events also overlapped with the events related to APB Opinion No. 31. The Opinion was formally announced in June

(CHAPTER III NOTES, Cont'd.)

1973 and effective as of December 31 of the year. However, three reasons can be pointed out for asserting that any information effect observed during the selected test periods could be ascribed to the SEC decision. First, the tests were conducted on the capitalized data of noncapitalized "financing" lease commitments, the data which are not available under the Opinion. (See Chapter II.) Second, although the Opinion recommends disclosing the PV of noncancelable leases in general, it entirely ignores the IE of such leases. Therefore, any observed information effect of both PV and IE disclosure can be exclusively ascribed to the SEC decision. Finally, the distinction between materially-affected firms (Gourp 3) and immateriallyaffected firms (Group 2) is possible only with the SEC's two materiality criteria, 5% for the PV disclosure and 3% for the IE disclosure. The Opinion provides no single guideline for differentiating the materiality of lease commitments. Therefore, the implications of the test results from comparing Group 3 with Group 2 can be interpreted only with respect to the SEC decision.

- 27. This test period and TP5 below are overlapped by eight months with the Beta estimation period (the Betas used in matching firms). However, the inclusion of eight months in the 60-month Beta estimation period was not considered to be so critical that the estimated Betas could be significantly contaminated by the lease information effect. Therefore, it is believed that the test results for these two periods are not significantly distorted.
- 28. It should be noted, however, that some firms in Group 2 which did not meet the SEC's two materiality criteria for 1973 and 1974 may be qualified as the members of Group 3 in the future since they could meet any (or both) of the two materiality criteria. Likewise, some firms in Group 3 may not be able to meet the materiality criteria in later years so that they may become the members of Group 2 in the future. In this sense the firms in both Group 3 and Group 2 can be considered homogeneous with respect to their longterm lease commitments so that a comparison of Group 2 with Group 1 can be a possibility for separate statistical evaluation.

## CHAPTER IV

### NOTES

- 1. The definition of each group and the reason for using two control groups were provided in the previous chapter.
- 2. Disclosure Journal, the editions of 1973 and 1974, Leasco, Inc.
- 3. The reason for going back to September 1968 is that the Beta estimates used in matching firms were computed on the basis of sixty monthly return observations for the period beginning September 1968 and ending August 1973.
- 4. The validity of including these firms with the immaterial lease commitments in Group 3 may be questioned since Group 3 is by definition supposed to consist of those firms which reported the capitalized lease data by meeting the materiality criteria. The reason for including those firms in Group 3 is based on the fact that (1) "disclosure" was of a primary concern in the present study rather than the materiality of lease commitments and (2) the benefit derived from increasing the number of sample firms by including such firms would exceed the cost of excluding them from the samples. It was hoped that the inclusion of a small number of such firms, for example, four and seven for 1973 and 1974 in the total sample of PV firms, would not distort the test results critically. The same logic was also applied to the case of the firms with both PV and IE disclosure.

Since the present study used monthly returns of the two different risk groups as sample units, the inclusion of such firms in Group 3 did not affect the sample size of return observations; only the number of securities in each risk group was affected. Of the seven PV firms in 1974, for example, three were included in the high risk group, while the remaining four were in the low risk group.

5. For one firm the negative PV numbers were reported since the capitalized amount of rental income from subleases exceeded the capitalized amount of primary future rental payments. (See Appendix A regarding the way that the PV number is computed.) The term "negative" is used in the sense that this PV of subleases in fact reduces the amount of liability which is different from typical cases wherein lease capitalization tends to increase the magnitude of a firm's liability. (CHAPTER IV NOTES, Cont'd.)

- 6. See Note 12 of Chapter III regarding the form of the simple market model.
- 7. Some test periods (TP1, TP2, and TP5) which were explained in the third section of Chapter III were overlapped with the Beta estimation period. However, the overlapped periods were relatively short (eight months in TP1, three in TP2, and eight in TP5) so that the test results were assumed not to be critically affected.
- 8. See Security Risk Evaluation (September 1973), Glossary.
- 9. Fertuck (1975), p. 847.
- 10. Because of the relatively strict definition of control firms (as seen in Figure 3-2) and their matching criteria, it was hard to meet the fourth condition regarding the fiscal year end for all control firms when these firms were selected. As a result, there were three firms in Group 2 which have non-December fiscal year-ends (one with October, one with November, and one with January), while five firms in Group 1 failed to meet the December fiscal year-end condition (two firms with February, another two with November, and one with January).
- 11. For details of this test, see the last section of Chapter V.
- 12. The tape is edited by the Center for Research on Security Prices (CRSP) at the University of Chicago. There are two different types of returns stored in the tape: RET1 and RET2. Returns of the first type are adjusted monthly returns, including all distributions, while returns of the latter type are adjusted monthly returns, including only price changes and non-taxable distribution. The present study used RET1 and converted returns defined in RET1 into continuously compounded rates of return on the basis of Eq. (4-1).

