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Daqing D. Qi

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Joseph H. Anthony
Major professor

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THE EFFECTS OF CORPORATE DISCLOSURES ON FIRMS' INFORMATION ENVIRONMENTS

By

Daqing D. Qi

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ABSTRACT

THE EFFECTS OF CORPORATE DISCLOSURES ON FIRMS' INFORMATION ENVIRONMENTS

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This dissertation seeks to provide input into the debate on the effectiveness of corporate disclosures in financial reporting. It consists of two separate, but related papers that investigate the effects of corporate disclosures on firms' information environments. The first paper is an association study on the effects of corporate disclosures on market expectations of future earnings. It examines (1) whether stock prices anticipate earnings information earlier for firms with more informative disclosures than for firms with less informative disclosures, and (2) which alternative disclosure media contribute to such an earlier anticipation. Empirical results indicate that market-adjusted returns of firms with more informative disclosures start to reflect earnings changes 20 months prior to fiscal year end, about three months ahead of firms with less informative disclosures. This lead is statistically significant. Further analysis suggests that such an earlier anticipation of prices over earnings mainly results from investor relations, instead of annual reports, quarterly reports, analyst following, or other factors proxied by firm size.

The second paper is an event study that investigates the effects of preemption and signal informativeness on the incremental information content of annual and 10-K reports. It addresses the following two research questions: (1) whether stock returns exhibit abnormal behavior in a three-day event period centered around the earlier of the dates on

which the Securities and Exchange Commission (SEC) receives and makes available to the public annual reports to shareholders and 10-K reports, and (2) if abnormal returns behavior is not observed around the receipt and release of these SEC filings, what alternative explanations may account for its absence. Empirical results in general fail to detect abnormal returns behavior in the three-day event period. However, evidence consistent with the existence of incremental information content in the annual and 10-K reports is found in both the annual earnings announcement period and the period immediately before the event period, suggesting that firms have released either these reports or the most relevant information in these reports before filing them with the SEC.

To Suqin

For her love, support, patience, and understanding

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INTRODUCTION AND OVERVIEW

1.1 INTRODUCTION

This dissertation seeks to provide input into the debate on the effectiveness of corporate disclosures in financial reporting. It consists of two separate, but related papers that investigate the effects of corporate disclosures on firms' information environments. The first paper is an association study on the effects of corporate disclosures on market expectations of future earnings. It examines (1) whether stock prices anticipate earnings information earlier for firms with more informative disclosures than for firms with less informative disclosures, and (2) which alternative disclosure media contribute to such an earlier anticipation. Empirical results indicate that market-adjusted returns of firms with more informative disclosures start to reflect earnings changes 20 months prior to fiscal year end, about three months ahead of firms with less informative disclosures. This lead is statistically significant. Further analysis suggests that such an earlier anticipation of prices over earnings mainly results from investor relations, instead of the annual reports to shareholders (ARS), quarterly reports, analyst following, or other factors proxied by firm size.

The second paper is an event study that investigates the effects of preemption and signal informativeness on the incremental information content of the ARS and 10-K

reports (10-K). It addresses the following two research questions: (1) whether stock returns exhibit abnormal behavior in a three-day event period centered around the earlier of the dates on which the Securities and Exchange Commission (SEC) receives and makes available to the public the ARS and 10-K, and (2) if abnormal returns behavior is not observed around the receipt and release of these SEC filings, what alternative explanations may account for its absence. Empirical results in general fail to detect abnormal returns behavior in the three-day event period. However, evidence consistent with the existence of incremental information content in the ARS and 10-K is found in both the annual earnings announcement period and the period immediately before the event period, suggesting that firms have released either these reports to investors or the most relevant information in these reports before filing them with the SEC.

