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Daniel W. Collins
Major professor

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INTERIM INFORMATION AND THE INFORMATION CONTENT OF ANNUAL EARNINGS ANNOUNCEMENTS

By

Edward Bradley Grant

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ABSTRACT

INTERIM INFORMATION AND THE INFORMATION CONTENT OF

ANNUAL EARNINGS ANNOUNCEMENTS

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The major objectives of this study were two-fold: (1) to provide empirical evidence on the relationship between the information content of annual earnings announcements and the amount of available interim information, and (2) to determine if the required filing of SEC interim financial reports has an impact on the level of information content of annual earnings announcements.

Recent empirical results (Ball and Brown, 1968) indicate that most of the information contained in the annual earnings announcements of NYSE firms is anticipated by the market prior to the announcement date. It has been suggested that this anticipatory market reaction is due to the availability of interim accounting and non-accounting information on a more timely basis. Accordingly, if this information is unavailable, the market might place more reliance on the annual earnings announcement as a source of information in establishing equilibrium prices. This study investigates this hypothesized inverse relationship between the information content of annual earnings announcements and the amount of available interim information. The research strategy consists of comparing the information content of

the annual earnings announcements of (1) NYSE firms (for which relatively large amounts of interim information are available) with (2) over-the-counter (OTC) firms (for which there is relatively limited available interim information).

Other research (May, 1971; Kiger, 1972; and Brown and Kennelly, 1972) has suggested that interim financial reports also have information content. Therefore, investors might be expected to find required SEC interim financial disclosures useful in portfolio decisions. A unique situation presented the opportunity to empirically evaluate whether the information content of annual earnings announcements is related to the presence or absence of interim SEC filings. If the investors do find the SEC disclosures useful in decision-making, it would be expected that the market reaction to the annual earnings announcements would be less for a sample of firms which filed the required SEC reports than for a sample of non-filing firms.

A measure of information content is constructed (using a methodology developed by Beaver (1968)) as the ratio of the variability of residual stock price change in the week of the annual earnings announcement to the average variability of residual stock price changes during other weeks in the year. If the ratio is significantly greater than unity, the report is interpreted to possess information content.

Parametric and nonparametric testing procedures are employed in making comparisons between the information content measures computed for each of the following samples of firms: (1) NYSE firms, (2) OTC firms, (3) firms which did not file interim SEC reports, and

(4) firms which did file interim SEC reports. The results suggest several tentative conclusions.

First, the annual earnings announcements of OTC firms (for which there are limited sources of interim information) apparently do possess information content. Second, the computed information content measures for the NYSE sample in the week of the annual earnings announcement are not significantly greater than observed for other weeks in the year. These results indicate that, due to fewer sources of available interim information, the information content of annual earnings announcements of OTC firms is significantly greater than that of NYSE firms.

A third conclusion from this study is that there is no observable difference between the information content of the annual earnings announcements of firms which did, and did not, file interim SEC financial reports. This result implies one of two conditions: (1) the SEC filings are not used by investors in anticipating annual results, or (2) the same information which is contained in the SEC interim financial reports is also provided by alternative accounting and non-accounting sources. Therefore, if the SEC reports are not available, investors may obtain the same information via these other mediums.

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CHAPTER ONE

INTRODUCTION

Recent empirical evidence suggests that although the accounting numbers presented in the annual earnings announcements for New York Stock Exchange (NYSE) firms are consistent with the underlying information set used in pricing securities, the information content of the numbers, to a large extent, is anticipated by the market prior to the date of release (Ball and Brown, 1968). This has been attributed, in part, to the fact that much of the data contained in the annual report is made available on a more timely basis by the many existing interim sources of information on NYSE firms, such as: interim financial reports, trade journals, security analysts' forecasts, industry forecasts, litigation, prospectuses, etc.[1] In their pioneering work, Ball and Brown (1968) recognized this, stating with reference to NYSE firms that

> ". . . the annual income report does not rate highly as a timely medium, since most of its content (about 85 to 90 percent) is captured by more prompt media which perhaps includes interim reports." (p. 176)

These results do not necessarily imply that this same anticipatory reaction exists for firms which are not listed on the NYSE, such as for those firms whose equity securities are traded over-the-counter

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[1] In this paper, interim information refers to all information available on a firm other than the annual earnings announcement.

(OTC). Several factors discussed subsequently in this chapter suggest that the amount of interim information that is available on OTC firms in particular may be systematically less than that available on NYSE firms. Furthermore, in the absence of alternative sources of information, OTC investors may rely more heavily on the annual announcement as a source of information for decision making. One objective of this study is to assess the differences in the information content of annual earnings announcements between a sample of OTC firms and a sample of NYSE firms.

As was mentioned above, the anticipation of information contained in the annual earnings announcement may be due largely to the release of interim earnings numbers. Since the information contained in the annual earnings numbers is most likely also incorporated in the interim numbers, to some extent, market reaction to annual earnings announcements may not be as pronounced as it would otherwise be if the interim earnings numbers had not been previously available (i.e., the interim earnings reports may also have information content).[2] This same relationship should also exist for the publicly available interim financial reports filed with the Securities and Exchange Commission (SEC). A unique situation created by the enactment of the Securities Acts Amendments of 1964 provides the opportunity to address the second objective of this study: to assess the effect of required SEC interim financial reports on the information content of the annual earnings announcements.

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[2]Previous studies (May, 1971; Kiger, 1972; Brown and Kennelly, 1972) suggest that the announcements of interim earnings in the Wall Street Journal possess information content.

Previous empirical results (Beaver, 1968; Ball and Brown, 1968) further suggest that the accounting process may be only one of many suppliers of information. On this issue, Gonedes (1972) points out that the accounting function operates in a competitive setting. For example, he argues that:

> "In particular it appears that the accounting process--qua supplier of information--does not possess strict monopoly power over the supply of information pertinent to the evaluation of a firm. Instead, it appears that the accounting process--qua supplier of information--functions within a competitive context." (p. 14)

However, to date, little evidence is available on the relative importance of accounting versus non-accounting sources of information as suppliers of information pertinent to valuing equity securities. The design of this study should allow preliminary evidence to be gathered on the relative importance of accounting versus non-accounting interim information to investors in anticipating annual results.

Research Hypotheses

As stated above, past empirical research indicates that accounting numbers apparently do possess information content (Beaver, 1968; Ball and Brown, 1968). Beaver (1968) states that

> "A firm's earnings report has information content if it leads to a change in investors' assessments of the probability distribution of future returns, such that there is a change in the equilibrium value of the current market price." (p. 68)

In other words, the information content of the earnings report is dependent on the investors' perceptions. If investors revise their expectations concerning the distribution of future returns as a result of data contained in the earnings report, and this revision, collectively, results in a change in equilibrium share price, then

the earnings report could be said to have information content.

A major contention of this study is that the annual earnings announcements of OTC firms should have greater information content than do those of NYSE firms due to fewer alternative sources of interim information. Furthermore, since one of the major sources of interim information is the interim financial report, the information content of annual earnings announcements for firms which do not issue these reports should be greater than the information content of annual earnings announcements for firms which do issue interim financial reports. Both of these contentions necessarily imply that the annual earnings announcements of OTC firms do have information content, in that the prior research mentioned above indicates that this is true for NYSE firms.

Gonedes (1972) underscored the notion that the information content of annual earnings announcements should be inversely related to the amount of interim information provided by alternate sources, by stating that:

> "If there were nothing competing with accounting numbers as sources of information, then (assuming that accounting numbers have some information content) one would expect to observe rapid price movements at the time the accounting numbers are issued . . . Under these conditions, one would not expect to observe price movements that begin to 'anticipate' accounting numbers by several months or weeks. Under these . . . conditions, the information content of the accounting numbers would constitute 'inside information' . . .; until they were brought 'outside' and made a part of the publicly available information." (p. 15-16)

Utilizing Beaver's definition quoted above, information content can be measured by observing the magnitude of the price changes in the weeks surrounding the annual earnings announcement relative

to other weeks in the year. It is expected that if earnings announcements contain information, the magnitude of the price change in the week of the announcement should be greater than in other weeks during the year. A measure of relative price change (based on Beaver's methodology) and the statistical analysis employed in testing the hypotheses is developed in Chapter Three.

The formal research hypotheses can thus be stated as follows:

H_1^1 : The annual earnings announcements for OTC firms have information content.

H_1^2 : The information content of annual earnings announcements for OTC firms is significantly greater than the information content of annual earnings announcements for NYSE firms.

H_1^3 : The information content of annual earnings announcements of OTC firms which did not file interim financial reports with the SEC is significantly greater than the information content of annual earnings announcements of OTC firms which did file interim financial reports with the SEC.

With these alternate hypotheses in mind, we may turn to the motivation for conducting the research.

Cross-Sectional Differences in the Information Content of Annual Earnings Announcements

There are many potential sources of interim information which may be useful in investment decision making. Interim financial reports for many firms are made available to the investment community through required filings with the SEC, as well as through announcements in the financial press and periodic mailings to existing shareholders. In addition, firms listed on the larger organized exchanges, such as the NYSE and the American Stock Exchange (ASE), currently must file

quarterly interim reports with their respective exchange.[3] Prospectuses filed with the SEC by registered firms prior to a new equity share offering also provide detailed current data. The financial press releases large amounts of data having potential information value on many different firms. Trade or industry journals typically report monthly or quarterly summary financial and production results for the larger firms in many industries. Industry forecasts are also easily available through various governmental agencies or industry-trade associations. Finally, security analysts apparently devote large amounts of time and financial resources for the purpose of acquiring timely information to be used in security selection and portfolio management decisions. While these information sources obviously do not form an exhaustive list, they do suggest the basis for our contention that OTC investors have fewer sources of interim information from which to make investment decisions.

Many smaller OTC firms have not registered with the SEC and thus are not required to make interim financial results public. Furthermore, because of their size and breadth of stock market exposure, these firms are probably less likely to be analyzed by trade journals or security analysts or be covered extensively by the financial press. Therefore, the OTC investor necessarily must rely more heavily on the limited information that is publicly available, which would most likely include the announcement of the annual earnings number.

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[3]The NYSE has required quarterly financial reports since 1946, whereas the ASE requirement began in 1962.

As was mentioned above, one major source of interim information is, most likely, the financial press, such as the Wall Street Journal. To support our earlier contentions concerning the relative amounts of interim information available for OTC versus NYSE firms, a preliminary test was conducted to access the difference, if any, that exists between the two groups in the number of interim news items. The random sample of 100 NYSE firms selected for this study was compared against a random subsample of 100 OTC firms, drawn from the larger sample of OTC firms to be investigated in this study.[4] For both the NYSE and OTC samples, the number of interim news items per firm appearing in the 1960 Wall Street Journal Index was tallied.[5] Table 1 presents the relevant statistics.

TABLE 1

Number of Interim News Items

	OTC	NYSE
Maximum	18	119
Minimum	1	4
Mean	7.1	19.2
Median	6	14
Standard Deviation	4.11	17.66

[4]The OTC sample for this research was selected in such a manner as to include only the larger OTC firms, whereas the NYSE firms were randomly selected. Due to this selection strategy, this test is conservative in measuring the real difference in news items for the entire population of NYSE firms versus the entire population of OTC firms. The sample selection process is described in detail in Chapter Three.

[5]For the purpose of the test, any news item other than the formal announcement of the annual income number was considered to be an "interim" news item.

Due to the nature of the sampling distributions, a nonparametric Mann-Whitney test was employed to assess differences in the medians of the respective populations.[6] Results of the test indicate that the median number of interim news items is significantly less ($\alpha<.0001$) for the OTC firms than for the NYSE firms.

In addition to the apparent fact that there are fewer interim news items on OTC firms, there are other reasons to support the investigation of OTC firms. There is reason to believe that even though all securities listed on the NYSE comprise a large total market value, the very characteristics of the NYSE make it biased as an estimate of the behavior of the total securities market. First, the number of issues traded on the NYSE is much less than 10% of the number of publicly traded issues in the United States. Whereas, the NYSE lists around 2,000 issues, there are estimated to be considerably more than 20,000 issues traded OTC. Although some of the companies may be relatively small, a study by the SEC estimated that one-half of all issues traded OTC had 500 or more shareholders (1963). Second, there is an extreme concentration of market value on the NYSE in a few companies. For example, in 1971, .2% of the number of issues listed had a market value equal to 17% of the total market value of all NYSE issues, and 2.5% of the issues contributed 45% of the total value of NYSE issues (Lorie and Hamilton, 1972). Finally, an ever-increasing proportion of the total value of NYSE share trading is being concentrated in institutional investors. Between 1960 and 1975, major financial institutions doubled their share in the market value of all NYSE firms. Furthermore,

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[6] See Conover (1971).

according to a recent study, institutions and other financial intermediaries accounted for 58 percent of NYSE public share volume and 69 percent of the public dollar volume (Reilly, 1975).

There are several implications of these statistics for accounting. It is entirely possible that the OTC may have more stockholders than does the NYSE, although each would hold less value on the average. From a user's perspective, it seems reasonable that the formulation of accounting principles should be consistent with the needs of as many users as possible. As stated earlier, the OTC investors may have different needs than those investing solely in NYSE firms. Specifically, OTC investors may rely more heavily on the annual earnings announcement to supply needed information because of the lack of alternative sources from which to acquire that information. If this is so, accounting policy decisions should not be made independent of the market in which a firm's equity shares are traded.

From a disclosure perspective, the degree and type of information actually disclosed in the annual report for OTC firms possibly should be more comprehensive than that required for NYSE firms. It is reasonable to expect that NYSE investors have alternative means from which to acquire necessary information. This is exemplified by the prevalence of institutional investors holding NYSE stocks which employ relatively sophisticated security analysts and portfolio managers. These individuals could be expected to have access to a much broader and more comprehensive set of publicly available information as compared to the "average" individual investor. Therefore, with sufficient institutional investors analyzing the same public information on the same set of firms, it is not unlikely that much of the

information contained in the annual earnings announcement is impounded in the equity share price by the time that the actual earnings number is released. But, as we have argued above, this is most likely a characteristic which is more prevalent and pervasive for NYSE firms than for firms trading OTC.

These systematic differences across firms and shareholders in the availability of information and its implications for financial reporting have received attention elsewhere. For example, one objective in the Trueblood Committee Report (1973) stated that:

> "An objective of financial statements is to serve primarily those users who have limited authority, ability, or resources to obtain information and who rely on financial statements as their principal source of information about an enterprise's economic activities." (p. 62)

If this objective is accepted as a desirable goal, accounting policy-makers should identify those users who fit this description. OTC investors may very well be a significant subset of this group. Furthermore, it may well be that OTC investors are one of the few groups of potential financial statement users characterized above which are significant in number and can be identified.

The SEC's Advisory Committee on Corporate Disclosure, created in February, 1976, has been charged with answering questions directly related to information availability and investor decisions. In addition to identifying the types of information which have an impact on security prices, the Committee is also attempting to ascertain those who make investment decisions, the information which they use, the means by which they secure the information, and the types of information which would be helpful in investment decision-making but which are not currently available. Hopefully, this study will provide some

empirical evidence relevant to addressing a number of these issues.

For purposes of this study, sources of information which influence equilibrium share prices may be roughly subdivided into interim financial accounting information, annual financial accounting information, and interim non-accounting information.[7] This study should provide some evidence of the impact on stock prices of these alternative information sources.[8] Furthermore, a major contention of this study is that OTC investors are a considerable segment of the total investment community and that these investors place much more reliance on the information contained in the annual earnings numbers than do their NYSE counterparts. As a result, the Advisory Committee on Corporate Disclosure, in fulfilling its charge, should certainly consider the cross-sectional differences in the amount and impact of interim information which exists for various types of firms, such as for OTC versus NYSE firms. Such comparisons would seem relevant to the notion of "differential disclosure," although this area, to date, has been used in reference to different degrees of SEC disclosure which might be required of a given firm.

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[7]This is a somewhat superficial classification scheme in that much of the data ultimately being released in "non-accounting" sources most likely originated within the traditional accounting function. However, this division might allow us to assess the relative importance of the interim and annual financial accounting information versus the other "non-accounting" information as perceived by investors.

[8]The formal research design is discussed in Chapter Three. For the present, we simply note that NYSE firms included in the sample had many potential non-accounting sources of information plus interim and annual accounting sources of information, while the OTC sample (all of which had fewer of these potential non-accounting sources of information) is composed of some firms which reported interim accounting numbers and other firms which did not.

A final motivation for the OTC versus NYSE comparison is reflected in a recent report released by the AICPA (Journal of Accountancy, November, 1976) which recommended to the SEC and the Financial Accounting Standards Board (FASB) that only large, publicly held, corporations be required to provide detailed financial information. The report stated that implementing the recommendation would relieve smaller firms from generating "costly, unnecessary information." (p. 22) If what we have hypothesized concerning the amount and effect of interim information is correct, this recommendation is precisely the opposite of what may be warranted. Due to a lack of alternative sources of interim information on smaller firms, investors may rely more heavily on the annual earnings data to make decisions. If this is found to be true, then information contained in the annual earnings report should be as complete as possible.

Whether or not detailed financial information is too "costly" is a nontrivial question. Clearly the appropriate amount of required financial statement disclosure is best analyzed in a cost-benefit framework. In a social context, benefits could include the improvement in predictability, reduction in forecasting error, or the more efficient utilization of resources employed in acquiring needed information. The costs would normally include the incremental cash required to finance the increased disclosure policy. In many instances concerning the disclosure of specific items, the accounting function could no doubt produce the needed information most efficiently. Therefore, it does not necessarily follow that because a firm is relatively small it should be released from the burden of providing adequate disclosure. The fact that a firm is small might well be one

indication that more, not less, disclosure of information is appropriate.

The Information Content of SEC Interim Financial Reports

A second aspect of the proposed study deals with assessing the impact of SEC interim financial reports on the information content of the annual earnings announcement. As was stated earlier, it has been hypothesized elsewhere (Ball and Brown, 1968) that the release of interim financial reports lessens the market reaction to the annual earnings announcement. Also, previous studies have suggested that there is a significant market reaction to the release of interim earnings numbers (May, 1971; Kiger, 1972). This study differs from the previous studies in that the SEC interim filings (and the related degree of information content) are the events of primary interest. The major research question is whether the filing of interim reports with the SEC has an impact on the information content of annual earnings announcements. Previous empirical results generally support the notion that interim earnings reports are an important source of information for investor decision-making (see, for example, the literature review in Chapter Two). However, no known study has identified whether the information content of the annual report is significantly different in the presence or absence of interim reports.

Assessing the effect of interim reports on the information content of annual earnings announcements is important for several reasons. First, as was mentioned above, the SEC Advisory Committee on Corporate Disclosure has been charged with determining the types of information which have an impact on security prices. In addition, the

Committee has also been charged with ascertaining what information may be useful to investors relative to that which is available in SEC files. One of the major disclosure requirements imposed by the SEC since the Securities Exchange Act of 1934 is that of interim reports.[9] Thus, although the Committee may be ultimately concerned with more specific disclosure issues (such as lease capitalization or replacement cost data, for example), it seems appropriate to first determine the impact of the broader areas, such as that of required interim reports. If required SEC interim reports do have information content as defined by Beaver (1968) and as measured in this study, analysis of the more specific topics of disclosure would be warranted. However, if the interim reports do not have an impact on share prices, it would seem somewhat tenuous to identify and analyze the more specific issues.

A second reason for analyzing the usefulness to investors of required SEC interim reporting relates directly to the findings of Benston (1973). Benston attempted to measure the benefits which might have accured from the Securities Exchange Act of 1934 for a sample of NYSE firms. One of his conclusions was that "the disclosure provisions of the '34 Act were of no apparent value to investors' (p. 148). He also implied that, given his results, it is questionable whether additional disclosures with the SEC are beneficial. These results suggest that even though financial statements do provide information, the required reporting of those statements apparently carries no

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[9]Through 1954, the SEC required quarterly 9K reports to be filed by all registered firms. From 1955 to 1970, the 9K reports was a semiannual filing. On October 28, 1970, the 9K was replaced by the quarterly 10Q report (Securities Exchange Act Release #9004).

measurable benefits. It is not clear whether Benston's findings can appropriately be generalized to all traded securities including those on the OTC, where fewer alternative sources of information are available. It may well be that the financial reports, both interim (8K and 9K) and annual (10K), required by the SEC, are important sources of information to OTC investors in that they have little else to rely upon to make their decisions. The present research should provide additional evidence with which to assess Benston's claims concerning the relative benefits derived by required SEC filings.

Finally, there has been no known study which has investigated the relative importance of accounting interim information (defined as the usual quarterly or semiannual financial report) vis-a-vis non-accounting interim information (defined to include all interim information except accounting information). The present study will also attempt to provide some evidence relevant to assessing the importance of these alternative sources of information. Due to changes in interim reporting requirements resulting from the Securities Acts Amendments of 1964, to be discussed below, a unique opportunity exists to assess the relative importance of interim accounting reports as opposed to non-accounting interim data as information sources used by investors in valuing their security holdings.