### CHAPTER V

#### NOTES

- 1. See the second section of Chapter II about the definition of the materiality criteria.
- 2. This implicit vector is one which maximizes the value of  $t^2$  and, thus, the observed value of F. All values of  $T^2$  and F associated with other weight vectors should be less than or equal to the values of  $T^2$  and F related to this implicit weight vector. Notice that this fact is true for all test periods as seen in Table 5-1 (and later in Table 5-2). See the second section of Chapter III for a theoretical discussion thereof.
- **3.** This is the critical value based on the two-tailed test. The present study used the two-tailed critical values of test statistics for a decision as to whether or not the null hypotheses are accepted. The reason for using the two-tailed critical values is that no assumption was initially made about a specific direction of lease information effect upon the pricing of securities. The assumption was made on the basis of an empirical finding that capitalized lease disclosure did not necessarily affect the firms (financial ratios) in one direction. (See Nelson (1963).)
- **4** The overall CARD curve was constructed using Eq. (5-2) and the CARD curves by different risk groups using Eq. (5-4) below:

$$\overline{d}_{t} = \sum_{j=1}^{n} (\hat{R}_{jtT} - \hat{R}_{jtC}) / n$$

$$CARD_{t} = \sum_{t=1}^{21} \overline{d}_{t}$$
(5-1)
(5-2)

where n = total number of firms (sixty for the PV firms and thirtynine for the PV-IE firms)

t = a month, from January 1973 to September 1974

$$\frac{\mathbf{d}}{\mathbf{d}_{t}}^{\mathbf{G}} = \sum_{j=1}^{n} \left( \hat{\mathbf{R}}_{jtT}^{\mathbf{G}} - \hat{\mathbf{R}}_{jtC}^{\mathbf{G}} \right) / n$$
 (5-3)

(CHAPTER V NOTES, Cont'd.)

$$CARD_{t}^{G} = \sum_{j=1}^{21} \overline{d}_{t}^{G}$$
(5-4)

where G = the high and low risk group

- 5. For further details, see Table 4-1 in Chapter IV.
- 6. See Table 4-1.
- 7. See Table 4-3 about the means and variances of Beta estimates by the different risk groups.
- 8. See Table 4-1.
- **9**. A separate evaluation of the importance of the SEC materiality guidelines on the basis of the empirical findings from the present study is given in the third section of this chapter.
- 10. See Note (2) of Table 5-1 for the exact values at various selected fractiles of the F distribution.
- **11** See Table 4-3.
- 12. The reason why the low risk firms were not adversely affected is not clear.

# CHAPTER VI

# NOTES

- **1.** See Note 24 of Chapter III about this assumption.
- 2. See Beaver (1968) regarding empirical evidence about the difference in return behavior between disclosure months and non-disclosure months.
- **3**. See Chapter II about the definition of this ratio and its importance viewed from the SEC's standpoint.

APPENDICES

# APPENDIX A

THE FINANCIAL STATEMENTS FOR A MATERIALLY AFFECTED FIRM (BEFORE AND AFTER THE SEC'S 1973 LEASE DISCLOSURE DECISION)

# APPENDIX A

# THE FINANCIAL STATEMENTS FOR A MATERIALLY AFFECTED FIRM (BEFORE AND AFTER THE SEC'S 1973 LEASE DISCLOSURE DECISION)

A. Before the SEC Decision

Consolidate at Dec. 31,	d Balance 1974 and	Sheet 1973	Consolidated S Earnings for	Statement 1974 & 19	t of 973
	1974	1973		1974	1973
Assets:			Net sales	133,570	120,982
Current assets Noncurrent assets	142,380	128,940 174,960	Cost of sales	87,420	82,355
TOTAL ASSETS	357,000	303,900	Gross Profits on sales	46,150	38,627
Liab. & SE: Current liab	56.370	47.370	Operating expenses including rentals	21,645	17,737
Long-term debt	65,290	45,470	Operating income Interest expense	24,505 3,280	20,890 2,650
Stockholders' equity	235,340	211,060	Income before taxes	21,225	18,240
- 4			Income Taxes (50%)	10,612	9,120
TOTAL LIAB. & SF	357.000	303,900	Net Income	10,613	9,120
			Earnings per share	2.65	2.14