1.2 OVERVIEW OF THE FIRST PAPER

The first research question in this paper examines the significance of disclosures as a source of firm-specific information for the market to form expectations of future earnings. Finance and accounting research from an information economics perspective generally assumes that managers have superior information on their firms' current and future performance relative to outside investors.[1] Healy and Palepu (1993) suggest that disclosures constitute a unique, nonsubstitutable source of such information. In other words, disclosures contain incremental information and their releases revise market expectations of future earnings. Evidence from empirical research on management

[1] Examples include Jensen and Meckling (1976), Fama and Jensen (1983a and 1983b), and Holthausen and Leftwich (1983).

earnings forecasts is consistent with Healy and Palepu's suggestion.[2] However, it is not clear to what degree insights gained from such evidence can be extended to disclosures other than management earnings forecasts. Most firms do not make management earnings forecasts. Even for firms that make management earnings forecasts, such forecasts constitute only a small portion of the overall disclosures released to the public. On the other hand, empirical capital markets studies such as Ball and Brown (1968), Freeman (1987), Collins and Kothari (1989), and Kothari and Sloan (1992) document that security returns anticipate accounting earnings long before their announcements. Moreover, studies on the valuation implications of disclosures on pensions and fair value estimates find that market values reflect information in these disclosures prior to their public releases.[3] Such price anticipation of earnings and other firm-specific information in disclosures indicates the existence of other more timely sources of information, which may or may not originate from the firms.

The presence of such pre-disclosure information makes it difficult to examine the content of incremental information in disclosures. I mitigate this problem by focusing on the effects of disclosures at the early stage of the empirical relation between returns and accounting earnings. At this stage, prior information is too noisy to affect market expectations of earnings in the fiscal year studied. Ceteris paribus, if disclosures are a

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[2] Examples include Patell (1976), Penman (1980), Waymire (1984), and Pownall et al. (1993).

[3] For example, Barth (1994) examines the relation between fair value disclosures and bank share prices. She find that, while fair values of investment securities possess significant incremental explanatory power, such fair values are reflected in bank share prices at fiscal-year ends before their public releases in the annual reports. Also see Barth, Beaver, and Landsman (1994).

unique, nonsubstitutable source of firm-specific information, stock prices should reflect earnings earlier for firms with more informative disclosures than for firms with less informative disclosures. Conversely, if the information in disclosures can be substituted by information from other sources, the above empirical regularity should not be observed.

The second research question examines the relative importance of disclosures released through different media as sources of firm-specific information that bear on earnings expectations. Most prior studies on the effects of disclosures on earnings expectations focus on a single aspect of disclosures, such as management earnings forecasts or segmental reporting. Managers, however, communicate with investors through different media, such as annual reports, quarterly reports, and investor relations. These media differ in management discretion, regulatory requirements, and timing flexibility. Consequently, information disclosed through them may have different effects on market expectations of future earnings. In this paper, I address this research question by examining whether the earnings response coefficient (ERC), obtained from regressing abnormal returns in the period of disclosures on unexpected earnings in the next period, is an increasing function of the informativeness of annual reports, quarterly reports, and investor relations.

Empirically testable hypotheses are derived from a model adapted from Holthausen and Verrecchia (1988). The Association for Investment Management and Research Corporate Information Committee Reports[4] (AIMR Reports) are used to develop proxies

[4] Published by the Financial Analyst Federation (FAF) Corporate Information Committee prior to 1989. The FAF has since merged with the Institute of Chartered Analysts to form AIMR.

for the informativeness of firms' disclosures. Stock exchange and industry memberships are controlled for through sample selection. For the sample in this paper, market-adjusted returns of firms with more informative disclosures start to reflect earnings changes 20 months prior to fiscal year end, about three months ahead of those of firms with less informative disclosures. The lead is statistically significant and robust after controlling for firm size and the degree of analyst following. Further analysis indicates that such an earlier anticipation of prices over earnings mainly results from investor (analyst) relations, instead of annual reports, quarterly reports, analyst following, or other factors proxied by firm size. Moreover, the size effect becomes statistically insignificant after the effects of disclosures are controlled for.