Further motivation for the investigation of the information content of interim reports stems from the controversy over the degree of auditor involvement in interim reporting. It would appear that this question can be, at least, partially resolved if one can determine the relative importance of the interim accounting reports vis-a-vis other interim data sources in investors' information sets. If the

market perceives the interim financial report as having information content, then this would seem to have some policy implications in terms of the auditor's position in the presentation of interim data. Specifically, if the market is using the interim financial report in investment decisions, then the audit procedures might appropriately be extended such that the auditors are in a position to attest to the fairness of the interim statements. May (1971) presented some empirical evidence in this area, which will be discussed in more detail in Chapter Two. One of his findings was that the degree of market reaction to the interim report was not significantly different to that observed for the annual report. (Brown and Kennelly, 1972, also present evidence consistent with that observed by May.) This would then imply that the market is unable to distinguish the alleged differences in quality between unaudited interim numbers and audited annual numbers. Therefore, it may be that society could benefit from the extension of audit procedures into the area of interim reporting.[10]

Auditor involvement implications are not as clear if the unaudited interim reports do not appear to be part of the information set used by investors in making decisions. It is not self-evident in this situation that extending the audit procedures for interim reports would increase the information content of the reports, since the market might not find the numbers to be useful whether they are audited or unaudited. Also, the increased reliability of audited

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[10]Of course, this is not necessarily warranted in that the increased costs due to the expansion of the audit function may outweigh the benefits to society, arising from the market's use of more reliable interim numbers.

interim data would not necessarily counteract the variability in interim numbers of many firms due to seasonality or other sources of fluctuation. Nonetheless, it is apparent that the auditing profession is moving in the direction of increased auditor involvement in interim reports.[11] The results from this study should provide additional evidence on the information content of interim financial reports. But more importantly, it may provide some evidence concerning the relative importance of accounting versus non-accounting interim data as alternate sources of information via which to anticipate the information content of annual reports.

Prior to 1964, the SEC, implementing the provisions of the Securities Exchange Act of 1934, required registration and subsequent filing of financial reports (annual, 10K; semiannual, 9K; and current, 8K) only by firms whose securities were listed and traded on an organized exchange. The single exception to this was for some OTC firms which registered under the Securities Act of 1933. The '33 Act had two basic objectives: (1) to provide investors with material financial and other information concerning securities offered for public sale, and (2) to prohibit misrepresentation, deceit and other acts of fraud in the sale of securities. In applying these objectives, the SEC brought certain OTC firms under the registration requirements of the '33 Act. These same firms were also required to file standard financial reports (8K, 9K, and 10K) under Sections 13 and/or 15(d) of the Securities Exchange Act of 1934.

Following several years of study and recommendations by a

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[11] SAS #10, SAS #13, for example.

special task force on security markets, the Securities Acts Amendments of 1964 were passed by Congress (Securities Act Release No. 4725, September 15, 1964). One segment of the '64 Amendments referred to the following:

> "The registration, periodic reporting, proxy solicitation and insider reporting and trading provisions of the Securities Exchange Act of 1934 were to be extended to over-the-counter companies having more than 750 shareholders (500 shareholders at a subsequent date) and more than $1,000,000 in assets. Companies meeting these standards would be required to file a registration statement containing material information regarding their businesses and to keep such information current by periodic reports . . ."[12]

Implementation of this provision began after April 30, 1965. Therefore, many OTC firms which were not registered and did not file with the SEC prior to 1965, became registered companies in 1965 and accordingly came within the reporting requirements under a revised section 12(g) of the '34 Act (created by the '64 Amendments). At the same time, many other OTC firms which filed before 1965 under section 13 and/or 15(d) of the '34 Act, began filing under section 12(g) after the '64 Amendments were enacted. The only systematic and observable difference between these two types of OTC firms is the fact that some did not file interim accounting reports with the SEC prior to 1965, while other firms did file such reports. As a result, this situation presents a unique opportunity to assess the impact of SEC interim financial reports on the information content of the annual earnings announcements.

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[12] 30th Annual Report of the Securities and Exchange Commission, 1964, pp. 8-9.

CHAPTER TWO

LITERATURE REVIEW

A number of studies in accounting and finance have attempted to investigate the information content of accounting earnings numbers for NYSE firms, employing various research strategies. One common research approach has been to measure the information content via assessing the predictive ability characteristics of interim and annual earnings numbers. More recently, various forms of market-based research have been employed to assess the information content of both interim and annual earnings numbers.

The present study is related to these previous works in several ways. First, much of the previous research has been restricted to the investigation of solely NYSE firms. For reasons stated in Chapter One, it is unclear whether policy implications of these studies may be generalized to other security markets such as the OTC. Second, a number of these studies suffer from potential limitations which, hopefully, will be corrected here. Finally, this study differs from previous research in that an attempt is made to gain some insight into the relative importance of accounting versus non-accounting sources of information. Results from selected studies suggest that non-accounting information sources are important suppliers of information to market participants. However, little evidence exists with which to assess

the relative importance of accounting and non-accounting information in investor decision making.

Cross-sectional Differences in the Information Content of Annual Earnings Announcements - Past Research

Ball and Brown's (1968) classic work represented one of the first attempts to empirically measure the information content of annual earnings announcements. The basic purpose of their research was to determine whether there was an observable revision in stock prices associated with the release of the annual earnings number. Using both a linear regression model and a naive martingale model to estimate the change in the earnings number,[1] Ball and Brown generated earnings forecast errors for each earnings announcement by comparing estimated and actual earnings changed. Firms were classified as having either a positive or negative forecast error.[2] Monthly abnormal returns (utilizing the "market model" developed by Markowitz (1952) and Sharpe (1963) and which is explained more fully in Chapter Three) were then computed for the months surrounding the date of the annual earnings announcement.[3] It was hypothesized that if earnings announcements

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[1] A martingale model implies that the previous period's income number is the best estimate of the following period's income number (i.e., $E(\text{Income}_t) = \text{Income}_{t-1}$).

[2] For example, if actual earnings exceeded estimated earnings, the earnings forecast error would be positive.

[3] The abnormal returns were then cumulated over the time frame from 11 months prior to the date of release of the earnings number to 4 months following the release using the "abnormal performance index" (API). The computed value of the API metric can be thought of intuitively as the value of an equally weighted portfolio of securities (with either positive or negative earnings forecast errors) at the end of a given month, given that the sign of the earnings forecast error had been known at the beginning of a specified holding period.

have information content, there should be a direct relationship between the sign of the earnings forecast error and the sign of the abnormal returns. Accordingly, firms with positive earnings forecast errors should have positive abnormal returns, and firms with negative earnings forecast errors should have negative abnormal returns for the time period leading to the release of the earnings number. Ball and Brown's tentative conclusions were that the annual earnings announcements did have information content. However, most of the information content (85-90 percent) of the earnings number as measured by changes in abnormal security returns was impounded in share prices by the date of its release. Therefore, the results suggest that investors who rely on the annual earnings report to provide information for investment decision making should not consistently earn abnormally high returns. In referring to the annual income report as not being very timely, Ball and Brown concluded that:

> "Since the efficiency of the capital market is largely determined by the adequacy of its data sources, we do not find it disconcerting that the market has turned to other sources which can be acted upon more promptly than annual net income." (p. 176-7)

Ball and Brown's results, however, must be interpreted in light of their sample of firms. Their criteria for inclusion in the sample resulted in the investigation of only the larger firms. To be included in their sample, a firm would need to have been included on the Compustat tapes for 20 consecutive years, to have its stock prices available on the CRSP (Center for Research in Security Prices) tapes, and to have preliminary earnings numbers reported in the Wall Street Journal. Satisfying these criteria not only requires that the sample be composed of entirely NYSE firms, but also that these firms be among the largest

of the firms listed on the exchange. Because the sample was presumably heavily populated with "blue-chip" firms widely followed by security analysts and institutional investors and for which considerable interim information was available, it is very likely that most of the information contained in the annual announcements for these firms may have been provided to the market by more timely interim sources. However, this does not imply that this same anticipatory reaction would exist for smaller firms which may have fewer potential sources of information.

The above quote from Ball and Brown also requires clarification. Ball and Brown directly inferred that the efficiency of a capital market in impounding new information into share prices is a function of the number and reliability of its available sources for acquiring information. This might imply that capital markets which have fewer information sources are necessarily less efficient than those which have more extensive data sources. While this may be sufficient to explain any observed differences in efficiency between various capital markets, it does not need to be so. The efficiency of a market refers to the speed and unbiasedness of the adjustment in stock prices to the release new information. Participants in a market for which there are fewer alternative sources of information must rely more heavily on the data which is available, and, as a result, there may be an almost instantaneous revision in equilibrium share prices once the data is released. Therefore, whereas there may not be the same advance market reaction to information contained in the annual earnings announcements of OTC firms, there still could be swift revisions in share prices once these annual results are made public. This would, in turn, leave few possibilities for earning abnormally high

returns (or low losses) from relying on the annual number.

Beaver (1968) analyzed both changes in share prices and trading volume which occurred during the weeks surrounding the annual earnings announcement. The volume test was conducted to assess changes in the expectations of individual investors, whereas the price test reflected changes in the expectations of the market as a whole. Beaver reasoned that while equilibrium market prices may be relatively unaffected by the release of the annual earnings announcement, there may still be observable volume changes reflecting changes being made by individual investors in the composition of their portfolios.

The changes in trading volume behavior were analyzed both unadjusted and adjusted for general market trading volume. This basically involved computing the unadjusted and adjusted weekly average in the daily percentage of total shares traded for each firm.[4] These measures were then analyzed over the 17 weeks surrounding the release of the annual earning announcement. The adjustment for the general market volume did not appear to greatly affect the results. However, it was apparent that there was a large increase in volume during the announcement week, thus implying that the earnings report was used by investors in shifting their portfolio positions.

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[4] Let V_{it} = weekly average of the daily percentage of shares traded:

$$V_{it} = \frac{\text{number of shares in firm i traded in week t}}{\text{number of shares outstanding for firm i in week t}} \times \frac{1}{\text{number of trading days in week t}}$$

Beaver's price analysis involved examining the variability in share prices for the 17 weeks surrounding the annual earnings announcement relative to the price variability during other weeks in the year. The specific methodology used by Beaver is also employed in this study with some modification. A detailed examination of its basic features are deferred to Chapter Three. For the present, it is sufficient to note that Beaver found that stock prices for his sample of NYSE firms were 67% more variable in the week of the annual earnings announcement than in other weeks during the year. Thus the earnings announcements could be said to have information content. However, he recognized that his selection criteria created a potential bias towards observing above-normal price variability in the week of the annual earnings announcement. Specifically, he chose only the smaller NYSE firms with less than 20 news items per year appearing in the Wall Street Journal. Beaver acknowledged this bias:

> "The effect of larger firms would tend to induce a bias against earnings reports because the larger firms are more generally associated with a greater flow of additional information than smaller firms." (p. 71)

In fact, analysis of his selection criteria reveals that approximately 25% of the NYSE firms were excluded from Beaver's sample solely because these firms had more than 20 news items per year.[5] If information content (as measured by the relative variability in share prices) is dependent on the amount of interim information arising from alternative sources (such as "news items"), it could be expected that the share

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[5]Recall the nonparametric test reported in Chapter One. In that test employing a random sample of NYSE firms, it was found that the simple arithmetic mean of the number of news items for the NYSE group was approximately 20 (19.2).

price variability in the announcement week of a randomly selected sample of NYSE firms would be less than the 67% above-normal figure which Beaver reported for his sample.

The present research will utilize a random sample of NYSE firms to compute measures of information content which will be compared with those computed for a sample of OTC firms. It is expected that the relative price variability for the OTC firms in the week of the annual earnings announcement will be systematically greater than that observed for the NYSE firms, primarily due to the lesser amount of interim information available for OTC firms.

Oppong (1976) recognized that the information content of the annual earnings announcements should be related to the amount of interim information. Accordingly, he hypothesized that there is a monotone decreasing relationship between the information content of a firm's annual earnings announcement and the amount of interim information available with respect to that particular firm. He attempted to investigate this possibility in two steps. First, he developed a measure for the information content (using Beaver's (1968) methodology) of annual earnings announcements for his sample of NYSE firms. Then he attempted to relate the computed amounts of information content to the amount of interim information.

The amount of interim information was approximated by five surrogate variables related to the firm. These variables included size of the firm (as denoted by total assets), the industry group to which the firm was classified (via SIC), the number of stockholders in the firm, the frequency with which the firm required external financing, and the degree of concentration in the primary industry in

which the firm operated. Oppong argued that each of these variables should be positively related to the amount of interim information and therefore negatively related to the information content of the annual earnings announcements.

Using monthly data, Oppong generally was unable to detect differences in price variability (as a measure of information content) in the month of the annual earnings announcement as compared with the other months in the year, irrespective of the five surrogate variables. Therefore, it was difficult to associate differences in the information content of annual earnings announcements with the amount of interim information.

Oppong's negative results, however, may have been due to using monthly, as opposed to weekly, share price data. If the capital market is reasonably efficient with respect to new public information, most of the share price reaction will have taken place by the date of, or shortly after, the annual earnings announcement. Observing month-end prices may fail to detect the price variability which in fact could have existed immediately surrounding the announcement date. Oppong recognized this problem:

> "Despite the relatively high R^2 obtained through the use of monthly data, it is still possible that a report period of one month is too long for the effects, if any, of annual earnings announcements on stock prices to be precisely measured." (p. 93)

The proposed study will utilize weekly data to overcome this potential problem.

Foster (1973) observed the trading volume and share price reaction to estimates of the annual earnings per share made by company officials in the Wall Street Journal. Since these estimates are

typically released from one to thirty days in advance of either the preliminary or complete earnings report, Foster argued that individual investors and the market as a whole may find this potential information source useful in either portfolio revisions or in setting equilibrium share prices. The volume test employed the same methodology used in Beaver's (1968) unadjusted volume analysis discussed above. Foster found that there was a 51% increase in the weekly average of the daily percentage of shares traded during the week in which the company official's estimate was made, relative to other weeks surrounding the estimate. For the same sample it was found that there was virtually no increase in trading volume when the preliminary annual earnings announcement was eventually released following the company official's estimate. However, for a control group of firms, for which there were no officials' estimates, there was a 47% increase in volume in the week of the preliminary annual earnings announcement. This implies that the investors were revising their portfolios to information contained in the annual EPS, but that they were using the source which provided the number to them on the most timely basis.

The price analysis employed by Foster paralleled the approach used by Ball and Brown (1968). Firms were classified as having either positive or negative earnings forecast errors. Abnormal returns were then computed for the time period surrounding the estimate of EPS made by company officials. Employing the API metric, Foster found that there was opportunity to earn abnormal returns up to the time of the company official's estimate, but that after this point trading strategies based on information contained in the estimate would not yield abnormal returns. Thus, this evidence further supports the

notion that investors rely on the earliest source of information in setting equilibrium prices. These results are also consistent with the argument made in previous pages that a market with fewer data sources may be as efficient as one with a multitude of sources. Participants, in the market having fewer data sources, may rely on the limited information which is available, but once that information is released, there may be swift adjustment in both portfolio composition and in equilibrium prices.

The Information Content of SEC Interim Financial Reports - Past Research

Past empirical work concerning the usefulness of interim financial reports has been mainly within the context of two types of studies. One type deals with attempts to measure the ability of the interim report to successfully predict some event or future accounting number which is deemed to be of interest to decision makers, such as the annual earnings number. A second type involves observing the stock market reaction to the release of the interim report so as to determine the market's evaluation of the information content of the interim accounting numbers.

Previous tests on the predictive ability of interim accounting numbers have relevance here for at least two reasons. First, if interim numbers do appear to be useful in predicting, for example, annual earnings numbers (and if the annual numbers are in turn related to real economic events affecting the firm), then investors can be expected to rely on the information contained in the interim earnings numbers in valuing their security holdings. Therefore, results observed in tests of the predictive power of interim earnings numbers should

give some notion of what may be expected in tests which attempt to assess the market's evaluation of the information content of the interim earnings numbers.

Empirical evidence on the predictive ability of interim reports is also important for a second, but related, reason. "A prediction is a statement about the probability distribution of the dependent variable (the event being predicted) conditional upon the value of the independent variable (the predictor)." (Beaver, Kennelly, and Voss, 1968) Therefore, observing that the interim earnings numbers do have some power in predicting another event, such as the annual earnings number, necessarily implies that there is an association between the two numbers (i.e., the annual number would be dependent on the interim number). Accordingly, if this dependence exists, investors who perceive the annual earnings number to have information content, can also be expected to react to information contained in the interim numbers.

Unfortunately, the evidence on the power of the interim earnings number to predict the value of the annual earnings number (which is the event of interest here) is mixed. One of the first empirical studies concerning the predictive value of interim reports was that of Green and Segall (1967). Their research objective was to determine whether knowledge of the first quarter EPS figure in a given year would provide better predictions of that year's annual earnings number than would predictions based solely on the previous year's annual number. Their general conclusion was that first quarter reports were not useful in forecasting the annual EPS. Green and Segall (1966) provided a replication of the 1967 study using more firms and

forecasting models and found similar results.

Brown and Niederhoffer (1968) replicated the Green and Segall studies using additional firms, forecasting models, and years. Their conclusions were that forecasting models employing interim information generally provided better predictions than did those relying solely on annual numbers. In addition, they also observed that the predictive ability of the interim reports improved with the release of each subsequent interim report during the course of the year. These results were disputed by Green and Segall (1968). After another exchange (Niederhoffer, 1970; Green and Segall, 1970), the argument ended without agreement.

Coates (1972) employed naïve forecasting models adjusted for seasonality factors to test the predictive ability of interim reports. He concluded that the quarterly reports reduced the uncertainty about the outcome of the annual report. In addition, the decrease in uncertainty associated with each earnings report was not dependent on the forecasting model chosen.

Reilly, Morgenson, and West (1972) found that prediction models utilizing interim data outperformed models using annual data in predicting annual net sales, net profit margin, and EPS. They also concluded that the best results were obtained in predicting net sales where there were none of the allocation or estimation problems which are usually associated with predicting annual EPS from interim data.

The majority of these studies suggest that interim earnings are useful in predicting annual results. Concerning the Green and Segall findings, it seems somewhat difficult to accept the notion that advance knowledge of a portion of a total value being predicted does

not improve the prediction. It is quite possible that quarterly forecasting models may exist which, while not employed by Green and Segall, do provide better predictions than models based solely on annual data. Furthermore, there is no reason to believe that the best forecasting model employing a given quarter's earnings will necessarily be the best model for other quarters in the year due to seasonality and other external factors which may affect each firm differently.

Empirical evidence to this effect has been reported by Foster (1977), who adopted a Box-Jenkins time-series methodology to examine the underlying time-series properties of quarterly accounting reports. He concluded that the changes in earnings from quarter to quarter are related and that the seasonality of quarter earnings is the single most important component in the underlying process by which quarterly earnings data is generated. Therefore, a cautious conclusion which might be derived from these studies is that it is very likely that, given the appropriate forecasting model, knowledge of interim earnings numbers will be useful in predicting annual earnings numbers.

One of the first studies which attempted to measure the stock market's evaluation of the information content of interim earnings was that of Brown and Kennelly (1972). Utilizing the methodology of Ball and Brown (1968) their objective was to determine if security trading rules based on advance knowledge of quarterly earnings data would yield higher returns than those based entirely on advance knowledge of the annual EPS. In addition to observing that the quarterly earnings models did, in fact, outperform those models based solely on annual data by approximately 30-40%, they also found that

the market response to the annual audited earnings numbers was less than that observed for unaudited interim reports. Thus it may be concluded that even though the numbers presented in the interim report are not subject to the review procedures imposed on annual numbers, investors do perceive the interim numbers to possess reliable information.

May (1971), using Beaver's (1968) methodology, attempted to assess the information content of interim reports for a sample of American Stock Exchange firms. He found that the share price variability in the weeks of the interim and the annual earnings announcements was greater than the average variability in the other weeks. This would imply, under Beaver's definition of information content stated earlier, that interim reports do possess information content. May also observed that the variability in the weeks of the unaudited quarterly earnings announcements was not statistically less than the variability in the week of the annual earnings announcement. This second finding prompted May to conclude that "investors may be unaware of or unable to take account of the difference in quality (reliability) of the quarterly and annual accounting data." (p. 150) However, if the market is aware of the nature of the data contained in interim reports, May's findings might also imply that the market may not put as high a value on the audited (more reliable) annual numbers as it does on the more timely interim numbers. This latter explanation would be consistent with what we have hypothesized in this study concerning the relationship between the information content of the annual earnings announcement and the amount of interim information which is publicly available.

Kiger (1972) employed a somewhat different methodology to investigate the share price and trading volume reactions to quarterly earnings announcements. Using a sample composed solely of NYSE firms, he also found that there were significant changes in both security prices and volume when the quarterly reports were released. Accordingly, these results also suggest that interim earnings data possess information content.

Finally, Oppong (1976) explicitly acknowledged that a major source of interim information is the interim financial report. However, his sample included only NYSE firms which all filed quarterly reports with both the NYSE and the SEC. Therefore, he had no way of testing for differences in the information content of the annual earnings announcement which might exist in the presence or absence of interim reports. The present study does have this capability in that some OTC firms released interim financial reports while others did not.

Summary

The present study is related to the prior research discussed above in several ways. First, with the exception of the study by May (1971) which investigated American Stock Exchange firms, all of the above studies have restricted their analysis to NYSE firms. As we have argued in Chapter One, the inferences which have been drawn from these studies may not appropriately be applied to firms for which there are fewer sources of available interim information (such as OTC firms). Second, many of these same studies (such as Ball and Brown, 1968; Beaver, 1968; and Oppong, 1976) imply that the anticipatory

reaction to information contained in the annual earnings report may be due to the existence of interim information which can be supplied to market participants on a more timely basis through various accounting and non-accounting sources. This study will attempt to gather preliminary evidence on the relative importance of interim accounting information vis-a-vis interim non-accounting information in anticipating annual operating results.