Note: Lease Commitments

- Total rental expenses for all noncancelable leases amounted to:

		1974	1973
Financ Other	ing leases leases	4,687 842	<b>4,972</b> <u>490</u>
		5,529	5,462
Less:	Rental income	250	235
		5,279	5,227
### APPENDIX A (Cont'd.)

		Type of Leas	se	Type of	Propert	4
	Total	Financing Leases	Other Leases	Real Properties	Equip- ment	Other
1075	2 000	0 ( ) 7	4.00	2 750	225	104
19/5	3,099	2,037	462	2,750	225	124
1976	3,724	3,260	464	3,380	218	120
1977	3,717	3,251	466	3,384	216	117
1978	3,700	3,242	458	3,382	208	110
1979	3,696	3,240	456	3,381	207	108
1980-84	18,090	16,092	1,998	17,518	572	
1085-80	17 216	15,600	1,550	16 763	453	•
1000 04	16 202	15,000	1,517	16 202	433	•
1990-94	10,203	10,031	1,1/2	10,203	•	•
1994	21,110	18,//5	2,335	21,110	•	•
TOTAL	90,555	81,227	9,328	87,877	2,099	579

-The future minimum rental commitments as of December 31, 1974 for all noncancelable leases were as follows:

# B. After the SEC Decision

The Consolidated Financial Statements:

Same as before

### Note: Lease Commitments

-Total rental expenses for all noncancelable leases:

Same as before

-The future minimum rental commitments existing as of December 31, 1974 under all noncancelable leases:

Same as before

# APPENDIX A (Cont'd.)

-The present values of all noncapitalized financing leases at December 31, 1974 and 1973 were as follows:

Asset	Category	Interes used in P	t rates V compt'n	Presen	t Values
		1974	1973	1974	1973
Real p Equipm Others	property ment	8.5% 7.8% 7.2%	8.3% 7.5% 7.0%	34,257 1,252 265	33,672 1,086 193
Less:	PV of rentals from subleases	6.7%	6.5%	2,565	2,424
	Total			33,209	32,527

-If (1) all the above noncapitalized financing leases were capitalized, (2) the related property rights were amortized on a straight line basis, and (3) interest costs were accrued on the basis of the outstanding PV lease liabilities, net income for the two years ended December 31, 1974 and 1973 would have been reduced as follows:

	1974	1973
Amortization of lease rights Interest costs	3,025 <u>3,252</u> 6,277	2,988 <u>3,024</u> 6,012
Less: Rental expenses	<u>4,063</u> 2,214	<u>3,924</u> 2,088
Less: Income taxes (50%)	1,063	1,002
Decrease in net income	<u>1,151</u>	1,086

APPENDIX B

KEY FINANCIAL RATIOS BEFORE AND AFTER THE SEC DECISION (1974)

# APPENDIX B

# KEY FINANCIAL RATIOS BEFORE AND AFTER THE SEC DECISION (1974)

	Before (1)	After (2)	Change ((2)-(1)) /(1)
Liquidity ratios:			, ( , ,
Current assets to current liabilities <sup>a</sup>	2.52	2.40	05
Current assets to total assets	.40	.36	10
Capital structure ratios:			
Total liabilities to total assets	.34	.40	+.18
Total liabilities to stockholders'equity	.52	.66	+.27
Return on investment ratios:			
Net income to total assets	.03	.02	33
Net income to stockholders' equity	.05	.04	20
Earnings per share	2.65	2.36	11

<sup>a</sup>In the computation of this liquidity ratio, it is assumed that the current portion of the lease PV is \$3,000.