This study contributes to the financial reporting and capital markets literature in several ways. First, it provides additional evidence that disclosures constitute a unique, nonsubstitutable source of firm-specific information for market participants to revise expectations of future earnings. Second, it compares the effectiveness of disclosures through different media and finds that investor relations are more effective in communicating firm-specific information to the market than annual and quarterly reports. Such a finding suggests that policy makers such as the FASB and the SEC should encourage firms to disclose more information voluntarily to investors by means such as "safe harbor" regulations that reduce firms' legal liabilities in case managers' ex ante forecasts do not materialize. Finally, it extends previous capital markets research on returns-earnings relations by documenting that the degree to which prices lead earnings is an increasing function of the informativeness of disclosures, and that the previously

documented effect of size on firms' information environment may in part be attributable to more informative voluntary disclosures by larger firms.

Taken together, this paper complements prior empirical research that considers the relation between disclosures and capital market variables such as the cost of equity capital (for example, Botosan 1995) and the bid-ask spreads of stocks (for example, Welker 1995). Most prior studies investigate the effects of disclosures on capital market variables without testing whether the disclosures examined have assisted the stock market in forming expectations of future earnings[5]. This leads to uncertainty on whether, and to what degree, the empirical results are causal relations as theorized. Most theoretical models assume that informative signals affect security valuation through the effect on market expectations of future earnings or liquidating dividends. By explicitly documenting the effects of disclosures on market expectations of future earnings, this paper provides evidence that supports the theorized mechanisms through which disclosures affect capital market variables.

1.3 OVERVIEW OF THE SECOND PAPER

This paper differs in three ways from previous studies that examine the incremental information content of ARS and 10-K. First, I explicitly control cross-sectional differences in information disclosed prior to the release of these reports and the informativeness of these reports themselves. This increases the power of the empirical tests since Holthausen and Verrecchia (1988) suggest that, under certain conditions, the magnitude of price reaction to the release of new information is a decreasing function of

[5] Lang and Lundholm (1994) is an exception. See discussions in the next section.

the informativeness of prior information and an increasing function of the informativeness of the new information. Most previous studies do not explicitly control such factors (see, for example, Cready and Mynatt 1991, Easton and Zmijewski 1993, Foster and Vickrey 1978, Foster, Jenkins, and Vickrey 1986, and Stice 1991)[6]. Second, I conduct tests based on both squared market model prediction errors and the empirical relation between returns and unexpected earnings. While the first test is the dominant methodology used in extant research in this area, the second test employed in this paper allows the simultaneous control of different information environment variables and provides more flexibility in determining the length of the test period. Third, I explicitly examine alternative explanations that may have reduced the incremental information content of ARS and 10-K on their receipt dates by the SEC. Easton and Zmijewski (1993) conjecture that this information becomes available to the market in a multiple-day period surrounding these dates. I empirically test two possibilities, that the market may already have had access to the information contained in ARS and 10-K reports prior to their filings at the SEC, and that the market may need time to access and evaluate the information and therefore delay its responses.

The AIMR Reports are used to develop proxies for the informativeness of firms' disclosures prior to and contained in ARS and 10-K. The SEC receipt dates of these reports are obtained from the SEC filing date data base developed and maintained at the University of Chicago. Empirical tests are based on a total of 933 firm-year observations

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[6] Stice (1991) studies the incremental information content of 10-Q and 10-K reports that are released before earnings announcements, but he does not explicitly control for prior disclosures or the informativeness of the 10-Q and 10-K.

from 1980 to 1984. For comparison, most tests are also conducted for a three-day period centered around the annual earnings announcement date.