Finally, several studies discussed above suffer from limitations which, hopefully, may be corrected here. Various studies have attempted to associate the "sign" of the earnings forecast error with the "sign" of the abnormal return for the time period in which the annual earnings number is released (Ball and Brown, 1968; Brown and Kennelly, 1972; Foster, 1973; Foster, 1977). However, results obtained by this approach are necessary conditional on the earnings forecast models chosen to generate the forecast errors. In this study no attempt is made to identify the "sign" of the forecast error. Rather, the variability in share prices in the week of the annual earnings announcement relative to other weeks in the year is used as a measure of the information content of the announcement. Therefore, results observed here are not subject to these potential misspecification problems.

Results by Oppong (1976) (who utilized a similar methodology to that employed in this study) indicate that a majority of the annual earnings announcements for firms which he analyzed did not possess information content. However, this may have been due to the use of monthly data. As discussed above, a one month reporting period may be too long a period to assess the effect of the announcement on share

prices. The present study employs weekly data to overcome this potential problem area.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

Sample Selection

This study covers the years 1960 through 1964. To address the research hypotheses stated in Chapter One, it was necessary to include firms from the populations of both the NYSE and OTC for this time period. Furthermore, the OTC sample was composed of two types of firms: (1) those which filed interim SEC reports during 1960-64 and (2) those which did not.

Due to the availability and reliability of data, it was necessary to select a sample of OTC firms which were somewhat larger than the median sized OTC firms. Recall from Chapter One that there were certain OTC firms which began filing with the SEC in 1965 while there were other OTC firms which filed with the SEC both before and after 1965. These two types of OTC firms will be referred to subsequently as "NF" firms ("new files") and "CF" firms ("continuous files"), respectively. The selection of the total OTC sample was accomplished by combining those samples chosen separately for the NF and CF groups. For all OTC firms, the following sampling criteria were established:

(1) the firm's equity shares must have been traded OTC for the entire 1960-64 period,

(2) complete data on stock prices, dividends, and capital changes must have been available for at least 77 weeks,

(3) the annual earnings announcement must have been made in the Wall Street Journal.

(4) the firm announced no dividends in the same week as the annual earnings announcement, and

(5) the firm announced no stock splits during the period from eight weeks prior to the earnings announcement through eight weeks following the announcement (this period coincides with the "report period" to be discussed below).

Two additional criteria were established in selecting the NF and CF samples. To be included in the NF sample,

(6) a firm must have first started filing with the SEC in 1965 as determined by analysis of the Directory of Companies Filing Annual Reports with the Securities and Exchange Commission (1960-1965).

Similarly, to be included in the CF sample,

(7) a firm must have filed continuously from 1960 through 1964 under section 13 and/or 15(d) of the Securities Exchange Act of 1934 and then switched to filing under section 12(g) in 1965. These firms were also identified by analyzing the Directory of Companies Filing Annual Reports with the Securities and Exchange Commission (1960-65).

Criterion (1) was used since many OTC firms apparently had their shares temporarily listed on an organized exchange for a period and then resumed trading OTC. It was not clear what effect, if any, this situation might have on share prices, but it was conceivable that there may have been a time lag after the trading medium was changed before prices were again in equilibrium. Similarly, there were many firms which traded OTC during the early stages of corporate life and subsequently switched permanently to an organized exchange, such as the American Stock Exchange. This change may also have had a dis-equilibrating effect on the share price due to possible changes in

investors' perceptions about expected return or risk, or both.[1]

Criterion (2) simply assured that adequate data were available to provide a measure of the information content of annual earnings announcements. As is described below, the 77 weeks constitute the time period surrounding the announcement.

Criterion (3) provided a focal point as to when the annual earnings number first became publicly available. Although this number may have been released later through alternate sources, such as the annual report or SEC 10K report, it has been generally accepted that one of the first releases which provides quick and thorough dissemination of the data is in the Wall Street Journal.

Criteria (4) and (5) were imposed because prior research has shown that announcements of either stock splits or dividends apparently have information content (see: Fama, Fisher, Jensen, and Roll, 1969; Pettit, 1972). If time periods containing these types of announcements were not excluded, it would be difficult to attribute any observed share price behavior to the annual earnings announcement.

Criteria (6) and (7) insured that firms belonged to only one group, either NF or CF. Some OTC firms filed under section 13 and/or 15(d) of the '34 Act in some years but not others during 1960-1964. Also, not all OTC firms began filing under section 12(g) in 1965 for

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[1]Past research is mixed on the effect of changing the medium for the trading of securities. O'Donnell (1969) undertook a case study of several delisted stocks from NYSE. He generally found that the market price was higher for listed than for unlisted stocks. Furst (1970) investigated new NYSE listings and concluded that (1) the listing had no significant effect on market price and (2) stocks were valued no differently as a result of the listing. Finally, Van Horne (1970) found that there were no significant price changes associated with the announcement to list a security.

undisclosed reasons. Therefore, without this requirement, it might not be clear that the only major systematic difference between the NF and CF groups was the existence of the required SEC filings.

As was mentioned above, this sampling procedure resulted in a sample biased towards larger OTC firms. Since one of the provisions for filing with the SEC under the '64 Amendments was that firms should have at least 750 shareholders (at that time) and at least one million dollars in assets, smaller firms were necessarily excluded from the study. However, this did insure the existence of two situations. First, the reliability of stock price quotes on larger, more widely traded firms was much better than on smaller firms in the period under study. Second, the requirement of at least 750 stockholders insured a relatively wide distribution of ownership for each firm, and accordingly, reduced the possibility that individual owners could have affected equilibrium prices. A study by the SEC disclosed that ownership of OTC stock generally tended to be more concentrated in individuals having a controlling position in the operations of the company than did ownership in listed stock (1963).

The NYSE sample was determined by the following criteria (criteria (3), (4), and (5) are identical with those established for the OTC group):

(1) the firm's equity shares must have been traded on the NYSE for the entire 1960-64 period,

(2) firms were included on the CRSP daily master tapes and had data available for at least 77 weeks.

(3) the annual earnings announcement must have been made in the Wall Street Journal,

(4) the firm announced no dividends in the same week as the annual earnings announcement, and

(5) the firm announced no stock splits during the period from eight weeks prior to the earnings announcement through eight weeks following the announcement.

The effect on sample sizes of imposing the above selection criteria is presented in Tables 2 and 3.

TABLE 2

Effect of Selection Criteria on Sample Size
OTC Firms

	NF	CF	OTC
Firms filing with SEC in 1965	1591	1591	
Less: (a) for NF firms, (b) for CF firms	1260	1164	
	331	427	
Less: Firms with incomplete data on prices, dividends, capital changes, and earnings announcements	204	300	
	127	164	
Less: Firms with either dividends in same week as or stock splits in same report period as the earnings report	32	48	
Number of Firms in Sample	95	116	211
Number of Announcements	332	415	747

(a) Those firms which filed with the SEC in one or more years from 1960-1964.

(b) Those firms which did not file with the SEC in every year from 1960-1964.

TABLE 3

Effect of Selection Criteria on Sample Size
NYSE Firms

Random Sample from Total Population		169
Less:	Firms with either dividends in same week or stock splits in same report period as the earnings report	48
		121
Less:	Firms not included on CRSP daily master tape	20
Number of Firms in Sample		101
Number of Announcements		336

Table 4 indicates the composition of each of the samples in terms of major industry groupings. The OTC sample is the combination of the NF and CF samples. The only major difference across samples appears to be for the CF group where 30% of the CF firms are utilities while only 11% of the NF firms and 14% of the NYSE firms fall into this classification. Possible implications of this disproportionate number of utilities in the CF sample are presented in Chapter Four.

Data Sources

The study period covers the years 1960 through 1964 inclusive. Weekly returns for the NYSE sample for the last two and one-half years of the study period were generated from the CRSP daily master tape. Prices, dividends, and capital change data for the period from January 1, 1960 through June 30, 1962 for the NYSE sample and for the entire five year period for the OTC sample were manually gathered.

TABLE 4

Distribution of Sample Firms
by Major Industry Group

Major Industry Group	2 Digit SIC Code	NYSE	NF	CF
Mining	10-14	7	8	10
Manufacturing	20-39	62	58	50
Transportation	40-46	6	7	8
Utilities	48-49	14	10	35
Wholesale & Retail Trade	50-59	8	3	3
Finance	60-67	4	3	5
Other			1	2
Unclassified				
Total Number of Firms		101	95	116

Weekly closing OTC bid quotations and NYSE closing prices were derived from Barron's. Data on cash dividends, stock dividends, and stock splits for the OTC and NYSE firms were acquired from Standard and Poor's Annual Dividend Record (1960-1964).

Some Underlying Assumptions

According to Beaver (1968), a firm's annual earnings announcement is said to have information content if it leads to a revision in investors' assessment of the distribution of expected returns such that there is a shift in equilibrium share price. Therefore, the amount of information content in the annual earnings announcement might be determined by observing the variability in returns during

the weeks surrounding the release of the earnings number relative to other weeks in the year. Greater magnitudes of price change at the date of the announcement would indicate that the earnings numbers do possess information content. This empirical approach to measuring information content, however, relies on two basic assumptions. First, it assumes the existence of equity capital markets which are efficient with respect to new publicly available information. Second, this approach assumes that the appropriate period-by-period return generating process can be specified.

Considerable evidence exists which supports the notion of a semi-strong form efficient capital market, at least with respect to NYSE-listed stocks. (See, Fama (1970), for example.) Less comprehensive data are available on the OTC market. However, the results which are available indicate that the OTC is also relatively efficient. Hagerman and Richmond (1973) conducted tests on the OTC to determine independence between successive price changes. Using serial correlation and runs tests, they concluded that the OTC was weak form efficient which implies that the size and direction of the next price change cannot be discerned by analysis of historical prices. Two other studies (Mampe, 1974; Reilly and Slaughter, 1973) were concerned with the efficiency of the OTC as evidenced by the bid and asked prices of NYSE shares that were traded OTC ("third market transactions"). These bid and asked prices were compared with the prices of the same issues in NYSE transactions. Both studies found no significant differences between transaction prices, net of transaction costs. This evidence also is consistent with a weak form efficient OTC market. The existence of weak form capital market efficiency is important in

that one major type of public information is, of course, historical stock prices. Therefore, if the OTC was not found to be weak form efficient, it also would not be efficient in the semi-strong form.

Fortunately, partial evidence is also available indicating that the OTC is able to quickly and unbiasedly impound another type of publicly available information, the information contained in the earnings announcements. Hagerman (1975) tested the association between share prices and annual earnings numbers for 97 banks, all of which were traded OTC. Foster (1975) examined the association between earnings numbers and stock prices of insurance companies trading OTC. The findings of both Hagerman and Foster are consistent with semi-strong form efficiency in the OTC market.

The second assumption noted above pertains to specifying the appropriate stochastic process generating period-by-period returns. Furthermore, it is important for this study that the assumed process allow one to measure returns which are associated with firm-specific events and which are not related to other phenomena. That is, in order to obtain a measure of the relative price variability surrounding the date of the income announcement, it is first necessary to control for the effects that other events have on share prices. The influences of these other economy-wide events may be reflected in changes in the observed returns of a market portfolio. Work by Markowitz (1952) and Sharpe (1963) has resulted in the "market model"[2]

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[2]Equation 1 is not a generating function consistent with the 2-factor model as developed by Black (1972), and empirically tested by Black, Jensen, and Scholes (1972), and Fama and Macbeth (1973). However, inputs into the 2-factor model are only available on a monthly basis and, for reasons stated in Chapter Two, this study uses weekly data. The traditional market model is the most widely known model which can utilize weekly data, and therefore, is employed in this study.

which explicitly considers the general market-wide effects as an independent variable:[3]

$$\tilde{R}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \tilde{u}_{it} \qquad \text{eq. (1)}$$

where:

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

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

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

$\tilde{R}_{it}$ = a random variable, $\ln (P_{it} + D_{it}/P_{i,t-1})$

$\tilde{R}_{mt}$ = a random variable, $\ln (SP_t/SP_{t-1})$

$\alpha_i \beta_i$ = parameter estimates

$\tilde{u}_{it}$ = a random variable, the residual term

P_{it} = price of security i at end of week t

D_{it} = dividends per share paid on security i in week t

SP_t = a market index, Standard and Poor's Price Index at end of week t

The $\tilde{R}_{it}$ can be defined as the rate of return on security i in week t compounded continuously. Similarly $\tilde{R}_{mt}$ is the rate of return on the market index in week t compounded continuously.

Equation (1) further asserts that the expected return on security i is conditional upon, and a linear function of, the ex post market return. That is:

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[3]Empirical evidence by King (1966) has indicated that the return from the market-wide portfolio is the single most important factor affecting security returns.

$$E(\tilde{R}_{it}|R_{mt}) = \alpha_i + \beta_i R_{mt} \qquad \text{eq. (2)}$$

Therefore, combining equations (1) and (2), and rearranging:

$$\tilde{u}_{it} = \tilde{R}_{it} - E(\tilde{R}_{it}|R_{mt}) \qquad \text{eq. (3)}$$

The $\tilde{u}_{it}$ reflects the return on security i in week t that is unexpected, and thus, in an efficient capital market, can be thought of as a measure of the effect of new information about firm i.

Information Content Measures

The estimates of α_i and β_i, denoted $\hat{\alpha}_i$ and $\hat{\beta}_i$, can be computed from a time-series Ordinary Least Squares regression. If stock prices do change with the earnings announcement, then it is expected that $\tilde{u}_{it}$ will be nonzero in the week of the announcement. However, the OLS regression technique automatically forces the sum of the $\tilde{u}_{it}$'s to zero, so including the earnings announcement period (the "report period" as defined below) in the parameter estimation process will result in a computational bias in the residuals. Therefore, the period of time surrounding the earnings announcement date is excluded from the estimation process.

The week of the annual earnings announcement is determined by the date on which the earnings number was first reported in the Wall Street Journal and is denoted as week 0.[4] The report period surrounding week 0 runs from 8 weeks prior to the announcement through 8 weeks after the announcement. The α_i and β_i parameters are estimated using R_{it}'s and R_{mt}'s for the 30 weeks immediately preceding,

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[4]The methodology discussed below (through equation 7) is basically the same as employed by Beaver (1968).

and the 30 immediately following the report period.[5] These estimates are then used to compute the residual $\tilde{u}_{it}$'s during the 17 week report period (week = t = -8, ...+8).

Since no earnings expectations models are being specified, the sign of the $\tilde{u}_{it}$ cannot be predicted and thus must be abstracted out.[6] This may be accomplished by squaring the residual ($\tilde{u}_{it}^2$). But the computed $\tilde{u}_{it}^2$'s must also be related to the variability of the residuals in the non-report period so as to denote unusual, or abnormal, price variability during the report period. The sample variance of the residuals during the non-report period can be estimated by the following:

$$S^2(\tilde{u}_i) = \frac{\sum_{g=1}^{G} [\tilde{u}_{ig} - E(\tilde{u}_{ig})]^2}{G-2} \quad g = 1, \ldots 60 \qquad \text{eq. (4)}$$

where G is the number of observations in the non-report period used to estimate α_i and β_i in equation (1).[7]

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[5]The time period for this study is 1960-1964. Some report periods are situated such that there are not 30 observations available both preceding and following the report period. For these report periods the estimates for α_i and β_i are computed by using extra observations from the side having the available data. For example, if the the report period is from April 22, 1960 through August 5, 1960, the 60 week estimation period would be from January 1, 1960 through April 15, 1960 (16 weeks) and from August 12, 1960 through June 30, 1961 (44 weeks).

[6]In other words, "good news" cannot be discerned from "bad news" as employed in the Ball and Brown (1968) methodology.

[7]To obtain an unbiased estimate of the variance of the residuals in the non-report period it is necessary to subtract one degree of freedom for each parameter estimate, $\hat{\alpha}$ and $\hat{\beta}$. As a result, the denominator is G-2.

However, $E(u_{ig}) = 0$ for all g if the capital market is normally in equilibrium in the non-report period. Therefore, the sample variance for this period reduces to:

$$S^2(\tilde{u}_i) = \frac{\sum_{g=1}^{G} (\tilde{u}_{ig})^2}{G-2} \qquad g=1, \ldots 60 \qquad \text{eq. (5)}$$

If the annual earnings announcement does have information content, the $\tilde{u}_{it}^2$ for $t=0$ should be greater than $S^2(\tilde{u}_i)$. Beaver (1968) proposed a ratio, which is also used here:

$$\bar{U}_{it} = \frac{\tilde{u}_{it}^2}{S^2(\tilde{u}_i)} \qquad \text{eq. (6)}$$

This ratio is defined as the measure of information content of the annual earnings announcement for firm i in week t.

Annual earnings announcement dates for a period of five years are determined for each firm. If J is the total number of announcements (and thus, also the number of report periods), for all I firms in the five year period, the average $\bar{U}_{it}$ across J announcements for a given week t would be:[8]

$$\bar{U}_t = \frac{\sum_{j=1}^{J} U_{jt}}{J} \qquad t = (-8, \ldots, 0, \ldots, +8) \qquad \text{eq. (7)}$$

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[8] As an illustration, if there were 100 firms in the sample with each firm having 5 announcement dates available, there would be a total of J=500 announcements (and thus, report periods). For each announcement date, the $\bar{U}_{it}$'s (eq. 6) would be computed for each of the 17 weeks in the report period. The $\bar{U}_t$ (eq. 7) would be the average U_{it} over all 500 announcements for one of the 17 weeks.

Statistical Testing Procedures

The first hypothesis presented in Chapter One states that the annual earnings announcements of OTC firms have information content. One method of testing this hypothesis is to refer the computed $\bar{U}_t$ for the OTC sample to an appropriate theoretical distribution of $\bar{U}_t$ under the null hypothesis. Past empirical evidence (Jaffe, 1974, for example) indicates that the $\tilde{u}_{it}$ is approximately normally distributed with $E(\tilde{u}_{it}) = 0$ and a measure of dispersion, σ_i^2. If this is correct, the square of a standardized $\tilde{u}_{it}$ would follow a chi-square distribution with one degree of freedom (see, for example, Glass and Stanley, 1970, p. 229-231):

$$\left[\frac{u_{it} - 0}{\sigma_i}\right]^2 = \frac{u_{it}^2}{\sigma_i^2} \sim \chi_1^2 \qquad \text{eq. (8)}$$

Under the null hypothesis of no information content, the variability of the $\tilde{u}_{it}$ during the report period should not be different from that observed for the non-report period. Therefore, since $S^2(\tilde{u}_i)$ is an unbiased estimate of the σ_i^2 for the non-report period, it may be substituted for the σ_i^2 for the report period. The result is the measure of information content stated in equation (6) above. Under the null hypothesis, this ratio should approximate a chi-square distribution with one degree of freedom. Testing for the information content of annual earnings announcements for OTC firms requires referring the computed $\bar{U}_t$ to this distribution at a specified confidence level.

The second hypothesis submits that the information content of the annual earnings announcements of OTC firms is greater than that

of NYSE firms. The third hypothesis states that the information content of the annual earnings announcements of NF firms is greater than that of CF firms. Both of these questions may be answered in a single statistical procedure, a one-factor analysis of variance (ANOVA) with 3 groups using planned comparisons (or its nonparametric analogue, the Kruskal-Wallis rank test with related post-hoc testing techniques if the assumptions underlying the ANOVA model are not satisfied.) The design would be as follows (let $\bar{U}_t^{N}$, $\bar{U}_t^{On}$, and $\bar{U}_t^{Oc}$ be the $\bar{U}_t$'s in week t for the NYSE, NF, and CF samples respectively:

	OTC	
(1)	(2)	(3)
NYSE	NF	CF
$\bar{U}_t^{N}$	$\bar{U}_t^{On}$	$\bar{U}_t^{Oc}$

The second hypothesis may be addressed in an ANOVA context by a planned comparison of the NYSE sample versus the CF plus NF sample. The third hypothesis would utilize a planned comparison of the NF sample versus the CF sample. Similar comparisons (contrasts) may be constructed for the Kruskal-Wallis procedure.

CHAPTER FOUR

RESULTS OF ANALYSIS

This chapter contains data on the distributions of annual earnings announcements, the regressions conducted to estimate the two parameters, α and β, for the assumed return generating process, and the analysis of computed information content measures. The results suggest at least five tentative conclusions. First, annual earnings announcements of OTC firms apparently do possess information content. Second, in contrast to results reported by Beaver (1968), there is no abnormal market reaction to the release of the earnings number for the sample of NYSE firms chosen for this study. Third, the information content of OTC announcements is significantly greater than that observed for announcements made by NYSE firms. Fourth, there is no statistically significant difference between the information content measures of NF and CF firms. Finally, preliminary results suggest that there may be an inverse relationship between the information content of annual earnings announcements and the number of news releases made during the year in the financial press.

Distributions of Annual Earnings Announcements

The first announcement of corporate earnings in the Wall Street Journal was deemed to be week zero in the report period. In some cases, this first release may have been the preliminary earnings

report which often supersedes the final annual earnings announcement.[1] Announcement weeks were obtained from the Wall Street Journal Index (1960-1964).