# APPENDIX C

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LIST OF SAMPLE COMPANIES BY GROUPS AND MATCHINGS OF FIRMS

# APPENDIX C

# LIST OF SAMPLE COMPANIES BY GROUPS AND MATCHINGS OF FIRMS

Group 3 (Disclosure Firms)	Airco, Inc.	Allied Chemical Corp.	American Airlines, Inc.	American Medicorp, Inc.	Amfac, Inc.	Amtel, Inc.	Atlantic Richfield Co.	Baker Inds., Inc.	Bancal Tri-State Corp.	Belden Corp.	Borden, Inc.	Braniff International Corp.	Burlington Northern, Inc.	Burndy Corp.	Chemetron Corp.	Chemical New York Corp.	Chessie System, Inc.
No.	-	2	e	4	ß	9	7	œ	6	10	Ξ	12	13	14	15	16	17

(Non-Disclosure Firms) Group 2

American Electric Power Co. Macandrews and Forbes Co. Electronic Assoc., Inc. Diamond Shamrock Corp. Crocker National Corp. Standard Brands, Inc. Gateway Inds., Inc. Reynolds Metals Co. **Cleveland Electric** Illuminating Co. Evans Products Co. White Motor Corp. U.S. Inds., Inc. Dictaphone Corp. Dan River, Inc. Apco Oil Corp. Faberge, Inc. Easco Corp.

(Non-Lease Firms) Group 1

Commercial Solvents Corp. Publicker Indus., Inc. Gulf Life Holding Co. Foster Wheeler Corp. Abbott Laboratories Union Pacific Corp. Carlisle Corp. Potlatch Corp. Cyclops Corp. Cerro Corp. Keene Corp. Norton Co. Ansul Co.

Fort Howard Paper Co. First Chicago Corp. C T S Corp.

Crouse-Hinds Co.

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18	Chicago Milawkee Corp.
۱ ک	City Investing Co.
20	Clark Oil & Refining Corp.
21	Cluett, Peabody & Co., Inc.
22	Coleco Inds., Inc.
23	Continental Airlines, Inc.
24	Continental Oil Co.
25	Cooper Tire & Rubber Co.
26	Crane Co.
27	Crompton & Knowles Corp.
28	Di Giorgio Corp.
29	The Dow Chemical Co.
30	Eastern Air Lines, Inc.
31	Edison Brothers Stores, Inc.
32	Emery Air Freight Corp.
33	Falstaff Brewing Corp.
34	Fibreboard Corp.
35	Fisher Foods, Inc.
36	Fuqua Inds., Inc.
37	General Host Corp.
38	Gifford-Hill & Co.
39	Gino's, Inc.

Budd Co. American General Insurance Co. Wolverine World Wide, Inc. American Broadcasting Cos. Raybetos-Manhattan, Inc. Chromalloy American Corp. Belding Hemingway, Inc. Capital Holding Corp. Libbey-Owens-Ford Co. Alaska Interstate Co. Sangamo Electric Co. Vulcan Materials Co. Athlone Inds., Inc. Munsingwear, Inc. Weyerhaeuser Co. Gulf Oil Corp. Celanese Corp. Disston, Inc. Akzona, Inc. G A F Corp. Southern Co. Tyler Corp. Foxboro Co.

Chicago Pneumatic Tool Co. General Development Corp. International Paper Co. Thiokol Chemical Corp. Earle M. Jorgensen Co. Southern Union Gas Co. C N A Financial Corp. Financial Federation Fairchild Inds., Inc. Pope & Talbot, Inc. Global Marine, Inc. Rorer-Anchem, Inc. Ambac Inds., Inc. Ford Motor Co. Parker Pen Co. Kraftco Corp. Dexter Corp. Armada Corp. Tonka Corp. Masco Corp. Maytag Co.

APPEN	DIX C (Cont'd.)		
40	B. F. Goodrich Co.	Owens-Illinois, Inc.	Monarch Machine Tool (
41	Heck's, Inc.	Dillingham Corp.	Alpha Portland Inds.,
42	Holiday Inns, Inc.	General Portland, Inc.	United Aircraft Corp.
43	Host International, Inc.	Mohasco Corp.	Quaker State Oil Refir
44	I U International Corp.	M. Lowenstein & Sons, Inc.	Midland-Ross Corp.
45	Illinois Central Inds., Inc.	Seaboard Coast Line Inds.	Leaseway Trans. Corp.
46	Kane-Miller Corp.	W. Kidde & Co., Inc.	Fansteel Incorporate
47	Kansas City Southern Inds., Inc.	Southern California Edison	Aetna Life & Casualty
48	Katy Inds., Inc.	Budget Inds., Inc.	Mapco, Inc.
49	Kroger Co.	Dart Inds., Inc.	Deer & Co.
50	Latrobe Steel Co.	Richardson Co.	Ampco-Pittsburgh Corp.
51	Leesona Corp.	Northwest Inds., Inc.	Babcock & Wilcox Co.
52	Marine Midland Banks, Inc.	Bank of New York Co., Inc.	Consumers Power Co.
53	Marquett Cement Mfg. Co.	Mohawk Rubber Co.	Medusa Corp.
54	McDonald's Corp.	Beneficial Corp.	Engelhard Minerals & ( Corp.
55	Melville Shoe Corp.	Gulf States Utilities Co.	Monsanto Co.
56	Milton Bradley Co.	Bemis Co., Inc.	General Steel Inds.,
57	Moore & McCormack Resources, Inc.	Pennzoil Co.	Oak Ind., Inc.
58	Munford, Inc.	Western Union Corp.	Aztec Oil & Gas Co.
59	National Cash Register Co.	American Standard, Inc.	Peter Paul, Inc.
60	National Gypsum Co.	American Bakeries Co.	Belco Petroleum Corp.