Results for the annual earnings announcement period are consistent with theoretical predictions in Holthausen and Verrecchia (1988) and results reported in previous empirical studies on the effects of interim information on security returns behavior surrounding earnings announcements (see, for example, Atiase 1985, Collins, Kothari and Rayburn 1987, Foster, Olsen, and Shevlin 1984, Freeman 1987, and Shores 1990). The magnitude of the market response to earnings announcements, measured as either squared market model errors, abnormal returns, or the earnings response coefficient (ERC) from regressing abnormal returns on future unexpected earnings, is smaller for firms with more informative prior disclosures. Interestingly, the ERC is also significantly higher for firms with more informative ARS and 10-K, indicating that some of the information contained in these reports is released to the market in this period[7].

I find evidence that is consistent with the existence of incremental information content in the ARS and 10-K in the period immediately prior to their SEC receipt and release. The ERC, obtained from regressing abnormal returns accumulated in the three-week (15 trading-day) period before the SEC receipt period on future unexpected earnings, is significantly larger for firms with more informative ARS and 10-K reports, and significantly smaller for firms with more informative prior disclosures. This finding suggests that the market has already had access to the information contained in ARS and

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[7] For example, this result can obtain if firms with more informative ARS and 10-K supplement their earnings announcements with information about revenues and segmental disclosures. Wilson (1987) reports that some firms in his sample disclose information in the ARS and 10-K in their earnings news releases.

10-K reports before their filing with the SEC, indicating that firms have either released these reports or the most relevant information in these reports to the market before filing them with the SEC. Such an interpretation is further supported by the fact that no abnormal returns behavior is detected in the three-week period immediately after the three-day SEC receipt period.

Empirical results in general do not support the existence of incremental information content associated with the SEC receipt and release of the ARS and 10-K. The majority of tests find no significant incremental information content. Consistent with results reported in prior studies, the standardized squared market model errors in the event period are not significantly higher than their theoretical expectation or those during other periods in the test interval for either the full or the partitioned samples. For the portfolio of firms with more informative ARS and 10-K and less informative prior disclosures, the standardized abnormal returns are not significantly positive (negative) for firms with positive (negative) unexpected earnings. Moreover, the ERC is not significantly higher for firms with more informative disclosures. On the other hand, one test based on the standardized abnormal returns for the full sample suggests that the SEC receipt and release of the ARS and 10-K provide incremental information for firms with positive future unexpected earnings.

This paper makes several contributions to extant research on the incremental information content of corporate disclosures. First and foremost, it documents systematic returns behavior that can be attributed to the informativeness of disclosures contained in ARS and 10-K in both the earnings announcement period and the period prior to the SEC

receipt of these reports. The existence of such behavior is consistent with the conjecture that a substantial number of firms release the ARS and 10-K or the most relevant information in these reports to market participants before filing them with the SEC. This explains the failure of previous studies in detecting abnormal returns behavior on the SEC receipt dates and provides evidence that is consistent with the existence of incremental information in these reports. Second, the absence of abnormal returns behavior under the majority of tests on the SEC receipt dates under a refined, more powerful research design lends further support to Easton and Zmijewski (1993)'s warning that "using the earlier of the SEC ARS and 10-K receipt dates as the date of the first public disclosure of the information in the annual report may introduce considerable error." This is not a trivial issue because it has implications on how to interpret the results from empirical studies which assume that non-earnings information is not available to the public until these or similar dates[8]. Finally, this paper extends extant studies that use size as a proxy for the availability of prior information to investigate market reaction to annual earnings announcements and provides direct evidence that the magnitude of the response is negatively associated with the informativeness of prior disclosures.

For the rest of this dissertation, Chapter 2 examines the effects of corporate disclosures on market expectations of future earnings. Chapter 3 investigates the effects of preemption and signal informativeness on the incremental information content of the ARS and 10-K. Concluding remarks are provided in Chapter 4.

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[8] See footnote 1 in Easton and Zmijewski (1993) for a list of such studies.