The distribution of earnings announcements by month for both OTC and NYSE samples is given in Table 5. As might be expected, the

TABLE 5

Distribution of Announcements by Month

Month	OTC		NYSE	
	Relative Frequency	Cumulative Frequency	Relative Frequency	Cumulative Frequency
January	.092	.092	.151	.151
February	.179	.271	.366	.517
March	.385	.656	.172	.689
April	.147	.803	.054	.743
May	.028	.831	.032	.775
June	.023	.854	.032	.807
July	.014	.868	.011	.818
August	.018	.886	.032	.850
September	.028	.914	.042	.892
October	.014	.928	.011	.903
November	.037	.965	.043	.946
December	.035	1.000	.054	1.000

[1]Prior evidence (Foster, 1973) has shown that the market reacts to the first report of earnings which becomes publicly available.

greatest number of announcements occurs in the early months of the calendar year because of the large majority of firms with December 31 fiscal year-ends. However, if earnings announcements do have information content, the clustering of sufficient numbers of announcements in a given period could result in changes in the market-wide rate of return for the same period. Thus, given that the effects of changes in aggregate market returns are eliminated via the market model, it is also possible that the effects of earnings announcements for some firms may be eliminated as well, thus causing a downward bias in the computed information content measures.[2]

The same market-wide variable, composed of returns from solely NYSE firms, is used to estimate residuals for both OTC and NYSE samples. As a result, this potential downward bias in information content measures, may be particularly likely for the NYSE firms. However, Table 5 indicates that the clustering of announcements occurs in different months for the OTC than for the NYSE. Therefore, the effect of the clustering of annual earnings announcements for NYSE firms on the market-wide return would not necessarily result in an underestimate of the information content of OTC earnings announcements.

To partially test for this possible bias, a Spearman rank order correlation coefficient was computed for the returns on the NYSE index versus the average returns on the OTC sample employed in this study for the entire 5 year (260 week) study period. The return for the OTC sample for a given week was calculated as the arithmetic

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[2]Beaver (1968) and Oppong (1976) have acknowledged this possibility.

average of returns of all OTC sample firms for that week assuming equal weighting. The computed correlation coefficient is .793 which is statistically significant at an α-level of less than .0001. Therefore, although not in perfect lock-step, the returns of the two securities markets do appear to be strongly related.

A summary of the relative magnitudes of the returns of the OTC sample and the NYSE index in each of the first 17 weeks of the calendar year is presented in Table 6. Analysis of the table indicates that NYSE returns tend to be somewhat larger during the early weeks of the 17 week period than in the later weeks. For the OTC sample, the market returns tend to be larger in the later weeks. However, there is a wide range in the magnitude of the returns over the entire 17 week period for both the OTC and the NYSE. This, and the relatively high correlation between the OTC and NYSE returns, suggest that while the clustering of announcements may be a possible cause of bias against the earnings announcements of NYSE firms, the effect of the clustering on the statistical tests to be discussed below cannot be clearly interpreted.

Table 7 presents the relative and cumulative frequencies of the time lag after year-end before the first annual earnings announcement appears in the Wall Street Journal. It is apparent that many NYSE firms release the earnings numbers closer to the fiscal year-end than do OTC firms. This presumably is due to there being a much greater proportion of NYSE firms which release preliminary earnings reports from 3 to 5 weeks in advance of the final announcements.

TABLE 6

Average Absolute Market Returns During
Announcement Clustering Period

Week	OTC	NYSE
1(a)	.0296	.0254
2	.0128	.0149
3	.0027	.0079
4	.0054	.0239
5	.0023	.0193
6	.0087	.0103
7	.0033	.0089
8	.0070	.0062
9	.0140	.0216
10	.0099	.0090
11	.0085	.0133
12	.0146	.0235
13	.0046	.0074
14	.0176	.0144
15	.0109	.0089
16	.0121	.0112
17	.0079	.0176

(a) The announcement clustering period is defined to include the 17 week period commencing with the first week in January and ending with the last week in April of each year.

(b) Tabled values are the average of the absolute returns for a given week over the 5 year study period.

TABLE 7

Number of Weeks Between Fiscal Year End and Announcement Date

Number of Weeks	OTC		NYSE	
	Relative Frequency	Cumulative Frequency	Relative Frequency	Cumulative Frequency
1	0	0	0	0
2	.015	.015	.021	.021
3	.084	.099	.031	.052
4	.059	.158	.046	.098
5	.059	.217	.084	.182
6	.035	.252	.114	.296
7	.050	.302	.129	.425
8	.059	.361	.124	.549
9	.119	.480	.101	.650
10	.114	.594	.073	.723
11	.100	.694	.054	.777
12	.089	.783	.061	.838
13	.064	.847	.068	.906
14	.054	.901	.043	.949
15	.044	.945	.031	.980
Over 15	.055	1.000	.020	1.000

Regression Analysis

For each firm and each earnings announcement, estimates of α_i and β_i for the market model:

$$\tilde{R}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \tilde{u}_{it}$$

were obtained by the Ordinary Least Squares (OLS) regression procedure. In the estimation process, 60 weeks of observations for both R_{it} and R_{mt} were used in the regression. In the normal situation, this consisted of 30 consecutive weeks immediately preceding the first week in the report period and 30 consecutive weeks immediately following the last week in the report period. For announcements occurring near the beginning or end of the study period, it was necessary to use as many as 44 observations from one side of the report period and as few as 16 observations from the remaining side. This allowed for an increased number of report periods to be analyzed while still maintaining a basic requirement that no earnings announcement week from either a preceding or subsequent year would be included in the 60 week estimation period.[3]

Implementing this procedure resulted in a total of 747 regressions being run on the OTC sample (332 for the NF group and 415 for the CF group) and 336 regressions on the NYSE sample. Tables 8 through 11 contain summaries of the relevant regression statistics.

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[3]If earnings reports do have information content, excluding announcement weeks from the estimation period should result in lower computed error term variances and thus improve the chances of observing significant information content measures in week zero.

TABLE 8

Summary of Regression Statistics - OTC Firms
(over 747 Regressions)

Statistics	$\hat{\alpha}$	$\hat{\beta}$	$S(\hat{\alpha})$	$S(\hat{\beta})$	$R^2(u)$	$R^2(a)$	Durbin Watson
Mean	.001	.844	.006	.303	.086	.070	2.030
Median	.001	.796	.005	.253	.064	.048	2.019
Standard Deviation	.005	.632	.009	.188	.089	.091	.344
Range:							
Minimum	-.023	-.944	.001	.057	0	-.017	1.050
Maximum	.020	2.901	.223	1.590	.486	.477	2.998
Quartiles:							
.25	-.001	.523	.003	.182	.028	.011	1.785
.50	.001	.796	.005	.253	.064	.048	2.019
.75	.002	1.125	.006	.352	.123	.109	2.257

$S(\hat{\alpha})$ = standard deviation of α estimate
$S(\hat{\beta})$ = standard deviation of β estimate
$R^2(u)$= R^2 unadjusted for degrees of freedom
$R^2(a)$= R^2 adjusted for degrees of freedom: df = 60-2 = 58

TABLE 9

Summary of Regression Statistics - NYSE Firms
(Over 334 Regressions)

Statistics	$\hat{\alpha}$	$\hat{\beta}$	$S(\hat{\alpha})$	$S(\hat{\beta})$	$R^2(u)$	$R^2(a)$	Durbin Watson
Mean	-.003	.907	.011	.274	.161	.148	2.203
Median	.002	.790	.004	.232	.131	.119	2.217
Standard Deviation	.006	.602	.086	.162	.139	.142	.288
Range:							
Minimum	-.076	-3.000	.002	.003	0	-.017	1.621
Maximum	.012	3.864	.123	1.540	.640	.634	2.901
Quartiles:							
.25	-.002	.492	.003	.190	.050	.034	2.008
.50	.002	.790	.004	.232	.131	.119	2.217
.75	.002	1.112	.005	.316	.241	.194	2.381

$S(\hat{\alpha})$ = standard deviation of α estimate
$S(\hat{\beta})$ = standard deviation of β estimate
$R^2(u)$= R^2 unadjusted for degrees of freedom
$R^2(a)$= R^2 adjusted for degrees of freedom: df = 60-2 = 58

TABLE 10

Summary of Regression Statistics - NF Firms
(Over 332 Regressions)

Statistics	$\hat{\alpha}$	$\hat{\beta}$	$S(\hat{\alpha})$	$S(\hat{\beta})$	$R^2(u)$	$R^2(a)$	Durbin Watson
Mean	.001	.870	.006	.313	.083	.066	2.050
Median	.001	.799	.005	.265	.060	.043	2.041
Standard Deviation	.005	.637	.008	.169	.091	.093	.332
Range:							
Minimum	-.016	-.944	.001	.080	0	-.017	1.238
Maximum	.020	1.963	.053	1.170	.486	.477	2.987
Quartiles:							
.25	-.002	.591	.003	.205	.030	.013	1.808
.50	.001	.799	.005	.265	.060	.043	2.041
.75	.002	1.293	.006	.369	.120	.106	2.258

$S(\hat{\alpha})$ = standard deviation of α estimate
$S(\hat{\beta})$ = standard deviation of β estimate
$R^2(u)$= R^2 unadjusted for degrees of freedom
$R^2(a)$= R^2 adjusted for degrees of freedom: df = 60-2 = 58

TABLE 11

Summary of Regression Statistics - CF Firms
(Over 415 Regressions)

Statistics	$\hat{\alpha}$	$\hat{\beta}$	$S(\hat{\alpha})$	$S(\hat{\beta})$	$R^2(u)$	$R^2(a)$	Durbin Watson
Mean	.001	.830	.006	.294	.093	.077	2.016
Median	.001	.786	.004	.240	.070	.054	1.998
Standard Deviation	.005	.597	.011	.202	.085	.087	.353
Range:							
Minimum	-.023	-.562	.001	.057	0	-.017	1.050
Maximum	.019	2.901	.223	1.590	.417	.400	2.998
Quartiles:							
.25	-.001	.480	.001	.168	.027	.010	1.760
.50	.001	.786	.004	.240	.070	.054	1.998
.75	.002	1.096	.005	.337	.134	.121	2.234

$S(\hat{\alpha})$ = standard deviation of α estimate
$S(\hat{\beta})$ = standard deviation of β estimate
$R^2(u)$= unadjusted for degrees of freedom
$R^2(a)$= R^2 adjusted for degrees of freedom: df = 60-2 = 58

The distribution of $\hat{\beta}$, the measure of a security's volatility or riskiness in relation to market-wide factors, indicates that all samples included in this study have below average risk.[4] Furthermore, it is apparent that the OTC sample is less risky than the NYSE sample. Analysis of the composition of the samples, however, indicates that this is most likely due to the larger percentage of utilities included in the OTC sample.[5] As Table 4 in Chapter 3 indicates, utilities comprise 21% of the OTC sample and only 14% of the NYSE sample. The difference in computed $\hat{\beta}$'s between the CF and NF groups may also be due to this same fact, in that 30% of the CF sample are utilities whereas only 11% of the NF firms fall into this classification.

An inspection of the R^2's reveals that they are considerably lower than those reported in previous studies using monthly returns,[6] but are consistent with other studies employing weekly data.[7] However, the explanatory power of the regression equations utilizing OTC data is less than one-half that observed for the NYSE sample. This might be caused by the independent variable, R_{mt}, being composed of returns from only NYSE firms. Alternatively, the return generating process for OTC firms may be somewhat different from that specified in equation 1, Chapter Three. Nonetheless, even for the OTC sample,

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[4]The risk of the market portfolio is unity.

[5]The mean $\hat{\beta}$ for all utilities included in this study is .608.

[6]Both King (1966) and Oppong (1976) reported R^2's of approximately 30% using monthly data.

[7]Beaver (1968) reported R^2's of 6% for the NYSE sample using weekly returns while May (1971) found R^2's of approximately 11% for a sample of ASE firms.

the mean R^2 is greater than the 6% reported by Beaver (1968).

The distribution of the Durbin Watson statistic indicates that there is no serious problem of autocorrelation in the computed residuals. The degree of autocorrelation in the error terms is either statistically significant at an α-level of .05 or inconclusive for 83 of the 747 regressions using OTC returns. No regressions utilizing NYSE data produced Durbin Watson statistics less than the tabled upper bound for 60 observations (see Neter and Wasserman, 1974).[8] This difference between the OTC and NYSE samples also lends support to the notion that there may be some explanatory variable not considered in the assumed return generating process for OTC firms, although it does not seem to be a serious omission.

Information Content Analysis

Individual α_i and β_i estimates were used to computed expected returns for each of the 60 non-report weeks. These expected returns were then subtracted from observed returns to obtain the error term, u_{ig}:

$$u_{ig} = R_{ig} - (\hat{\alpha}_i + \hat{\beta}_i R_{mg}) \qquad g = 1, \ldots 60$$

The sample variance of the residuals, $S^2(u_i)$, was obtained from the regression output, and was estimated as follows:

$$S^2(u_i) = \frac{\sum_{g=1}^{60} (u_{ig})^2}{58}$$

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[8] Later analysis is conducted with and without the 83 regressions where autocorrelation in the error terms may be present.

The computed sample variance gives some notion of the amount of price movement that takes place during the non-report period. Some distributional properties of $S^2(u_i)$, calculated for OTC, NYSE, NF, and CF samples are reported in Table 12. As can be observed, there are no apparent differences in the distribution between the various samples. This has an important implication for interpreting the results from the statistical tests presented below. Specifically, because the variability in the non-report period is essentially the same for all samples, one can more readily attribute any observed differences in information content measures between the samples to differences in the price variability in the report period rather than in the non-report period.

TABLE 12

Summary Statistics on Reactions
During the Non-Report Period

Statistics	$S^2(u)^{OTC}$	$S^2(u)^{NYSE}$	$S^2(u)^{NF}$	$S^2(u)^{CF}$
Mean	.0020	.0020	.0020	.0020
Median	.0012	.0010	.0013	.0011
Standard Deviation	.0032	.0044	.0024	.0037
Range:				
Minimum	.0001	.0003	.0001	.0001
Maximum	.0393	.0380	.0186	.0393
Quartiles:				
.25	.0006	.0006	.0007	.0005
.50	.0012	.0010	.0013	.0011
.75	.0021	.0016	.0022	.0020

Beaver (1968) did not report any statistics on the computed values of $S^2(u_i)$ for his sample. However, it may be that the values found in that study are greater than those reported here, in that the estimation period in his study extended over earnings report periods from different fiscal years. Oppong (1976) reports a mean sample variance of .00441 which is more than twice that reported here. This may also be due to the inclusion of earnings report periods from other fiscal years in the estimation process, as well as the use of monthly data.

The report period has been defined as 8 weeks before through 8 weeks following the week of the annual earnings announcement. The following equation was used to obtain the estimated residuals for this 17 week period:

$$u_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \qquad t = 1, \ldots 17$$

Squaring the u_{it} and dividing by the sample variance in the non-report period provides the measure of information content:

$$U_{it} = \frac{(u_{it})^2}{S^2(u_i)} \qquad t = 1, \ldots 17$$

U_{it}'s, for each of the samples (NYSE, OTC, NF, and CF), were averaged across all announcements for each of the 17 weeks.

Assessing the Information Content of Annual Earnings Announcements - OTC versus NYSE Firms

As stated above, the information content measure, U_{it}, was computed for each firm for each of the 17 weeks in the report period for both the OTC and NYSE samples. Tables 13 and 14 present relevant statistics on the computed measures as a result of averaging over all

TABLE 13

Summary Statistics on Information Content Measures - OTC Firms
(Over 747 Report Periods)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	1.209	.819	1.088	.823	.918	.839	.724	.708	2.596	1.674	1.489	.941	.956	1.119	1.043	1.136	1.388
Median	.401	.414	.446	.409	.355	.359	.373	.371	1.066	.868	.562	.358	.407	.436	.431	.414	.401
Standard Deviation	4.586	1.820	3.611	1.948	2.593	2.434	1.785	1.904	2.735	4.786	2.876	2.329	2.137	3.876	3.006	3.953	5.073
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	72.022	22.723	66.722	21.768	36.894	39.916	27.586	29.857	69.088	71.986	48.283	78.244	72.637	74.727	57.114	53.596	73.813
Quartiles:																	
.25	.148	.138	.150	.141	.136	.136	.133	.137	.385	.294	.197	.141	.144	.153	.157	.154	.150
.50	.401	.414	.446	.409	.355	.359	.373	.371	1.066	.868	.562	.358	.407	.436	.431	.414	.401
.75	.891	.872	.931	.884	.839	.868	.900	.838	2.138	1.691	1.089	.877	.903	.897	1.007	.912	1.003
Cumulative Frequency at $E(U_t) = 1.0$	.787	.801	.759	.777	.790	.802	.782	.829	.470	.598	.709	.799	.769	.763	.737	.783	.748

TABLE 14

Summary Statistics on Information Content Measures - NYSE Firms
(Over 336 Report Periods)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	1.223	1.294	.962	1.066	1.263	1.400	.775	.911	1.282	1.084	1.308	1.057	1.325	1.166	1.068	1.317	1.409
Median	.455	.438	.410	.545	.380	.496	.487	.428	.454	.451	.365	.350	.385	.367	.440	.456	.440
Standard Deviation	2.482	2.832	2.032	2.106	2.800	2.892	1.488	2.067	2.320	3.422	3.566	2.359	3.904	3.397	1.930	2.745	3.295
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	18.160	38.070	16.672	18.895	18.892	19.519	12.796	18.845	17.899	43.232	59.803	18.770	31.535	32.747	15.750	18.039	32.999
Quartiles:																	
.25	.178	.146	.152	.179	.138	.179	.167	.184	.148	.143	.141	.154	.166	.155	.162	.160	.148
.50	.455	.438	.410	.545	.380	.496	.487	.428	.454	.451	.365	.350	.385	.367	.440	.456	.440
.75	1.147	1.098	.855	1.242	1.201	1.308	.936	.954	1.345	1.126	.993	1.000	.911	.968	1.265	1.051	1.351
Cumulative Frequency at $E(U_t) = 1.0$	.722	.730	.784	.670	.732	.675	.768	.784	.696	.722	.758	.753	.768	.753	.680	.727	.716

earnings announcements.

Inspection of Table 13 for the OTC firms indicates that the mean reaction in week zero for the OTC firms is considerably greater than that of any other week in the report period. It also appears that there is greater than normal reaction in the two weeks following the week of the earnings report. This suggests that OTC investors do perceive earnings reports to have information content and that revisions in their portfolios as a result of the new information may continue for one to two weeks following the release of the earnings report in many cases. However, analysis of the cumulative frequency distributions indicates that week zero is the only week in the report period where the majority of computed information content measures are greater than unity (that is, above normal).[9] Therefore, although the average measure is above normal in the week of the announcement plus the two weeks following, week zero is the only week where there are more above normal than below normal reactions.

Table 14 presents the results for the NYSE sample. For the sample chosen for this study, there does not seem to be any abnormal reaction to the announcement of annual earnings numbers. This is not consistent with Beaver's (1968) results where the price variability in week zero was 67% greater than that of other weeks in the non-report period. One plausible explanation may be discussed in Chapter Two. Namely, Beaver systematically chose firms with a relatively small

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[9]The bottom row on Tables 13 and 14 (and on other similar tables presented below) indicates the cumulative frequency of the information content measures at 1.0 (the expected value of the information content measure if there is no above normal variation in the report period).

number of news items appearing in the Wall Street Journal. The NYSE sample chosen for this study was randomly selected and, in general, contains many firms with a large number of news releases in the Wall Street Journal (see Table 1, Chapter One). If the number of news items is an indication of the amount of interim information which is available on a particular firm, then it might be expected that firms which have the greater number of news items would also experience the least amount of reaction when the annual report is released.[10]

The first hypothesis maintains that the annual earnings announcements of OTC firms have information content. The second hypothesis states that earnings reports by OTC firms should have greater information content than do reports issued by NYSE firms due to the lesser amounts of interim information available on the OTC firms. A graphical representation of the mean reactions during the 17 week report period for the OTC firms versus the NYSE firms appears in Figure 1. It is readily apparent that the reaction in the week of the annual earnings announcement is considerably greater for the OTC firms than it is for those firms trading on the NYSE. Furthermore, it could be expected that, if earnings reports do have information content, there should be a larger proportion of U's with values greater than unity in week zero than in other weeks. Figure 2 suggests that this is true for the OTC group but not for the NYSE.

As was described in Chapter Three, the first hypothesis may addressed by referring the computed information content measures of

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[10]Some evidence on the impact of differences in the number of interim news items on the information content measures is presented in a later section of this chapter.