tate Oil Refining Corp. orp. d Minerals & Chemicals rtland Inds., Inc. Steel Inds., Inc. fe & Casualty Co. Aachine Tool Co. ttsburgh Corp. ircraft Corp. Trans. Corp. Incorpora te & Wilcox Co. , Inc. 1 & Gas Co. s Power Co. Ross Corp. J, Inc. со. nc. .

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AFFEN	UIN ( (CONT G.)		
61	North American Coal Corp.	Kaiser Aluminum & Chemical	Zenith Radio Corp.
62	North Central Airlines, Inc.	Woods Corp.	Capital Cities Communications
63	Pan American World Airways, Inc.	Honeywell, Inc.	Callahan Mining Corp.
64	Pennwalt Corp.	Grolier, Inc.	Collins & Aikman Corp.
65	Peoples Drug Stores, Inc.	Stone Container Corp.	Hecla Mining Co.
66	Phillips Petroleum Co.	Central Telephone & Utilities Corp.	Newmont Mining Corp.
67	Pitney-Bowes, Inc.	Caterpillar Tractor Co.	U M C Inds.,Inc.
68	Puerto Rican Cement Co.	The Stanley Works	Mesta Machine Co.
69	Pullman Inc.	Square D. Co.	Cincinnatti Gas & Electric Co.
70	Ramada Inns, Inc.	Fairchild Camera & Instruments	Boeing Co.
71	Reed Tool Co.	N V F Corp.	Emhart Corp.
72	R. J. Reynolds Inds., Inc.	Liggett & Myers, Inc.	Merck & Co.
73	Safeguard Inds., Inc.	Ward Foods, Inc.	Chrysler Corp.
74	Safeway Stores, Inc.	Kerr-McGee Corp.	Georgia-Pacific Corp.
75	Sav-On-Drugs, Inc.	Gannett Corp.	Travelers Corp.
76	Scovill Mfg. Co.	Curtiss-Wright Corp.	Interpace Corp.
77	Seagrave Corp.	Stanray Corp.	Sundstrand Corp.
78	Sonesta Internat'l. Hotels Corp.	Creditthrift Financial Corp.	First Charter Financial Corp.
79	The Southland Corp.	Cornings Glass Works	First Mortgage Investors
80	Southwest Forest Inds., Inc.	Adams-Mills Corp.	MGIC Investment Corp.
81	Squibb Corp.	Ceco Corp.	Timken Co.
82	Standard Oil Co. of Calif.	Big Three Inds., Inc.	U. S. Tobacco Co.

ADDENDIY C (Cont'd )

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Consolidated Freightways, Inc. Coca-Cola Bottling Co. of New York Gibraltar Financial Corp. of Certain-Teed Products Corp. [wentieth Century-Fox Film Hospital Corp. of America Continental Invest. Corp. Knight Newspapers, Inc. United Industrial Corp. General Cable Corp. fransamerica Corp. Dennison Mfg. Co. Murphy Oil Corp. Cone Mills Corp. Brunswick Corp. Interlake, Inc. Getty Oil Co. Calif.

G. F. Business Equipment, Inc. American Smelting & Refining Lynch Communication System [mperial Corp. of America Wheeling Pittsburgh Steel Communications Satellite International Flavors & Western Publishing Co. Lykes Youngstown Corp. Giddings & Lewis, Inc. Wesco Financial Corp. Republic Steel Corp. General Motors Corp. Stewart-Warner Corp. Illinois Power Co. Unitrode Corp. Howmet Corp. Fragrances

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