Chapter 2

THE EFFECTS OF CORPORATE DISCLOSURES ON MARKET EXPECTATIONS OF FUTURE EARNINGS

This chapter examines whether corporate disclosures assist investors in forming expectations of future earnings. It is organized as follows. Section 2.1 provides background and motivation. Section 2.2 discusses a model that links disclosures, earnings expectations, and stock returns and develops hypotheses. Statistical methods for hypothesis testing and variable measurements are outlined in section 2.3. Section 2.4 describes the sample and variables. The last section reports empirical results and sensitivity analysis.

2.1 BACKGROUND AND MOTIVATION

Ever since the passage of the Securities Act of 1933 and the Securities Exchange Act of 1934, financial reporting in the United States has been developed and designed to protect the interests of stakeholders in publicly-traded corporations, particularly those of stockholders, by providing them with decision-relevant information about these entities. According to the Financial Accounting Standards Board (FASB), financial reporting should "provide information to help present and potential investors and creditors and other users in making rational investment, credit, and similar decisions," and "the primary

focus of financial reporting is information about an enterprise's performance provided by measures of earnings and its components."[9]

While financial statements are a central feature of financial reporting, a large amount of information is communicated to the public through corporate disclosures. Some disclosures, such as news releases and management's earnings forecasts, are voluntary and subject to management discretion. Others, however, are mandated by either the Generally Accepted Accounting Principles (GAAP) or SEC regulations. Barth and Murphy (1994) examine the purposes, subject, number, and trends of financial statement disclosures required by the FASB and its predecessors. They report that 454 disclosure items are mandatory under GAAP through Statement of Financial Accounting Standards (SFAS) 109. Moreover, there exists a clear trend of increasing disclosure requirements over time, and few of the requirements have been eliminated once adopted.

The increasing number of disclosure requirements has, in recent years, led to concerns and debates about disclosure overload, i.e., whether too many disclosure items are required under GAAP given the costs of making such disclosures. In 1991, the American Institute of Certified Public Accountants (AICPA) formed the Special Committee on Financial Reporting to address concerns about the relevance and usefulness of business reporting. In a report released in 1994, the committee states that

> Because business reporting is not free, improving it requires considering the relative costs and benefits of information, just as costs and benefits are key to

[9] FASB. 1978. Objectives of Financial Reporting by Business Enterprises. Statement of Financial Accounting Concepts No.1. Stamford, Conn.: FASB.

> determining the features included in any product. Undisciplined expansion of mandated reporting could result in large and needless costs.[10]

As a result, it calls for standard setters and regulators to better understand the costs and benefits of business reporting and to "search for and eliminate less relevant disclosures."[11]

Currently, both the SEC and FASB are examining the effectiveness of mandated disclosures and searching for measures to improve the present system. The SEC has formed an internal task force to review its existing corporate disclosure regulations and seek detailed views from corporate leaders. The FASB, meanwhile, is considering whether to add a formal project on disclosure effectiveness to its technical agenda and calling for research inputs on this issue from all interested parties, especially academic researchers.[12]

To date, theoretical research has provided useful insights on the cost-benefit tradeoff of financial reporting. Audited mandatory disclosures can reduce transaction costs and increase market liquidity by mitigating the incentives problems between managers and investors, and between informed and uninformed investors[13]. Moreover, both mandated and voluntary disclosures can enable managers to better differentiate their firms from the "lemons" to achieve costs of equity capital that are lower than otherwise, as noted in Akerlof (1970) and Spence (1973). On the other hand, disclosures are costly, incurring not only the costs of actually preparing and disclosing the information but also

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[10] The AICPA Special Committee on Financial Reporting. 1994. Improving Business Reporting - A Customer Focus. Jersey City, NJ: AICPA.

[11] ibid.

[12] Beresford, D. and J. Hepp. 1995. Financial Statement Disclosures: Too Many or Too Few? Financial Accounting Series (No. 149-B). Stamford, Conn.: FASB.