FIGURE 1

Information Content Measures - OTC versus NYSE

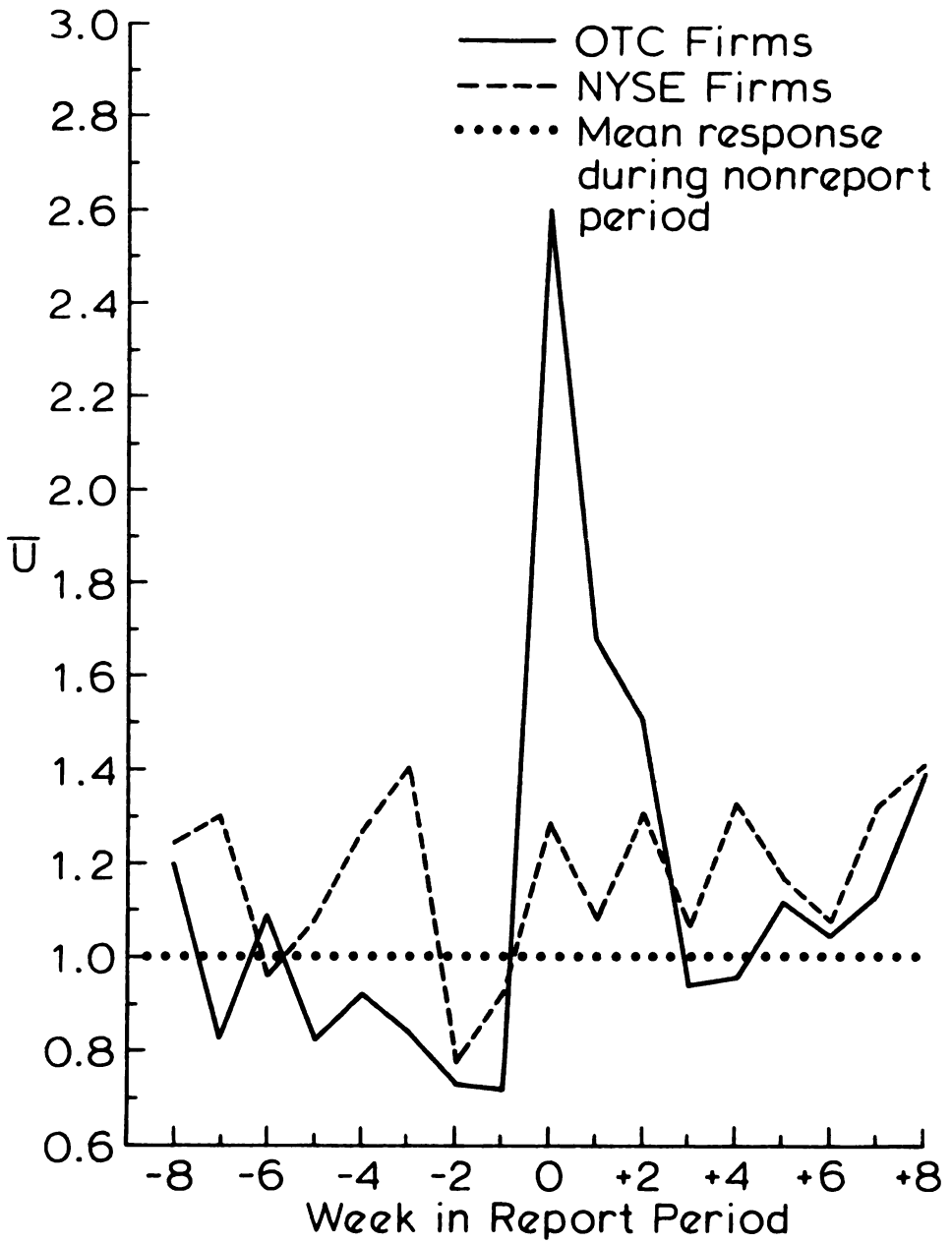
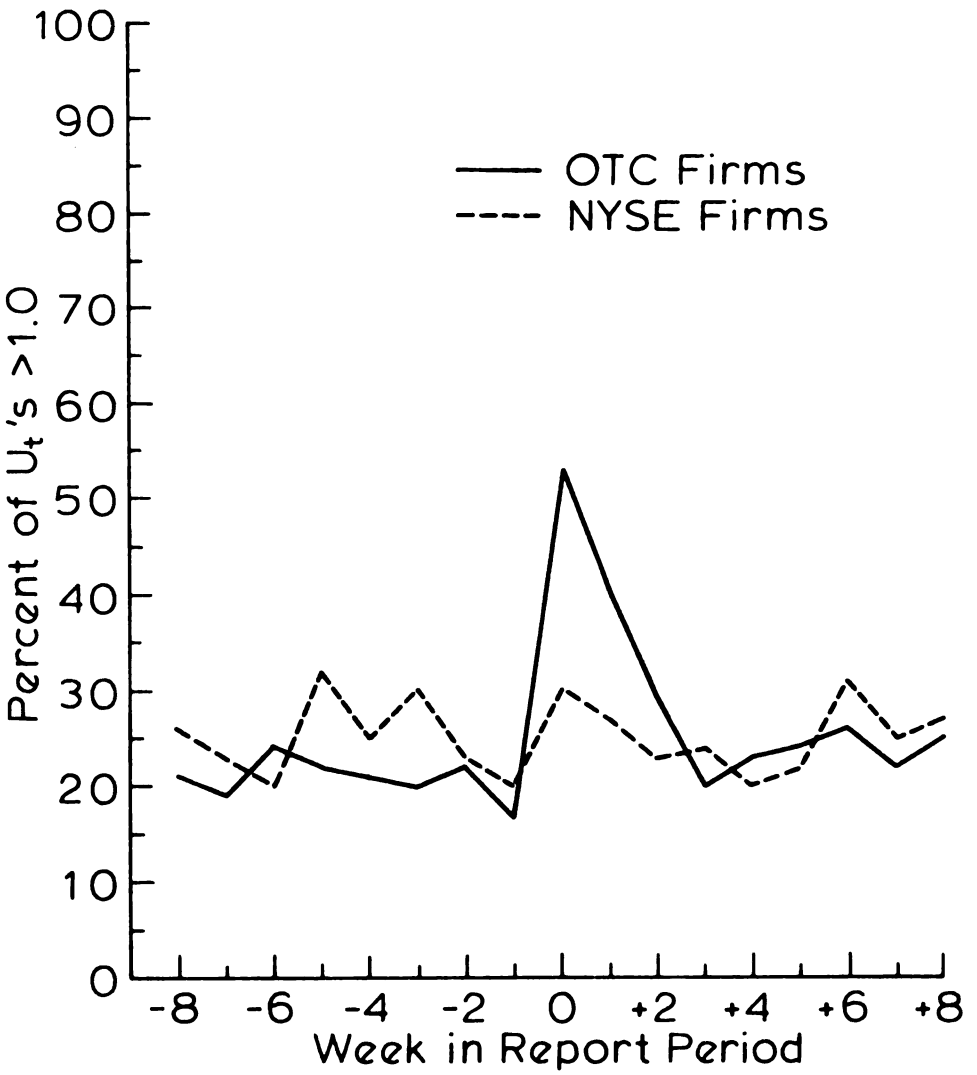


FIGURE 2

Information Content Measures Greater Than Unity -
OTC versus NYSE



OTC firms for week zero to a chi-square distribution with one degree of freedom. The computed value of 2.596 lies close to the 90th percentile on the chi-square distribution.[11] Therefore, it is apparent that OTC earnings announcements do have information content.[12]

The second hypothesis states that information content of the annual earnings announcements of OTC firms is greater than that of NYSE firms. As discussed in Chapter Three, this hypothesis may be addressed in a one-factor analysis of variance context utilizing planned comparisons. The planned comparisons procedure involves establishing contrasts between groups of interest so as to directly address questions of differences in group means. Specifically, several hypotheses of interest are substituted for the more general hypothesis normally associated with a one-factor design that all group means are equal. In our present case, the following contrast was constructed to test the second hypothesis ($\bar{U}^{N}$, $\bar{U}^{On}$, and $\bar{U}^{Oc}$ are the mean reactions in week zero for the NYSE, NF, and CF groups respectively):

$$\text{Contrast 1:} \quad \bar{U}^{On} + \bar{U}^{Oc} - 2\bar{U}^{N} = 0$$

Table 15 presents the results from the analysis of variance procedure (Contrast 2 refers to the third hypothesis and is discussed below).

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[11] The tabled valued at a 90% confidence level is 2.706, while at 80%, the value is 1.642.

[12] As an aside, the computed value of 1.67 reported by Beaver (1968) would be statistically significant at an α-level of .200. A more extensive comparison of the OTC results with the results reported by Beaver is presented in Chapter Five.

TABLE 15

ANOVA Results

Sources of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	F Ratios
Contrast 1	403.00	1	403.00	306.93
Contrast 2	1.44	1	1.44	1.10
Within	1418.30	1080	1.31	

It is apparent from Contrast 1 that the null hypothesis of no differences in group means between the OTC and NYSE samples may be confidently rejected. The F ratio of 306.93 is far in excess of any tabled values of α-levels of greater than or equal to .001.[13] Therefore, the mean information content measure for the OTC sample in week zero is significantly greater than that observed for the NYSE sample for the same week.

One basic assumption underlying the parametric ANOVA procedure is that the underlying populations for each group are normally distributed. Figures 3 and 4 present the relative frequencies of the computed information content measures for OTC and NYSE firms for the week in which the annual earnings announcement is made. These plots and a Kolmogorov-Smirnov goodness-of-fit test suggest gross departures from the normality assumption.[14] Under such circumstances the median

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[13]The tabled F value of α= .001 with 1 and 120 (conservatively) degrees of freedom is only 11.38

[14]The probability that there is no difference between the distribution of computed U's and the normal distribution is close to zero. Beaver (1968) and Oppong (1976) found similar results.

FIGURE 3

Relative Frequency of Information Content Measures in Week Zero - OTC Firms

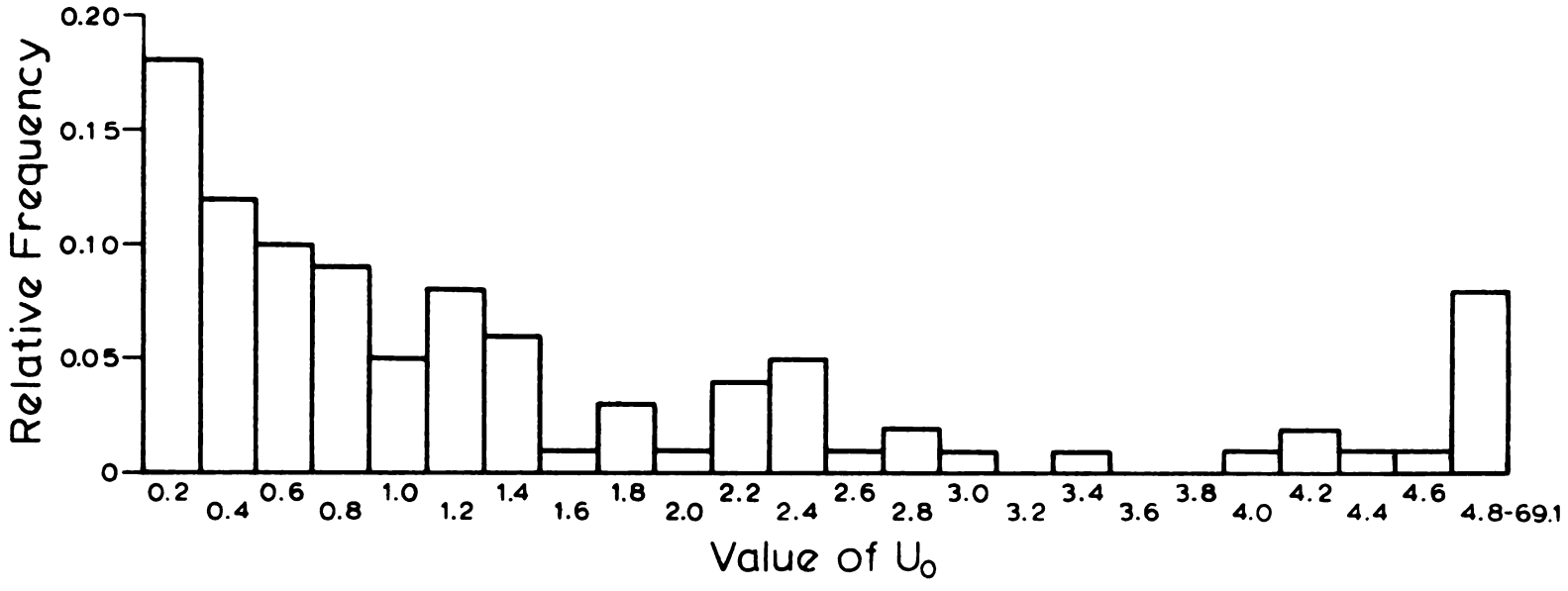
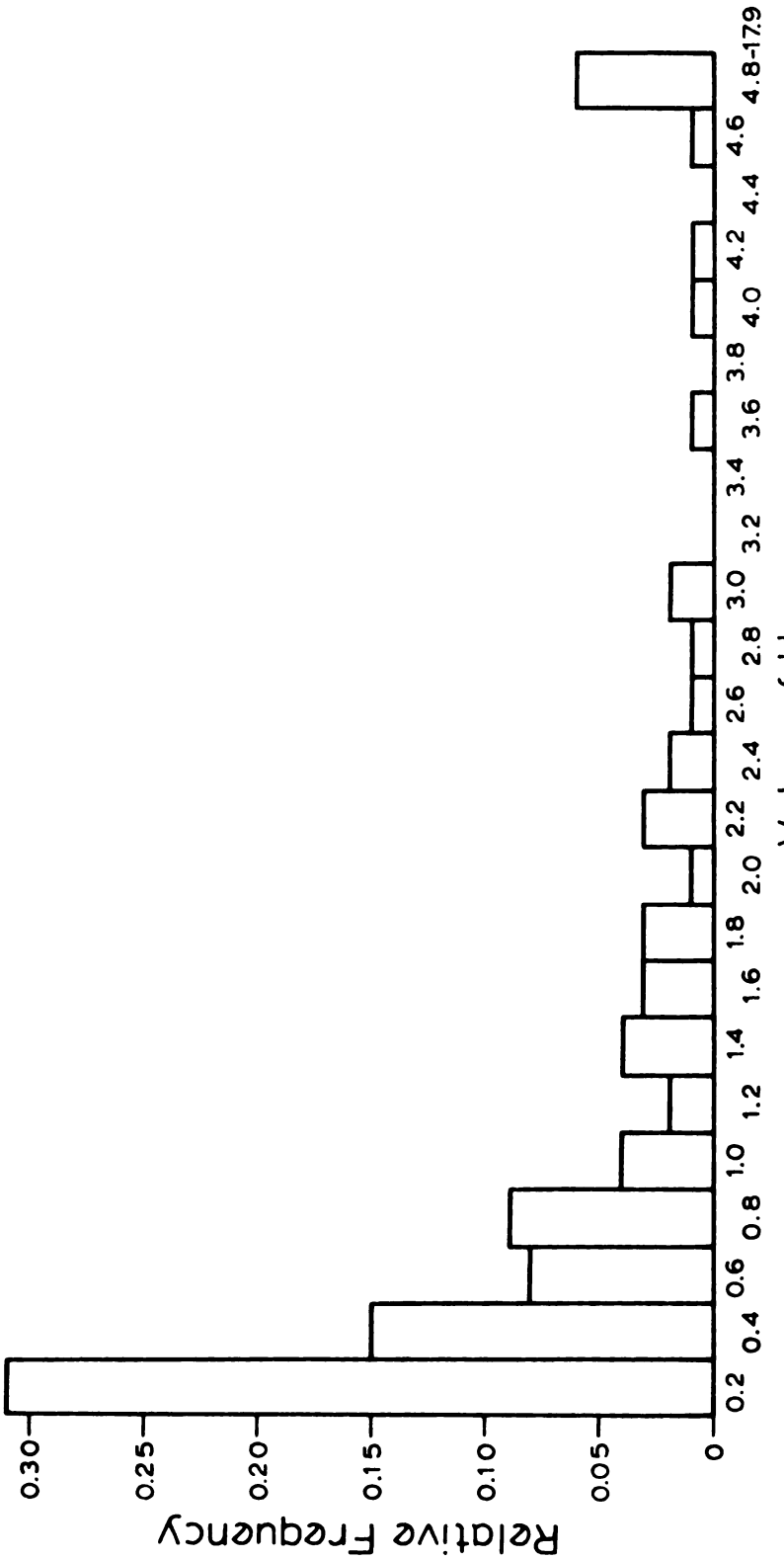


FIGURE 4

Relative Frequency of Information Content Measures in Week Zero - NYSE Firms



is generally considered to be a better measure of central tendency than the arithmetic mean. As a result, the nonparametric Kruskal-Wallis test along with related post-hoc comparisons was employed to assess any differences in medians that might exist between the OTC and NYSE samples. The design being identical with the parametric analog, the null hypothesis of no differences in medians between the NYSE and OTC groups may be rejected at an α-level of less than .001. A post-hoc comparison utilizing the same contrast as for the ANOVA procedure (with average ranks replacing means) suggests the same conclusion to that reached in the parametric test.

In summary, both the parametric ANOVA and nonparametric Kruskal-Wallis procedures indicate that the information content of the annual earnings announcements for OTC firms is significantly greater than for NYSE firms. Furthermore, this systematic differences is presumed to be due to the lesser amounts of interim information which are available on the OTC firms.

Assessing the Information Content of SEC Interim Financial Reports

The third hypothesis states that if SEC interim financial reports do have information content, it could be expected that the reaction to the annual earnings announcement would be greater for firms not making the SEC disclosures (NF firms), than it would be for firms which filed the SEC interim reports (CF firms). Tables 16 and 17 present summaries of the relevant statistics on the information content measures computed for the NF and CF samples for each of the 17 weeks in the report period.

Analysis of Tables 16 and 17 indicates that there is little

TABLE 16

Summary Statistics on Information Content Measures - NF Firms
(Over 332 Report Periods)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	1.183	.768	.869	.775	1.037	.951	.653	.644	2.546	1.488	1.393	.895	1.202	1.157	.867	1.048	1.657
Median	.386	.393	.387	.419	.362	.385	.379	.402	1.029	.754	.559	.371	.439	.393	.458	.439	.405
Standard Deviation	3.493	1.937	2.328	1.627	2.944	3.171	1.364	1.076	2.481	3.183	2.551	2.501	4.733	4.539	1.821	3.452	6.773
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	49.851	22.723	25.314	13.002	36.894	39.916	11.327	6.967	57.437	25.207	37.199	24.612	72.637	74.724	17.146	53.596	73.813
Quartiles:																	
.25	.141	.137	.133	.134	.138	.132	.127	.143	.401	.271	.197	.140	.143	.147	.159	.148	.152
.50	.386	.393	.387	.419	.362	.385	.379	.402	1.029	.754	.559	.371	.439	.393	.458	.439	.405
.75	.920	.848	.877	.883	1.019	.876	.778	.909	2.098	1.491	1.091	.903	.941	.881	.987	.959	1.019
Cumulative Frequency at $E(U_t) = 1.0$	.774	.805	.801	.775	.722	.810	.840	.767	.491	.605	.694	.801	.761	.789	.753	.765	.731

TABLE 17

Summary Statistics on Information Content Measures - CF Firms
(Over 415 Report Periods)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	1.230	.860	1.263	.861	.823	.749	.780	.759	2.635	1.823	1.566	.978	.759	1.089	1.184	1.206	1.173
Median	.404	.426	.484	.403	.351	.345	.372	.365	1.109	.947	.576	.349	.376	.446	.404	.378	.394
Standard Deviation	5.305	1.721	4.378	2.172	2.274	1.623	2.059	2.367	2.823	5.762	3.114	4.816	1.627	3.255	3.685	4.315	3.098
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	72.022	14.613	66.722	21.768	20.519	16.851	27.586	29.857	53.463	71.986	48.283	88.244	17.351	38.527	57.114	51.958	31.394
Quartiles:																	
.25	.149	.142	.153	.142	.135	.142	.138	.133	.381	.304	.196	.141	.147	.164	.154	.191	.149
.50	.404	.426	.484	.403	.351	.345	.372	.365	1.109	.947	.576	.349	.376	.446	.404	.378	.394
.75	.820	.918	1.056	.891	.792	.863	.955	.779	2.205	1.758	1.070	.819	.830	1.008	1.018	.793	1.000
Cumulative Frequency at $E(U_t) = 1.0$	.798	.799	.711	.781	.833	.798	.760	.846	.455	.592	.746	.796	.780	.738	.723	.810	.750

difference in the computed information content measures in week zero between NF and CF groups. Furthermore, the difference that does exist is not in the hypothesized direction. This is also illustrated in Figure 5 which graphically presents the comparison of the mean information content measures for both the NF and CF samples for the 17 week report period.

The third hypothesis was tested by the ANOVA-planned comparisons procedure discussed above. Contrast 2 was developed to directly compare the mean information content measure in week zero of the NF group with that of the CF group. Formally, the contrast was constructed as follows (as before, $\bar{U}^{0n}$ and $\bar{U}^{0c}$ are the mean reactions in week zero for the NF and CF groups respectively):

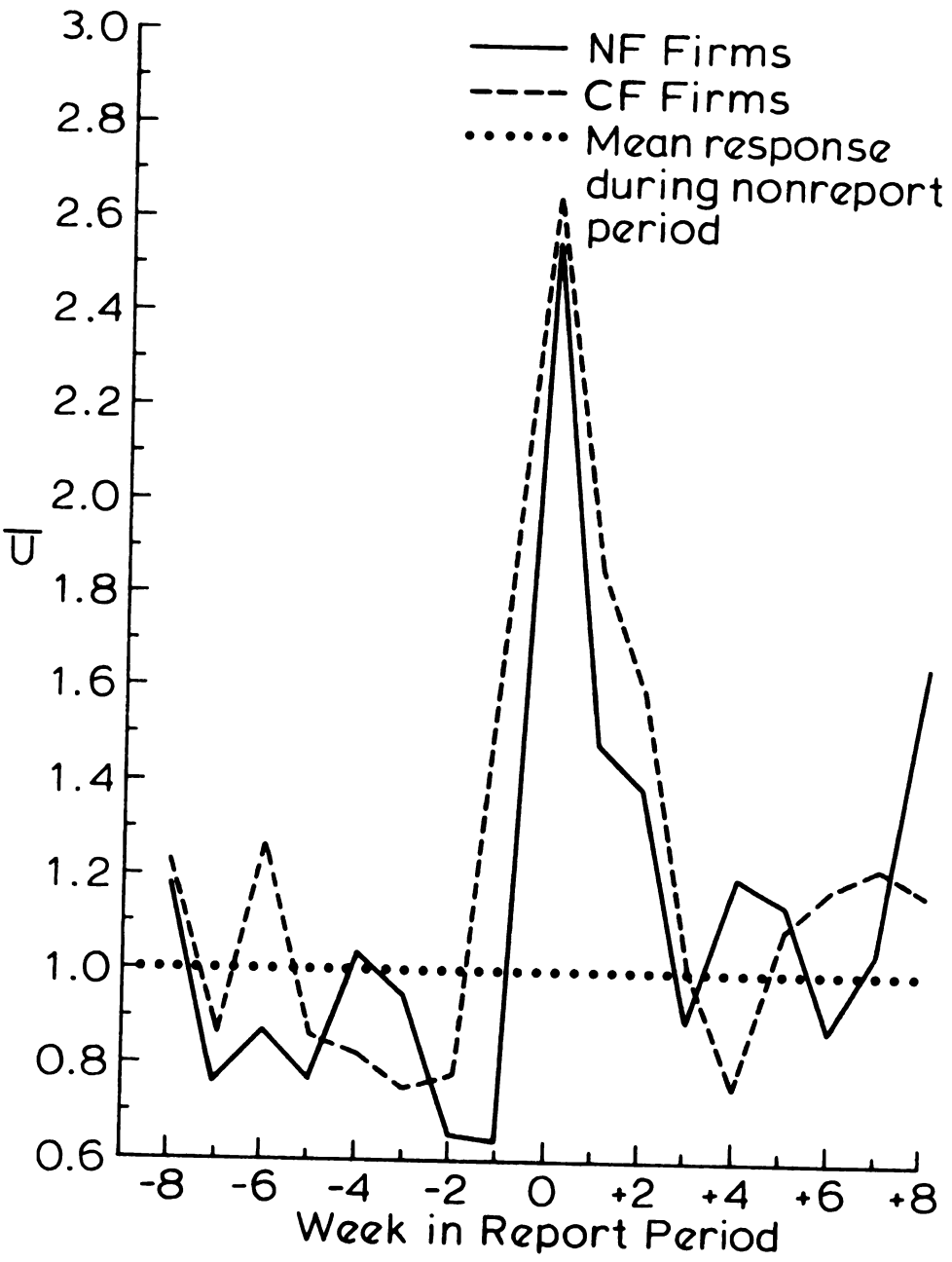
$$\text{Contrast 2:} \quad \bar{U}^{0n} - \bar{U}^{0c} = 0$$

The results from the ANOVA procedure were presented above in Table 15. Analysis of that table indicates that the computed F ratio of 1.10 for Contrast 2 is not statistically significant at any meaningful α-level. Furthermore, the computed F value is with respect to the CF group mean being greater than the NF group mean. (The planned comparisons procedure does not specify which group has the greater mean but only that there is a difference in the estimated parameters.)

As with the OTC versus NYSE comparison, the hypothesis of no difference in median information content measures between the NF sample and the CF sample was also tested using the post-hoc procedures to the Kruskal-Wallis test. The appropriate contrast was the same as stated above for Contrast 2 with average ranks replacing means. Results from the nonparametric test indicate that there is no

FIGURE 5

Information Content Measures - NF versus CF



significant difference between the median information content measure of 1.029 observed for the NF group and the 1.109 observed for the CF group.[15]

As a result of the above tests, it is apparent that the disclosure of interim financial data with the SEC does not appear to lessen the market reaction to the annual earnings announcement, at least for the OTC firms in the years studied.

Additional Testing

Both parametric and nonparametric tests indicate that the price reaction in the week of the annual earnings announcements of OTC firms is greater than for weeks in the non-report period. Results for the NYSE sample indicate that there is no abnormal price response to the release of the earnings report. An additional question concerns the uniqueness of the information content measures in the announcement week relative to other weeks in the report period. Namely, it may be that investors have access to information contained in the earnings report in weeks other than the week in which the report is made in the Wall Street Journal. Due to the apparent non-normality of the sampling distributions, a Wilcoxon matched-pairs ranked-sign test was employed to test the research hypothesis that the information content measures in week zero are significantly larger than those for other report period weeks. The results of the tests appear in Table 18.

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[15]As in the case of means, the median information content measure for the CF group is greater than that for the NF group.

TABLE 18

Wilcoxon Matched Pairs Ranked Sign Test

Research Hypotheses	Statistically Significant @ α =			
	OTC	NYSE	NF	CF
$U_o > U_{-8}$	<.0005	.775	<.0005	.001
$U_o > U_{-7}$	<.0005	.541	<.0005	<.0005
$U_o > U_{-6}$	<.0005	.273	<.0005	<.0005
$U_o > U_{-5}$	<.0005	.948	<.0005	<.0005
$U_o > U_{-4}$	<.0005	.134	<.0005	<.0005
$U_o > U_{-3}$	<.0005	.916	<.0005	<.0005
$U_o > U_{-2}$	<.0005	.102	<.0005	<.0005
$U_o > U_{-1}$	<.0005	.230	<.0005	<.0005
$U_o > U_{+1}$	.040	.845	.020	.175
$U_o > U_{+2}$	<.0005	.079	<.0005	<.0005
$U_o > U_{+3}$	<.0005	.041	<.0005	<.0005
$U_o > U_{+4}$	<.0005	.119	<.0005	<.0005
$U_o > U_{+5}$	<.0005	.046	<.0005	<.0005
$U_o > U_{+6}$	<.0005	.541	<.0005	<.0005
$U_o > U_{+7}$	<.0005	.885	<.0005	<.0005
$U_o > U_{+8}$	.001	.649	.030	<.0005

Analysis of Table 18 indicates that the information content measures in week zero are significantly greater than in any other week in the report period for the OTC, NF, and CF samples.[16] Results for the NYSE sample are mixed but generally do not support the contention that the information content measures for the announcement week are greater than in other report period weeks. The computed α-level is less than .10 in only 3 of 16 tests while it is greater than .50 in 8 different instances.

Two separate additional analyses were performed on the information content measures for all the groups. In the first analysis, all announcements were excluded which had regressions associated with them where the generated error terms had degrees of autocorrelation that were either statistically significant at an α-level of .05 or inconclusive (that is, the Durbin Watson statistic fell between the upper and lower bounds). This was done to avoid making inferences from error terms which are in fact not serially independent. For the OTC sample, 83 regressions were excluded involving 61 firms (composed of 35 regressions and 24 firms from the NF sample and 48 regressions and 37 firms from the CF sample). No regressions using returns from NYSE firms had Durbin Watson statistics below the upper bound at an α-level of .05.

The summaries of statistics on the resulting information content measures for OTC, NF, and CF firms are presented in Tables 19 through 21. The results suggest one change from the analyses above

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[16] The lone exception is for $U_0 > U_{+1}$ for the CF group. The achieved α-level for this test was .175.

TABLE 19

Summary Statistics on Information Content Measures - OTC Firms
(Excludes Announcements with Autocorrelated Residuals)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	1.058	.827	1.206	.876	.996	.893	.740	.708	2.858	1.551	1.394	1.116	1.085	1.186	1.203	1.160	1.529
Median	.392	.417	.418	.432	.373	.362	.384	.365	1.243	.986	.623	.392	.414	.444	.439	.422	.416
Standard Deviation	3.668	1.973	4.210	1.969	2.866	2.774	1,846	1.859	2.329	5,058	2.246	4.679	3.995	4.316	3.487	4.143	5.785
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	69.511	22.723	66.722	21.768	36.894	39.916	27.586	29.857	74.837	71.986	37.199	88.244	72.637	74.724	57.114	53.596	73.813
Quartiles:																	
.25	.138	.154	.149	.142	.145	.144	.140	.148	.242	.229	.188	.145	.148	.164	.168	.149	.164
.50	.392	.417	.418	.432	.373	.362	.384	.365	1.243	.986	.623	.492	.414	.444	.432	.422	.416
.75	1.078	1.028	1.068	1.087	.987	1.005	.992	.948	3.176	2.131	1.074	1.004	1.074	1.120	1.243	1.056	1.227
Cumulative Frequency at $E(U_t) = 1.0$	.730	.738	.742	.695	.789	.750	.761	.809	.412	.562	.713	.744	.732	.690	.665	.731	.684

TABLE 20

Summary Statistics on Information Content Measures - NF Firms
(Excludes Announcements with Autocorrelated Residuals)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	1.067	.802	.983	.811	1.117	.974	.648	.646	3.002	1.439	1.546	1.025	1.398	1.291	.946	1.124	2.021
Median	.386	.396	.391	.429	.370	.383	.376	.392	1.448	.933	.634	.373	.436	.389	.487	.451	.415
Standard Deviation	2.317	2.171	2.659	1.628	3.168	3.586	1.412	1.078	2.358	3.343	2.756	2.835	5.486	5.239	1.985	3.914	7.874
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.0001	0	0
Maximum	16.797	22.723	25.314	13.002	36.894	39.916	11.327	6.967	74.837	25.207	37.199	24.612	72.637	74.724	17.146	53.596	73.813
Quartiles:																	
.25	.136	.141	.132	.133	.136	.146	.129	.158	.253	.214	.193	.141	.199	.132	.181	.150	.154
.50	.386	.396	.391	.429	.370	.383	.376	.392	1.448	.933	.634	.373	.436	.389	.487	.451	.415
.75	1.196	.974	1.068	1.015	1.190	.996	.850	1.105	3.602	2.133	1.289	1.074	2.291	1.013	1.148	1.067	1.237
Cumulative Frequency at $E(U_t) = 1.0$	.695	.764	.735	.739	.693	.761	.797	.735	.393	.596	.674	.735	.638	.731	.697	.730	.661

TABLE 21

Summary Statistics on Information Content Measures - CF Firms
(Excludes Announcements with Autocorrelated Residuals)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	1.046	.838	1.405	.921	.880	.815	.812	.753	2.702	1.632	.892	1.182	.798	1.079	1.412	1.184	1.083
Median	.394	.426	.461	.432	.380	.359	.398	.347	1.148	.999	.431	.395	.379	.462	.404	.371	.416
Standard Deviation	4.513	1.774	5.175	2.216	2.555	1.771	2.143	2.327	2.282	6.152	1.670	5.806	1.830	3.280	4.369	4.312	2.812
Range:																	
Minimum	0	0	0	0	0	0	0	0	.0001	0	0	0	0	0	0	0	0
Maximum	69.511	14.613	66.722	21.768	20.519	16.851	27.586	29.857	37.610	71.986	10.706	88.244	17.351	38.527	57.114	51.958	31.394
Quartiles:																	
.25	.143	.178	.198	.163	.152	.141	.161	.139	.239	.237	.159	.166	.133	.227	.160	.142	.175
.50	.394	.426	.461	.432	.380	.359	.398	.347	1.148	.999	.431	.395	.379	.462	.404	.371	.416
.75	.927	1.102	1.068	1.108	.983	1.146	1.039	.861	2.873	1.819	1.091	.961	.936	1.162	1.483	1.018	1.217
Cumulative Frequency at $E(U_t) = 1.0$	.786	.719	.743	.689	.797	.723	.742	.818	.486	.502	.737	.761	.788	.686	.659	.741	.685

where the regressions and associated announcements involving significant Durbin Watson statistics were not excluded. The information content measures for the NF group are greater than those for the CF group, although the difference still appears to be rather modest. This result is consistent with our contentions made in previous chapters that firms which do not file interim reports with the SEC should have greater price reaction associated with their earnings reports than do firms which disclose interim data with the SEC.

Repetition of the parametric ANOVA and nonparametric Kruskal-Wallis procedures indicates that there are few meaningful modifications in the statistical inferences which were originally drawn from the total sample. The computed test statistics for the OTC versus NYSE comparison are even larger than reported initially. Concerning the NF versus CF test, the NF information content measures are greater than the CF measures with the questionable regressions and associated announcement periods excluded. However, both the parametric and nonparametric tests indicate that the difference is not statistically significant, at an α-level of as high as .20.

The second additional analysis is based on much less objective grounds. In this analysis, any information content measures greater than 10 in any week were excluded. The major concern in this case is with the influence of extremely large measures on the computed test statistics, particularly for the parametric test on differences in group means. The average number of observations excluded in any week is approximately 31 for the OTC firms and 16 for the NYSE firms. Thus, given the differences in sample sizes, both groups appear to have about the same percentage of information content measures

greater than 10. Similar results exist for the NF and CF firms which had an average of 14 and 17 measures excluded, respectively. Tables 22 through 25 present the relevant statistics on the resulting information content measures. The only major observable change (other than the expected downward shift in the statistics) is that the median information content measures for all samples involving OTC firms is less than unity. Thus, a majority of the information content measures are below normal with the extreme observations excluded. This would suggest that, although the market reaction to the announcement for many OTC firms in the sample appears to be sizable, there is a significant number of firms for which there is relatively little, if any, abnormal market reaction in the week of the annual earnings announcement. Results from the ANOVA and Kruskal-Wallis tests are not meaningfully different from those initially reported.

The apparent lack of information content of the annual earnings announcements for NYSE firms suggested in the above analyses is contrary to prior empirical evidence (Beaver, 1968). Three additional analyses were conducted on the NYSE sample in an attempt to explain the reason for this finding.

As was stated above, this observed difference in results for NYSE firms may be due to differences in the amount of interim information available on the sample randomly selected for this study and the sample selected for Beaver's study. To partially test this proposition, all NYSE firms with 11 or more announcements in any calendar year in the Wall Street Journal were excluded from the

TABLE 22

Summary Statistics on Information Content Measures - OTC Firms
(Excludes Measures Greater Than 10 in Any Week)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	.775	.724	.726	.634	.684	.662	.623	.601	1.879	1.026	.839	.688	.715	.751	.729	.737	.772
Median	.319	.359	.327	.354	.299	.308	.322	.317	.798	.593	.359	.269	.349	.336	.367	.354	.339
Standard Deviation	1.499	1.326	1.320	1.186	1.284	1.257	1.181	1.096	1.284	1.666	1.326	1.136	1.307	1.411	1.287	1.462	1.467
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	9.820	9.544	9.492	9.431	9.786	9.254	9.832	9.869	9.931	9.345	8.542	9.983	9.353	9.292	9.431	9.992	9.282
Quartiles:																	
.25	.139	.131	.145	.139	.131	.130	.132	.129	.289	.188	.143	.140	.137	.136	.151	.142	.133
.50	.319	.359	.327	.354	.299	.308	.322	.317	.798	.593	.359	.269	.349	.336	.367	.354	.339
.75	.803	.846	.909	.879	.837	.835	.869	.820	1.816	1.372	1.022	.749	.802	.795	.902	.869	.831
Cumulative Frequency at $E(U_t) = 1.0$	.801	.805	.795	.819	.803	.811	.827	.834	.596	.621	.730	.843	.815	.792	.789	.820	.787

TABLE 23

Summary Statistics on Information Content Measures - NYSE Firms
(Excludes Measures Greater Than 10 in Any Week)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	.945	.998	.782	.892	.931	.965	.713	.734	1.149	.785	.943	.826	.697	.737	.895	.907	1.018
Median	.441	.410	.404	.521	.359	.463	.384	.422	.449	.449	.355	.337	.371	.360	.434	.444	.411
Standard Deviation	1.525	1.786	1.392	1.232	1.604	1.462	1.212	1.121	1.886	1.104	1.523	1.431	1.179	1.248	1.315	1.469	1.811
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	9.274	9.372	9.169	7.792	9.511	9.413	8.854	9.071	8.950	8.438	9.237	9.611	8.803	9.224	8.436	9.213	9.992
Quartiles:																	
.25	.177	.138	.148	.174	.137	.178	.162	.183	.147	.139	.141	.154	.164	.155	.160	.158	.147
.50	.441	.410	.404	.521	.359	.463	.384	.422	.449	.449	.355	.337	.371	.360	.434	.444	.411
.75	1.033	.989	.816	1.230	1.019	1.200	.924	.928	1.296	1.106	.936	.943	.844	.892	1.222	1.008	1.020
Cumulative Frequency at $E(U_t) = 1.0$	.737	.766	.796	.677	.747	.697	.772	.792	.703	.729	.766	.764	.793	.768	.691	.750	.735

TABLE 24

Summary Statistics on Information Content Measures - NF Firms
(Excludes Measures Greater Than 10 in Any Week)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	.849	.643	.610	.649	.751	.631	.620	.644	1.954	1.066	.732	.612	.777	.835	.720	.781	.793
Median	.330	.339	.327	.357	.300	.323	.336	.402	.809	.565	.457	.312	.379	.349	.402	.385	.347
Standard Deviation	1.643	1.072	1.156	1.093	1.450	1.166	1.234	1.076	1.265	1.766	1.307	1.135	1.450	1.614	1.216	1.495	1.562
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	9.820	7.161	9.492	9.431	9.134	8.056	9.832	6.967	9.931	9.345	8.542	9.777	9.353	9.087	9.431	9.992	9.067
Quartiles:																	
.25	.131	.136	.132	.129	.137	.132	.126	.143	.319	.185	.152	.132	.140	.126	.158	.146	.149
.50	.330	.339	.327	.357	.300	.323	.336	.402	.809	.565	.457	.312	.379	.349	.402	.385	.347
.75	.846	.836	.840	.809	.944	.830	.767	.909	1.851	1.364	.865	.744	.841	.861	.960	.931	.835
Cumulative Frequency at $E(U_t) = 1.0$	.788	.800	.816	.809	.776	.819	.843	.767	.636	.622	.768	.816	.804	.796	.788	.805	.788

TABLE 25

Summary Statistics on Information Content Measures - CF Firms
(Excludes Measures Greater Than 10 in Any Week)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	.715	.790	.819	.622	.606	.687	.624	.559	1.819	.993	.926	.767	.665	.683	.735	.702	.755
Median	.291	.372	.327	.336	.299	.293	.320	.307	.793	.611	.338	.198	.328	.324	.336	.331	.332
Standard Deviation	1.372	1.497	1.433	1.198	1.297	1.325	1.138	1.111	1.298	1.584	1.343	1.138	1.181	1.219	1.344	1.435	1.387
Range:																	
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	9.591	9.544	9.411	9.330	9.786	9.254	9.001	9.869	9.629	9.130	8.951	9.983	6.649	9.292	8.769	9.953	9.282
Quartiles:																	
.25	.143	.127	.151	.134	.127	.127	.135	.121	.276	.193	.137	.136	.138	.138	.141	.137	.135
.50	.291	.372	.327	.336	.299	.293	.320	.307	.793	.611	.338	.198	.328	.324	.336	.331	.332
.75	.787	.847	.946	.909	.663	.860	.876	.747	1.799	1.461	1.035	.758	.743	.749	.887	.734	.821
Cumulative Frequency at $E(U_t) = 1.0$	.811	.806	.778	.828	.846	.801	.817	.856	.571	.604	.787	.848	.816	.790	.795	.828	.787

analysis.[17] It could be expected that the price reaction in week zero might be greater for the remaining firms due to the limited amount of exposure received during the year in the financial press. The results appear in Table 26.

As can be observed, the information content measures for week zero are considerably greater than those reported in previous analyses. This would imply that there may be an inverse relationship between the number of news items and the level of price reaction to the annual earnings report. However, results from Wilcoxin matched-pairs ranked-sign tests indicate that the information content measures for week zero are not systematically greater than for other weeks in the report period.[18] Nonetheless, the results from this test suggest that the lack of any significant price reaction in week zero for the NYSE firms reported in the initial analysis may be at least partially due to large differences in the amount of interim information.

An additional attempt was made to test the hypothesized inverse relationship between the information content of annual earnings announcements and the number of interim news items. For each year in which a firm's earnings announcement was included in this study, the number of interim news items appearing in the Wall Street Journal for that firm was tallied. The computed information

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[17] Recall the nonparametric test from Chapter One. Although not reported there, the first quartile of the number of news items for the NYSE firms has an upper limit of 10 news items.

[18] For 4 other weeks in the report period, the hypothesis of no difference in medians could not be rejected at an α-level of .10.

TABLE 26

Summary Statistics on Information Content Measures - NYSE Firms
(Includes Firms With Less Than 11 Wall Street Journal Announcements Per Year)

	- Week in Report Period -																
	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8
Mean	.972	2.077	1.091	1.686	.910	1.208	.818	1.339	2.028	2.218	3.030	1.070	1.613	2.078	.583	.603	.866
Median	.333	.664	.483	.679	.356	.684	.773	.587	.699	.618	.358	.278	.446	.422	.231	.270	.275
Standard Deviation	2.308	6.856	1.820	3.582	1.595	1.338	1.289	3.381	2.562	7.792	10.888	1.937	4.296	6.258	.704	.923	1.873
Range:																	
Minimum	0	.013	.001	0	.002	.003	.003	.001	0	.001	0	0	.002	0	0	.014	.011
Maximum	10.824	38.070	7.336	18.895	6.606	5.375	5.446	18.845	7.691	43.232	59.803	9.611	23.156	32.747	2.344	4.348	9.992
Quartiles:																	
.25	.068	.162	.128	.191	.106	.123	.210	.093	.249	.237	.139	.094	.151	.112	.022	.050	.046
.50	.333	.664	.483	.679	.356	.684	.773	.587	.699	.618	.358	.278	.446	.422	.231	.270	.275
.75	.684	1.178	1.287	2.199	.973	1.923	1.439	1.237	3.469	1.205	2.873	1.363	1.130	1.153	1.110	1.024	1.311
Cumulative Frequency at $E(U_t) = 1.0$	.833	.667	.690	.567	.805	.560	.733	.700	.600	.667	.665	.708	.700	.705	.734	.731	.669

content measures in week zero were then associated with the number of interim news items by calculating a Spearman rank order correlation coefficient. This was conducted for both OTC and NYSE samples. The results of the tests and an indication of the relationship between the number of interim news items and the information content measures in week zero appear in Table 27.