[13] See Jensen and Meckling (1976), Hakansson (1977), Fama and Jensen (1983a and 1983b), Holthausen and Leftwich(1983), and Beaver (1989).

the opportunity costs due to the loss of competitive advantage to competitors as a result of publicly disclosing the information. Consequently, at the aggregate level, firms should be required to disclose additional information only when the incremental social benefits are greater than the incremental social costs. At the individual firm level, managers may choose to disclose more information voluntarily until the marginal benefits accruing to the firm equal the marginal costs.

While few dispute the theoretical importance of adequate financial reporting and the cost-benefit tradeoff involved in the process, empirical evidence on the benefits of corporate disclosures has been limited. The majority of empirical accounting research on capital markets and financial reporting focuses on accounting numbers recognized in the financial statements, such as earnings, cash flows, and their components. Of the more recent studies that deal directly with items disclosed but not recognized in financial statements, most concentrate on the valuation implications, instead of the disclosure effectiveness, of a single disclosed item or set of items that relate to a single subject, such as pensions, current cost accounting of oil and gas properties, and market value of marketable securities.[14] Because these papers do not address the overall informativeness of corporate disclosures and do not control for the effects of information from other sources, they provide only limited insights on the benefits of disclosures.

Several current manuscripts have taken a more global approach to investigate the benefits of corporate disclosures. Lang and Lundholm (1994), for instance, indicate that firms with more forthcoming disclosure policies have a larger analyst following, more

[14] See footnote 1 in Barth and Sweeney (1995) for a list of papers in this area of research.

accurate analyst forecasts for earnings in the same fiscal year, less dispersion among analyst forecasts, and less variability in forecast revisions. Byrd, Johnson, and Johnson (1994) present evidence that CEO presentations are positively correlated with analyst following and, in the case of lightly followed firms, a reduction of the cost of equity capital as measured by their equity beta. Welker (1995) documents that the stocks of firms with more forthcoming disclosures have smaller bid-ask spreads. Botosan (1995) finds that greater voluntary disclosure in annual reports is associated with a lower cost of equity capital after controlling for cross-sectional variation in systematic risk and size, provided that a measure other than market value is used to proxy size. Healy, Palepu, and Sweeney (1995) provide evidence that disclosure improvement is associated with a reduction of the dispersion of analyst earnings forecasts, a decline in bid-ask spreads for the test firms, and an increase in analyst following.

Taken together, these more recent studies present evidence consistent with hypothesized relations between disclosures and analyst following, analyst forecast dispersion, analyst forecast accuracy of earnings in the current fiscal year, and stock liquidity. These tests also provide weak support for the hypothesis that the informativeness of disclosures is negatively correlated with the cost of equity capital. However, they provide only limited evidence on whether the disclosures examined have assisted the stock market in improving expectations of sample firms' future events, especially future earnings. Consequently, it remains rather uncertain whether, and to what degree, such associations are causal relations as predicted by theoretical papers cited in these empirical studies.

Several theoretical papers have provided insights on the possible mechanisms through which more informative disclosures lead to lower costs of equity capital. Barry and Brown (1985) investigate the lack of information as a source of nondiversifiable risk. Merton (1987) studies the relation between investor recognition and the cost of equity capital. Lev (1988), Diamond and Verrecchia (1991), and Elliot and Jacobson (1994) explore the effects of adverse selection on the cost of equity capital. While their focuses differ, the existence of informative signals is explicitly or implicitly assumed. These informative signals enable investors to form better expectations of future events such as future earnings or cash flows, leading to a lower cost of capital through reduced nondiversifiable risk, additional investor recognition, mitigated adverse selection, or more likely, a combination of these factors. Consequently, for disclosures to affect stock liquidity and the cost of equity capital, a prerequisite applies. That is, after controlling for the effects of other information, the items disclosed must provide additional information to investors, and more informative disclosures should be more effective in assisting investors in the formation of expectations of future events such as earnings.