TABLE 27

Classification of Information Content Measures
by Number of Interim News Items

Number of WSJ Interim News Items	Median Information Content Measures	
	OTC	NYSE
1-3	.794	(a)
4-6	1.112	.496
7-9	1.283	.835
10-12	.781	1.089
13-15	.450	.681
16-18	1.216	.462
19-21	.731 (b)	.758
22-24	(b)	.371
25-27	(b)	.584
28 and over	(b)	.683
Spearman Rank Order Correlation Coefficient	-.127 (α<.0005)	-.091 (α<.05)

(a) No NYSE firms had less than 4 announcements per year in the Wall Street Journal.

(b) Only one OTC firm (with 19 announcements in 1962) had greater than 18 announcements per year in the Wall Street Journal.

Analysis of Table 27 indicates that the sign of the correlation coefficient for both the OTC and NYSE samples is negative as expected. In addition, both coefficients are statistically significant as nominal α-levels. Nonetheless, the relatively small coefficient computed for the NYSE firms, in particular, suggests that the low magnitude of the NYSE information content measures in week zero cannot be entirely explained in terms of the large amounts of exposure received by NYSE firms in the financial press.

Another extension of the analysis on the NYSE firms was conducted due to the large number of NYSE firms which reported earnings during the first three months of each year. As was discussed in an earlier section of this chapter, the grouping of significant numbers of announcements in a few periods may cause a change in the market-wide rates of return for those periods, if earnings reports do have information content. Therefore, when the market returns are abstracted out via the market model, a portion or all of the information content in the report may also be eliminated. To partially test this possibility, only NYSE firms with announcements in the months of May through December were analyzed. For NYSE announcements in these months, there is an increase in the mean information content measure in week zero to 1.584. Results from Wilcoxin matched-pairs ranked-sign tests indicate, however, that the median for week zero is not uniquely greater than those observed for other weeks in the report period.[19] Thus, consistent with what was stated earlier,

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[19]Three other weeks in the report period had medians not significantly different from that for week zero at an α-level of .10.

while the clustering of announcements in a few months may partially explain the low information content measures observed for the NYSE firms for the announcement week there, nevertheless, does not appear to be any clear evidence that the measures in week zero are systematically greater than those observed in other weeks.

From this additional analyses, it is apparent that the major inferences drawn from the original comparisons still hold. The information content of annual earnings reports for OTC firms is significantly greater than that observed for the NYSE sample. However, the results do not suggest that the information content measures are greater for NF firms than for CF firms. This might be due to sufficient amounts of interim information being available on the NF firms from sources other than the SEC. To partially explore this possibility, the Wall Street Journal Index was analyzed to assess whether there were any systematic differences in the average number of interim accounting and non-accounting news items appearing for both NF and CF firms. As discussed above, a higher number of news items for the NF sample might contribute to the explanation of why reactions are not greater for that group. However, the results suggest that the number of accounting and non-accounting news items is considerably greater for the CF sample than for the NF sample. Additional interpretations of the results of all tests appear in Chapter Five.

addition, analysis of Figure 1 from Chapter Four suggests that the OTC investment community relies very heavily on the annual report due to the apparent lack of more timely sources of information. The reaction in weeks preceding the release of the annual earnings announcement is, in general, below the mean reaction during other weeks in the year.[1] This suggests that there may be few opportunities to gain access to information contained in the annual earnings number prior to its announcement in the Wall Street Journal. In other words, the leakage of information contained in the annual earnings report through more timely sources of interim information appears to be negligible.

In contrast to the general tendency for below normal price volatility prior to the announcement date, the results for the OTC sample indicate that the reactions following the annual earnings announcement are, for the most part, greater than normal. In fact, the computed information content measures in each of the two weeks immediately following the announcement week are also greater than those found in other weeks in the report period. This would suggest that the market's evaluation of the information contained in the annual earnings announcement continues for at least two weeks following the week of the release. It also appears that the opportunities for abnormal returns from relying on the earnings announcements made in the Wall Street Journal diminish quickly after these

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[1]The observed values of $\bar{U}$, the information content measure, are less than 1.0 in 6 or 8 weeks preceding the announcement week.

two weeks.[2] Therefore, consistent with prior research utilizing OTC returns, the results from this study suggest that the OTC is reasonably efficient in impounding the information contained in the annual earnings announcement into equilibrium share prices.

Results of a statistical comparison of the information content measures for the OTC group versus a randomly selected NYSE sample indicate rather convincingly that the reaction to annual earnings announcements is greater for the OTC firms than it is for those firms listed on the NYSE. In fact, for the NYSE firms chosen for this study, there does not appear to be any reaction to the release of the annual earnings announcement uniquely different from that found in other weeks in the report period. (See Figure 1 in Chapter Four.) This would suggest two possible explanations. One inference might be that the annual earnings announcements made by the NYSE firms in the Wall Street Journal are of no apparent value to investors in valuing their portfolios. Investors, for whatever the reason, may choose to ignore the data contained in the annual earnings report. A second, and perhaps more plausible, interpretation might be that the investors have a multitude of different sources from which to acquire information concerning NYSE firms on a much more timely basis than that of the annual earnings announcement made in the Wall Street Journal. Therefore, when the annual earnings number is released, it may be used merely to verify the accuracy of the information acquired earlier from the more timely interim sources. Any reaction that is observed

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[2]The noticeable reaction in week +8 may quite likely be due to the release of the interim earnings number for the first quarter of the subsequent year.

in the announcement week might then be attributed to revisions in portfolios due to this verification process.

Under this second explanation, the results observed in this study for NYSE firms are more consistent with those reported by Beaver (1968). As alluded to earlier, Beaver's sample was composed of firms with relatively few interim news items in the Wall Street Journal. If the number of news items is a reasonable surrogate for the amount of interim information which may be available on a firm, then it might be expected that the greater the number of news items, the less the price reaction would be when the annual report is released.[3] The average number of news items for the NYSE sample in this study is considerably greater than that for Beaver's NYSE sample. Therefore, it might be expected that the reaction to the annual earnings announcements observed in this study would be correspondingly less than that reported by Beaver.

The results for the OTC firms included in this study and those reported by Beaver on his NYSE sample provide an interesting comparison. Some of the OTC firms filed interim SEC reports and others did not. But a common element in every OTC firm is the relatively few number of news items. Beaver's sample, as mentioned, was also composed of firms with a limited number of news items. However, the number of news releases for firms in Beaver's sample was still much greater than that for the OTC group.[4] Figure 6 presents the

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[3]Results from the elimination of all NYSE firms with more than 10 news items per year from the analysis seems to bear this out although the results are, at best, preliminary. (See Chapter Four.)

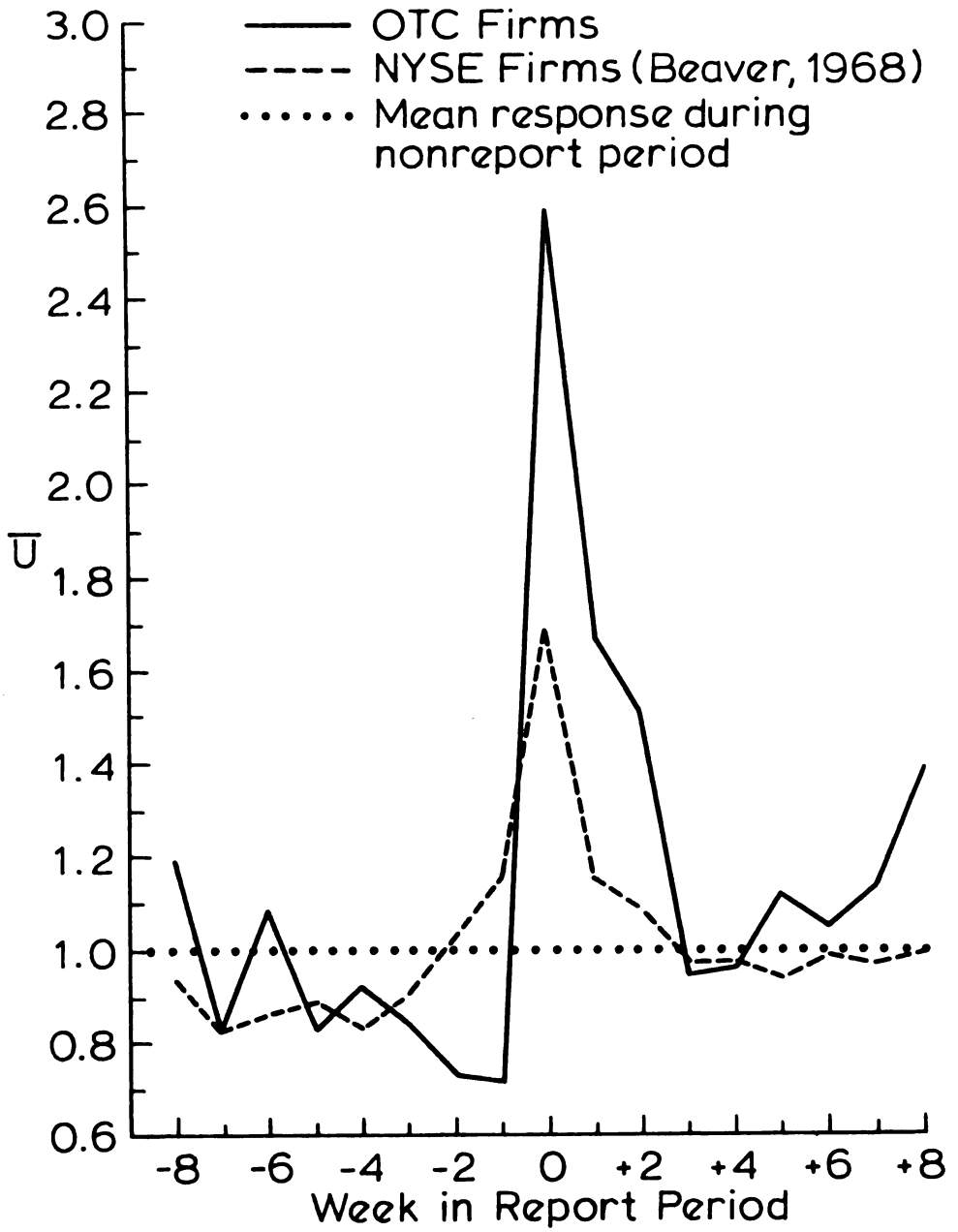
[4]Recall from Chapter One (from the test on differences in the number of news items for OTC versus NYSE), that the maximum number for the OTC sample was 18. Beaver excluded firms with 20 or more news items per year.

information content measures obtained in this study for OTC firms versus those observed by Beaver. The plots suggest that the information content of OTC announcements is considerably greater than for Beaver's NYSE group. The apparent difference may be due to lesser amounts of interim information available in the OTC firms. This difference in the amount of interim information might be composed of either (or both) accounting information (SEC reports for the NF component of the OTC sample, or interim financial reports made in the Wall Street Journal or distributed to shareholders, for example), or non-accounting information (such as news release other than earnings reports, security analyst's forecasts, etc.).

The third aspect of this study pertains to the amount of information provided investors by the required filing of interim financial reports with the SEC. Namely, if SEC filings are useful in anticipating the annual results, it could be expected that the market reaction to the annual earnings announcements for firms which file the SEC reports would be less than that observed for firms not making the SEC filings. The empirical evidence reported in Chapter Four does not support this contention. No significant difference appears to exist in the reactions during week zero between the non-filing (NF) firms and the filing (CF) firms. This implies one of three conditions. The SEC interim filings may not provide any useful information to investors in valuing their security holdings, and as a result the presence or absence of such data would not influence equilibrium share prices. However, this interpretation conflicts with results from prior studies (i.e., May, 1971; Kiger, 1972; Brown and Kennelly, 1972). A second interpretation is also possible.

FIGURE 6

Information Content Measures -
OTC versus NYSE (Beaver, 1968)



It may be that data contained in the SEC interim filings does have information content and could be useful to investors in portfolio decisions. However, the potential information that is contained in SEC reports may also be provided by alternate sources, either accounting or non-accounting. Therefore, when comparing the two groups (NF and CF) which are presumably identical, except for meeting SEC disclosure requirements, the absence of any observable difference may be due to this condition. Specifically, NF firms may have no greater reaction than do CF firms due to the fact that the same information which is supplied in the SEC reports is also supplied via alternative accounting or non-accounting sources. Furthermore, if it is assumed that the amount of interim accounting information available for each group is approximately equal, then the information which is contained in the SEC interim reports may be supplied to market participants by solely non-accounting sources.[5] Finally, a third explanation for the observed results might be that most NF firms disclosed the same information, which would otherwise be available in SEC interim filings, by the voluntary distribution of interim financial reports to shareholders and other interested parties. The design of this study is such that any firms which did voluntarily disseminate interim financial data could not be identified.

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[5]In fact, analysis of the Wall Street Journal Index indicates that CF firms are more likely to make interim earnings announcements in the Wall Street Journal than are NF firms, thus suggesting that non-accounting sources are providing a significant portion of the total amount of information on NF firms.

Implications of the Results

There are several implications of the results reported in Chapter Four. First, Ball and Brown (1968), among others, have suggested that the annual earnings announcement is not a timely medium due to the many alternative sources of information. It is apparent from the evidence in this study, that the timeliness of the earnings report may be conditional upon the amount of interim information which is available. For a population such as the OTC securities market, the annual earnings announcement does appear to be timely due to the limited number of alternative sources of information which are available on these firms other than the annual report. This is consistent with remarks made by Gonedes (1972), and quoted in an earlier chapter, that the accounting process, as a supplier of information, operates in a competitive setting. However,

> "if there is nothing competing with accounting numbers as sources of information, then (assuming that accounting numbers have information content) one would expect to observe rapid price movements at the time the accounting numbers are issued. . . ." (p.15)

Because of this apparent difference in timeliness of the annual earnings announcements across securities markets, accounting policy-making bodies (FASB, SEC, for example) should not establish disclosure requirements independent of the market in which a firm is traded. The results reported here suggest that before taking action to eliminate existing reporting requirements or impose new reporting requirements, accounting policy-making bodies should perhaps consider the existing information environment and what competing (alternative) sources of information may be available via which the information disclosures in question may be disseminated

to market participants. If the annual report is the primary source of information available for use in setting equilibrium share prices, it presumably should be as comprehensive as possible. If, however, there are many potential sources of interim information available, then the composition of the annual earnings report should perhaps be determined with these alternative information sources in mind. In many cases, the information contained in the earnings report would be presumably supplied most efficiently by the accounting process. However, policy-making groups should not attempt to determine disclosure requirements without also considering other sources which may supply information pertinent to the valuation of the firm.

These results also have direct implications for the SEC's Advisory Committee on Corporate Disclosure. As was stated earlier, some of the charges of this group include identifying the types of information which affect share prices, those who make investment decisions, the information which they use, and the means by which they acquire the information. This study provides evidence on a number of these areas. First, it is apparent that the annual earnings announcement for OTC firms is associated with observed security price adjustments. Second, this study has identified a particular segment of the securities market which may rely more heavily on annual accounting reports because of problems in acquiring necessary information from alternative sources. Third, a major result of this paper is that investors apparently use the information which is made available to them on the most timely basis. Finally, the results from both the OTC versus NYSE and the NF versus CF comparisons may be interpreted to imply that investors use the means which are available

to acquire needed information. In some cases, this may require substituting one source of information which is available for another which is unavailable (e.g., for NF firms, accounting and/or non-accounting sources may be substituted for the unavailable SEC interim reports). In other cases, investors may simply postpone portfolio decisions, if no alternative sources of information can adequately meet their needs.

An additional implication of these research results relates directly to statements made recently by the AICPA. As was mentioned in Chapter One, the AICPA has argued for increased financial disclosure only for the largest firms thus relieving the smaller firms from generating unnecessary information. The evidence presented here suggests that this recommendation may be the opposite of what should be proposed to the rule-making bodies. It is reasonably well accepted that the largest firms have the greatest amount of exposure in the financial press, with security analysts, and in other popular sources of information. But we have shown that there appears to be an inverse relationship between the amount of interim information of this type and the information content of the annual earnings announcements. Therefore the proposal made by the AICPA, if adopted by the FASB or SEC, would only increase the disclosure for the largest firms with no apparent benefit to the marketplace in setting equilibrium prices. Similarly, the data on the smaller firms would become more limited which would further reduce the already scarce supply of information available on these firms from which to make portfolio decisions. Results of this study suggest that the scope of the annual report for smaller firms (such as those firms whose equity

shares are traded OTC) should possibly be expanded, rather than reduced as recommended by the AICPA.

CHAPTER SIX

SUMMARY, LIMITATIONS, AND SUGGESTIONS FOR FUTURE RESEARCH

Summary and Conclusions

The major objectives of this study were twofold. First, evidence was sought on whether the degree of information content in annual earnings announcements is inversely related to the amount of available interim information. The second goal of this study was to determine if the required interim financial reporting to the SEC appears to influence the degree of information content in the annual earnings announcements. The investigation of the first question required selecting samples from (1) a population for which there appears to be only limited interim information available (OTC firms), and (2) a population (NYSE firms) which normally would have a wide range of interim information sources. The second question was addressed by separating the OTC sample into two groups: Those firms which filed interim SEC financial reports (CF firms), and those which did not (NF firms).

For each of these samples, a measure of information content was computed for each week from eight weeks prior, to eight weeks following the week of the annual earnings announcement. (The 17 week interval was referred to as the report period.) The information content measure was constructed as a ratio of the variability of

residual stock price changes in a given week in the report period to the mean variability of residual price changes during the weeks not in the report period. For the week of the annual earnings announcement, if this ratio was greater than unity for a given sample the announcement was inferred to possess information content. Alternatively, if the ratio was less than one, the earnings report was considered to have no information content. In addition, the level of the information contained in the annual earnings announcement was measured by the relative magnitude of the information content measure in the announcement week versus other weeks in the year.

Statistical comparisons (utilizing parametric and nonparametric testing procedures) were made between the levels of the information content measures computed for each of the various samples (OTC, NYSE, NF, and CF firms) in addressing the major questions posed in this paper. The results of the information content analysis and statistical tests (see Chapter Four) suggest several tentative conclusions.

First, the annual earnings announcements of OTC firms appear to possess information content. The computed information content measures in the announcement week for the OTC sample were considerably greater than unity. Second, the computed information content measures for a random sample of NYSE firms were not significantly different in the week of the annual earnings announcements from other weeks in the report period. The basic interpretation for the observed difference between the OTC and NYSE information content measures in the week of the annual earnings announcement relates to the differential amounts of interim information available on the two groups.

OTC investors apparently have few alternative sources from which to acquire information on firms prior to the release of the annual earnings number. Therefore, when the announcement is made, the market reaction to the information contained in the report is significant. On the other hand, a multitude of sources are available on many NYSE firms which presumably supply considerable amounts of information to investors on a more timely basis than that of the annual earnings announcement. Thus, the eventual release of the earnings number provides relatively little additional information.

It was also hypothesized in this study that if investors find the SEC interim financial reports to be useful in anticipating annual results, the information content measures of annual earnings announcements should be less for those firms which file with the SEC than for those firms which do not. Or, in other words, if investors are able to obtain information during the year through interim SEC filings which will allow them to anticipate the contents of the annual earnings announcement, the market reaction to the report of the annual earnings number should not be as great as it would otherwise be in the absence of the interim SEC disclosures.

The results of the empirical investigation do not support this contention. There appears to be no difference in the information content measures in the week of the annual earnings announcement between the firms which do make interim SEC filings (CF firms) and those which do not (NF firms). The most plausible inference from these findings would be that the same information contained in the SEC disclosures may also be made available by alternative accounting and non-accounting sources. As a result, if the SEC reports are unavailable

for certain non-filing firms, investors in those firms may obtain the same information from other sources. Furthermore, one of these sources may be the voluntary distribution of interim financial reports by the non-filing firms to their shareholders and other interested parties. This explanation is consistent with comments made in prior research (May and Sundem, 1973; Gonedes, 1972; for example) that the accounting function is only one supplier of information and that much of the data contained in accounting reports may also be supplied to market participants through other sources.

The results of the study suggest several implications which are discussed in detail in the preceding chapter. The major implication from the findings, however, is that the timeliness of the annual earnings announcement may be conditional upon the amount of interim information which is available. This would suggest that accounting policy-making bodies, such as the FASB or SEC, should perhaps consider the existing information environment in setting standards for financial disclosure. Competing sources may, or may not, be available via which the disclosure of specific items in question might be disseminated to market participants. It therefore would seem appropriate that the policy-making bodies attempt to (1) identify these potential competing sources of information, and (2) ascertain the relative importance of these various sources along with the annual accounting report in setting equilibrium share prices.

Limitations of the Study

The reliability of the empirical results is related to the appropriateness of the assumed return generating process and the

procedures used to obtain the results. Furthermore, the conclusions and interpretations placed on the findings are dependent on the accuracy of claims made about the relative amounts of interim information available on the various groups observed in this study. Therefore, the results and conclusions of this empirical investigation should be evaluated with these limitations in mind.

The use of the market model as the assumed process by which period-by-period returns are generated for each firm poses several potential problems. From the results of this and other studies (King, 1966; Oppong, 1976; Beaver, 1968; and May, 1971, among others) it is apparent that the model may be better specified for monthly than for weekly returns. The explanatory power of the independent variable, the market-wide return surrogate, appears to be considerably higher using monthly data.

The use of the market model also implies that the market risk measure, beta, for each firm is stationary and can be estimated with little or no error. Previous research (Blume, 1971; Meyers, 1973; for example) has suggested that this may not be true at the individual security level, as was the case in this study. To partially overcome this, the beta estimate for each firm was computed for each consecutive announcement period. However, it is still very possible that the beta estimates were not stationary for all announcement years.

The computed regression statistics (see Chapter Four) also imply that the form of the return generating process assumed in this study for OTC firms could be better specified. The amount of variation in OTC returns explained by the market variable was considerably less than that observed for the regressions utilizing NYSE data. In

addition, the number of regressions which contained autocorrelated error terms was significantly greater for the OTC group than for the NYSE group. Both of these factors may have been related to the use of a NYSE index as the independent variable for the regressions conducted on the returns of OTC firms. To the extent that the market returns for the OTC sample were not directly related to the returns on the NYSE index, the observed lower R^2's and greater incidence of autocorrelated error terms might be expected.

Finally there is another specification issue concerning the market model. As mentioned in Chapter Three, prior research (Black, 1972; Black, Jensen, and Scholes, 1972; and Fama and Macbeth, 1973) has indicated that a two-factor model may be a more accurate approximation of the actual underlying process of generating returns, at least for monthly returns on NYSE firms.[1] This might be one explanation for the low information content measures computed for the NYSE firms in this study.

As reported in Chapter Four, there was a significant amount of clustering of earnings announcements in the early months of each year in the study period. If earnings announcements have information content, the clustering of sufficient numbers of announcements in a given period could have resulted in a change in the market return for that same period. Thus since the effects of changes in the market return were eliminated via the market model, it is possible that the

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[1]As mentioned in Chapter Three, the primary reason for not employing the two-factor model for generating returns in this study was the lack of available estimates of the required cross-sectional parameters on a weekly basis.

reactions to earnings reports may have been eliminated as well. This may especially be true for the NYSE firms, in that the return on a NYSE index was used as the independent variable for the regressions. As a result, there may have been a systematic bias against NYSE firms in observing a significant market reaction in the week of the annual earnings announcement.

The process of selecting earnings announcements of firms for inclusion in this study also leaves opportunity for the information content measures to contain "noise". Report periods which contained announcements of dividends or splits were systematically excluded from the study since prior research (Fama, Fisher, Jensen, and Roll, 1969; and Pettit, 1972) has indicated that these disclosures also contain information. However, many other types of events which might have an impact on share prices were not identified and excluded. Therefore, to the extent that these events were significant enough to influence the summary measures of information content, this presents a potential limitation of the study.

An additional limitation refers to interpretations made from the OTC versus NYSE comparison. The observed difference in information content measures between the OTC and NYSE samples has been attributed to differences in the availability of interim information. The data also suggest that there are fewer news releases in the Wall Street Journal for OTC firms than for NYSE firms. However, no other differences in potential information sources have been documented in this study. Therefore if, in fact, the amount of disclosure in the financial press is not directly related to the total amount of interim information which is available from all sources, the interpretations

placed on the data must be tempered.

Results of the comparison between NF and CF firms indicated that there were no significant differences in the information content of the annual earnings announcements. However, as mentioned above, this study could not identify which NF firms, if any, voluntarily issued interim financial reports to shareholders. To the extent that the same information contained in SEC filings was also made available by NF firms through the voluntary distribution of interim financial reports, the observed similarity in results between the NF and CF groups might be expected.

Suggestions for Future Research

Several limitations described in the preceding section may possibly be overcome by further research. The assumed return generating process for OTC and NYSE firms might be modified in light of other research and results of this study.[2] This would presumably result in information content measures with lower variation associated with them and thus yielding more reliable results.

This study did not distinguish between the different types of news items which appear in the Wall Street Journal; however it is reasonable to expect that some announcements are more useful than others in anticipating annual results. Therefore, one suggested avenue for future research might be to relate the various types of news releases (e.g., management forecasts, changes in management, acqusitions and/or divestures, loss of major customers, pending

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[2]Of course, an adequate data base would have to be developed if returns were to be analyzed on less than a monthly basis.

litigation, etc.) to the observed market reaction to the annual earnings report.

An additional limitation of this study was the inability to define the various sources of available interim information. Therefore, any statements about the impact of differential amounts of interim information on share prices must be considered tentative. A logical extension of this study would be to catalog all potential, reasonably well-known sources of information. Firms could be classified by the relative amounts of information which are supplied by the identified sources. It could then be determined whether there was, in fact, an inverse relationship between the amount of interim information provided on a firm and the information content of the firm's annual earnings announcement as has been aruged in this study.[3]

An additional suggestion for future investigation would be to address the same research questions posed here in a different design framework. The design might be one of determining the association between the "signs" of the earnings forecast error and the computed stock price residual (i.e., the methodology employed by Ball and Brown, 1968, among others) in the time periods surrounding the annual earnings announcement. Or, as an alternate approach, the changes in volume of share trading might be observed for the time period surrounding the annual earnings announcement. (This has been

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[3]This design would necessarily require some scheme for handling duplicate information from two or more different sources. In addition, an explicit weighting system would have to be devised to determine the "amount" of interim information available on a given firm.

used by Beaver, 1968; Kiger, 1972; and Foster, 1973, among others.)

Further research is also needed on the OTC for the time period following the implementation in 1971 of the NASDAQ (National Association of Security Dealers Automated Quotations) system. It might be expected that, due to a more efficient communication system, the OTC market would react to new information (such as the annual earnings announcement) more rapidly than that observed here.

Finally, an analysis of the market effects of SEC interim disclosure requirements should be made within a design which better controls for potential confounding events.[4] This might entail observing price behavior for the period of time surrounding the filing and public disclosure of the SEC reports. In such a study, it would also be necessary to control for the possible leakage of information contained in the SEC reports through other available sources of information.[5]

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[4]For example, this study could not control for the presence of interim financial data from sources other than the SEC. Accordingly, the similarity of results between the NF and CF groups could not be unambiguously interpreted.

[5]Possible leakages would include the announcement of interim earnings in the Wall Street Journal or the voluntary distribution of interim earnings reports to shareholders.

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APPENDICES

APPENDIX A

Over The Counter
Sample

	Group
ACME ELECTRIC CORPORATION	NF
ACME INDUSTRIES INC.	CF
AEROVOX CORPORATION	CF
AMERICAN EXPRESS COMPANY	NF
AMERICAN FURNITURE COMPANY INC.	NF
AMERICAN GREETINGS CORP.	CF
AMERICAN PIPE & CONSTRUCTION CO.	CF
ARDEN FARMS CO.	CF
ARKANSAS MISSOURI POWER CO.	CF
ARKANSAS WESTERN GAS COMPANY	CF
ARROW HART & HEGEMAN ELECTRIC CO.	NF
ART METAL INC.	NF
ASSOCIATED TRANSPORT INC.	NF
ATLANTA GAS LIGHT COMPANY	CF
AUTOMOTIVE BANKING CORPORATION	CF
AZTEC OIL & GAS CO.	CF
BANGOR HYDRO ELECTRIC COMPANY	CF
BELMONT IRON WORKS	CF
BERKSHIRE HATHAWAY INC.	NF
BERYLLIUM CORP.	CF
BIRD & SON INC.	NF
BLACK SIVALL & BRYSON INC.	CF
BOGUE ELECTRIC MANUFACTURING CO.	CF
BOSTON HERALD TRAVELER	NF
BRIDGEPORT HYDRAULIC COMPANY	CF
THE BRISTOL BRASS CORPORATION	NF
BUCKEYE STEEL CASTINGS COMPANY	NF
BURRUS MILLS INC.	CF
CALIFORNIA INTERSTATE TELEPHONE CO.	CF
CALIFORNIA WATER SERVICE CO.	NF
CAMCO INCORPORATED	CF
CANNON MILLS CO.	NF
CASCADE NATURAL GAS CORPORATION	CF
CENTRAL ILLINOIS ELECTRIC & GAS CO.	CF
CENTRAL INDIANA GAS COMPANY	CF
CENTRAL LOUISIANA ELECTRIC COMPANY	CF
CHANCE (A.B.) CO.	CF
COLLYER INSULATED WIRE COMPANY	NF
COLONIAL STORES INCORPORATED	CF

	Group
COLORADO MILLING & ELEVATOR	CF
COMMONWEALTH GAS CORP.	NF
COMMONWEALTH NATURAL GAS CORP.	CF
COMMONWEALTH TELEPHONE CO.	CF
CONNECTICUT LIGHT & POWER CO.	CF
CONN (C.G.) LTD.	NF
CONSOLIDATED ROCK PRODUCTS	NF
CONTINENTAL TRANSPORTATION LINES INC.	NF
CORNING NATURAL GAS CORPORATION	NF
DANLY MACHINE SPECIALTIES INC.	CF
DAYTON MALLEABLE IRON COMPANY	NF
DELHI TAYLOR OIL CORPORATION	CF
DENVER CHICAGO TRUCKING CO. INC.	NF
DETROIT & CANADA TUNNEL CORP.	NF
DETROIT INTERNATIONAL BRIDGE CO.	NF
DIXON (JOSEPH) CRUCIBLE COMPANY	NF
DOESKIN PRODUCTS INC.	NF
DOUGLAS & LOMASON COMPANY	NF
DRAVO CORPORATION	CF
DUN & BRADSTREET INC.	NF
DURIRON COMPANY INC.	CF
EASTERN UTILITIES ASSOCIATES	CF
ELECTROLUX CORPORATION	NF
ELIZABETHTOWN CONSOLIDATED GAS CO.	NF
ELK HORN COAL CORPORATION	NF
ELOX CORPORATION OF MICHIGAN	NF
EL PASO ELECTRIC COMPANY	CF
EMPIRE STATE OIL COMPANY	NF
FALL RIVER GAS COMPANY	NF
FARRINGTON MFG CO.	CF
FEDERAL SCREW WORKS	NF
FIRST BOSTON CORPORATION	NF
FLORIDA TELEPHONE CORP.	CF
FOOD FAIR PROPERTIES INC.	CF
GAS SERVICE CO.	CF
GENERAL CRUDE OIL CO.	NF
GENERAL WATERWORKS CORPORATION	CF
GIDDINGS & LEWIS MACHINE TOOL CO.	CF
GISHOLT MACHINE COMPANY	CF
GOLDEN CYCLE CORP.	NF
GREEN (A.P.) FIRE BRICK CO.	CF
GREEN MOUNTAIN POWER CORP.	CF
GRINNELL CORPORATION	NF
HARVILL CORPORATION	NF
HEYWOOD-WAKEFIELD COMPANY	NF
HOUSTON NATURAL GAS CORP.	CF
HOUSTON OIL FIELD MATERIAL CO.	CF
HUBINGER COMPANY	NF
INDIANA GAS & WATER COMPANY INC.	NF
INDIANAPOLIS WATER COMPANY	CF
INTERNATIONAL TEXTBOOK COMPANY	NF

	Group
INTERSTATE ENGINEERING CORP.	NF
INTERSTATE SECURITIES COMPANY	CF
IONICS INC.	CF
IOWA SOUTHERN UTILITIES CO.	NF
JACOBSEN MFG CO.	CF
JAMAICA WATER SUPPLY COMPANY	CF
JANTZEN INC.	NF
JERROLD ELECTRONICS CORP.	CF
JESSOP STEEL COMPANY	CF
KAISER STEEL CORP.	CF
KAMAN AIRCRAFT CORP.	CF
KANSAS NEBRASKA NATURAL GAS CO. INC.	CF
KEARNEY & TRECKER CORPORATION	CF
KELLETT AIRCRAFT CORPORATION	NF
KENDALL REFINING COMPANY	NF
KENNAMETAL INC.	NF
KEWANEE OIL COMPANY	NF
KEYES FIBRE COMPANY	CF
KINGSPORT PRESS INC.	CF
LACLEDE STEEL CO.	NF
LAKE SUPERIOR DISTRICT POWER CO.	CF
LIBERTY LOAN CORP.	CF
LIPE ROLLWAY CORP.	NF
LIQUIDOMETER CORPORATION	NF
LOFT CANDY CORP.	NF
LONE STAR BREWING CO.	CF
LONE STAR STEEL COMPANY	CF
LONGHORN PORTLAND CEMENT COMPANY	NF
MADISON GAS & ELECTRIC CO.	CF
MALLINCKRODT CHEMICAL WORKS	CF
MARYLAND SHIPBUILDING & DRYDOCK CO.	CF
MCGRAW (F.H.) & CO.	NF
MECHANICAL HANDLING SYSTEMS, INC.	CF
MICHIGAN GAS & ELECTRIC CO.	CF
MINNEAPOLIS GAS CO.	CF
MISSISSIPPI GLASS COMPANY	NF
MISSISSIPPI VALLEY BARGE LINE CO.	NF
MISSISSIPPI VALLEY GAS CO.	CF
MISSOURI UTILITIES COMPANY	CF
MOHAWK RUBBER CO.	CF
MOORE DROP FORGING COMPANY	CF
MORRISON KNUDSEN CO. INC.	CF
MURRAY CO. OF TEXAS, INC.	NF
NATIONAL GAS & OIL CORP.	NF
NATIONAL SCREW & MANUFACTURING CO.	NF
NEW BRITAIN MACHINE COMPANY	CF
NEW ENGLAND GAS & ELECTRIC ASSN.	CF
NEW HAVEN WATER COMPANY	CF
NEW JERSEY NATURAL GAS CO.	CF
NIAGARA FRONTIER TRANSIT SYSTEM, INC.	NF
NORTEX OIL & GAS CORP.	CF

	Group
NORTH AMERICAN REFRACTORIES CO.	NF
NORTHWESTERN PUBLIC SERVICE CO.	CF
OHIO WATER SERVICE COMPANY	CF
OTTER TAIL POWER COMPANY	CF
PABST BREWING CO.	NF
PACIFIC FAR EAST LINE, INC.	CF
PACIFIC GAMBLE ROBINSON CO.	NF
PENOBSCOT CHEMICAL FIBRE CO.	CF
PEPSI-COLA BOTTLING CO. WASHINGTON, D.C. INC.	NF
PETER PAUL, INC.	NF
PETROLITE CORP.	NF
PHILADELPHIA SUBURBAN WATER CO.	CF
PIEDMONT AVIATION, INC.	NF
PIEDMONT NATURAL GAS CO., INC.	CF
PLASTIC WIRE & CABLE CORP.	CF
PLYMOUTH CORDAGE CO.	NF
PLYMOUTH RUBBER CO., INC.	CF
POTASH COMPANY OF AMERICA	CF
PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE	CF
PUBLIC SERVICE COMPANY OF NEW MEXICO	CF
PURITY STORES, INC.	CF
RICHARDSON CO.	NF
RICH'S, INC.	CF
RILEY STOKER CORP.	NF
ROBBINS & MYERS, INC.	NF
ROBERTSON (H.H.) CO.	NF
ROCKWELL MANUFACTURING CO.	NF
SCOTT & WILLIAMS, INC.	NF
SEALED POWER CORP.	CF
SEA-PACK CORPORATION	NF
SEISMOGRAPH SERVICE CORPORATION	CF
SHEPARD NILES CRANE & HOIST CORP.	NF
SIERRA PACIFIC POWER CO.	CF
SORG PAPER CO.	NF
SOUTHEASTERN TELEPHONE CO.	CF
SOUTHERN AIRWAYS, INC.	NF
SOUTHERN CALIFORNIA WATER CO.	CF
SOUTHERN NEW ENGLAND TELEPHONE CO.	CF
SOUTHERN UNION GAS COMPANY	CF
SOUTH SHORE OIL & DEVELOPMENT CO.	NF
SOUTHWESTERN ELECTRIC SERVICE	CF
SOUTHWEST GAS PRODUCING CO., INC.	NF
SPRAGUE ELECTRIC COMPANY	NF
STANDARD FRUIT & STEAMSHIP CORP.	NF
STANDARD SCREW CO.	CF
STANLEY HOME PRODUCTS, INC.	NF
STRAWBRIDGE & CLOTHIER	NF
SWANK CORP.	NF
TAMPAX INCORPORATED	NF
TAPPAN CO.	CF

	Group
TAYLOR INSTRUMENT COMPANIES	CF
TEJON RANCH CO.	NF
THERMAL RESEARCH & ENGINEERING CORP.	NF
TOKHEIM CORP.	CF
TRANSCONTINENTAL GAS PIPE LINE CORP.	CF
TRICO PRODUCTS CORP.	NF
UNITED STATES ENVELOPE CO.	CF
UNITED STATES SUGAR CORPORATION	CF
U.S. TRUCK LINES INC. OF DELAWARE	CF
VANITY FAIR MILLS INC.	CF
VITRO CORPORATION OF AMERICA	CF
VOLUNTEER NATURAL GAS CO.	NF
WASHINGTON NATURAL GAS CO.	CF
WASHINGTON STEEL CORPORATION	CF
WHITING CORP.	CF
WHITIN MACHINE WORKS	NF
WISCONSIN POWER & LIGHT COMPANY	CF
WOOD CONVERSION CO.	NF
WURLITZER CO.	NF
YUBA CONSOLIDATED INDUSTRIES, INC.	CF

APPENDIX B

New York Stock Exchange
Sample

ALDENS INC.
AMERICAN BROADCASTING COMPANIES, INC.
AMERICAN CAN CO.
AMERICAN INVESTMENT CO. OF ILLINOIS
AMERICAN TELEPHONE AND TELEGRAPH
ARO EQUIPMENT CORP.
AUSTIN, NICHOLS & CO., INC.
AVCO CORP.
BASIC INC.
BENDIX CORP.
BLACK & DECKER MANUFACTURING CO.
BORDEN CO.
BROOKLYN UNION GAS CO.
BUCKEYE PIPELINE CO.
CAMPBELL RED LAKE MINES LTD.
CENTRAL ILLINOIS PUBLIC SERVICE CO.
CHAMPION SPARK PLUG CO.
CHESAPEAKE & OHIO RAILWAY CO.
CHICAGO PNEUMATIC TOOL CO.
CHRYSLER CORP.
COCA COLA CO.
COMMERCIAL CREDIT CO.
CONSUMERS POWER CO.
CONTINENTAL CAN CO., INC.
COOPER TIRE AND RUBBER CO.
CROWN ZELLERBACH CORP.
DOME MINES LTD.
DUPLAN CORP.
DUQUESNE LIGHT CO.
EASTMAN KODAK CO.
EQUITABLE GAS CO.
FANSTEEL INC.
FEDERAL-MOGAL-BOWER BEARINGS
FLINTKOTE CO.
GABRIEL CO.
GENERAL BANCSHARES
GENERAL MOTORS CORP.
GENERAL PORTLAND CEMENT CO.
GEORGIA-PACIFIC CORP.
GRANBY MINING CO., LTD.

GULF, MOBILE, AND OHIO RAILROAD
HALL (W.F.) PRINTING CO.
HAMMOND ORGAN CO.
HARBISON-WALKER REFRACTORIES CO.
HERSHEY CHOCOLATE CORP.
IDAHO POWER CO.
INTERNATIONAL HARVESTER CO.
IOWA-ILLINOIS GAS & ELECTRIC CO.
KLM ROYAL DUTCH AIRLINES
LEHIGH VALLEY INDUSTRIES INC.
LOUISVILLE & NASHVILLE RAILROAD
MACY (R.H.) & CO.
MAY DEPARTMENT STORES
MCINTYRE MINES LTD.
MCLEAN TRUCKING CO.
METRO-GOLDWYN-MAYER, INC.
MONSANTO CHEMICAL CO.
MORRELL (JOHN) & CO.
NATIONAL TEA CO.
NAUTEC CORP.
NIAGARA MOHAWK POWER CORP.
NORTHERN STATES POWER CO.
OHIO EDISON CO.
ORANGE & ROCKLAND UTILITIES INC.
PENN-DIXIE CEMENT CORP.
PFIZER (CHAS.) & CO. INC.
PILLSBURY CO.
PITTSBURG PLATE GLASS CO.
PUBLICKER INDUSTRIES INC.
REED ROLLER BIT CO.
REYNOLDS (R.J.) TOBACCO CO.
ROHR INDUSTRIES
ROYAL CROWN COLA CO.
SAFEWAY STORES INC.
ST. REGIS PAPER CO.
SEARS, ROEBUCK & CO.
SHELL OIL CO.
SINGER MANUFACTURING CO.
SPERRY RAND CORP.
SPIEGEL INC.
STANDARD OIL CO. OF INDIANA
STERLING DRUG INC.
SUNRAY MID-CONTINENT OIL CO.
TEXAS INSTRUMENTS INC.
TEXTRON INC.
TIMKEN CORP.
TORRINGTON CO.
TRANSITRON ELECTRONIC CORP.
UDYLITE CORP.
U. S. BORAX & CHEMICAL CORP.
U. S. SHOE CORP.
UPJOHN CO.
UTAH POWER & LIGHT CO.

VENDO CO.
VULCAN MATERIALS CO.
WARNER LAMBERT CO.
WHEELING STEEL CORP.
WISCONSIN ELECTRIC POWER CO.
WOOLWORTH (F.W.) CO.
YOUNGSTOWN SHEET & TUBE CO.
ZENITH RADIO CORP.