Prior research has provided some evidence on the effects of disclosures on the formation of earnings expectations. Studies on management earnings forecasts show that forecasts are price informative (i.e., Patell 1976; Penman 1980, Waymire 1984, Pownall et al. 1993). Baldwin (1984) finds that analyst earnings forecasts become more accurate for multisegment firms after the adoption of segmental reporting requirements. Gill (1994) finds that both analysts and the stock market react to firms' qualitative comments on earnings, but do not react to announcements on cost-cuttings, capital expenditures and

price changes. Lang and Lundholm (1994) provide evidence that firms with more forthcoming disclosure policies have more accurate analyst forecasts for earnings in the same fiscal year.

Although these prior studies, taken together, indicate that disclosures lead to more accurate earnings expectations, they are subject to two limitations. First, they only address the effects of disclosures on the expectations of earnings in the same fiscal year. Consequently, it remains unresolved whether and when disclosures can assist investors in forming expectations of earnings beyond the current fiscal year. Evidence presented in Freeman (1987), Collins and Kothari (1989), and Kothari and Sloan (1992) shows that prices start to incorporate earnings information well before the beginning of the fiscal year. The degree to which price anticipates earnings varies systematically with some variables, such as firms' market capitalization.[15] Because managers have superior information about their firms' future performance unobservable to outsiders, as noted in Healy and Palepu (1993), disclosures can be an important determinant on the degree to which prices lead earnings.

Second, most prior studies, with the exception of Lang and Lundholm (1994), focus on just one aspect of disclosures, such as management earnings forecasts or segmental reporting. Managers, however, communicate with investors through several media, including conversations with financial analysts, press releases, quarterly reports, and annual and 10-K reports. As a result, when studying the overall effects of disclosures

[15]Freeman (1987) finds that the percentage of large-firm abnormal returns realized in 'early' months exceeds the percentage for small firms, but the difference in the lead times of prices over earnings is *not* statistically significant.

on market expectations of future earnings, a comprehensive measure that can aggregate disclosures through different media seems more appropriate. On the other hand, examining disclosures through different media separately provides no insights on their relative contributions to more accurate earnings expectations. An empirical examination of this issue is important and of interest to policy makers because while investor relations are largely voluntary, almost all required disclosures are released through quarterly and especially annual reports.

In this paper, I attempt to overcome the limitations by investigating two interrelated research questions: (1) whether stock prices anticipate earnings information earlier for firms with more informative disclosures than for firms with less informative disclosures, and (2) which categories of disclosures contribute to such an earlier anticipation.

2.2 THEORY AND HYPOTHESES

Even though changes in investors' earnings expectations are not directly observable, they can be inferred from abnormal security returns. Three assumptions are made to link stock returns and earnings: (1) stock price equals the present value of expected future dividends, (2) the discount rate is constant over time, and (3) the present value of the revisions in expectations of future dividends is the same as the present value of the revisions in expectations of future earnings. As Lipe (1990) notes, the first two assumptions are commonly adopted in finance and accounting research, and the last assumption can be interpreted as an extreme version of the statement that accounting earnings provide information about the future dividend paying ability of the firm.

Taken together, these assumptions imply that the releases of signals that provide useful information on future earnings lead to share price revisions reflected as abnormal returns. If earnings announcements are the only source available for earnings information, abnormal returns will only be observed when accounting earnings are announced. This scenario, of course, is unrealistic. For publicly-traded firms, relevant information about earnings is available from many other more timely sources. They include, but are not limited to, articles in trade journals, earnings releases by competitors, analyst earnings forecasts, and mandatory and voluntary corporate disclosures.

Under the current financial accounting and reporting system, corporate disclosures are assumed to be an important source of incremental information about future earnings. FASB believes that corporate disclosures serve four purposes, (1) to describe and provide additional relevant measures of items that are recognized on the face of the financial statements, (2) to describe and provide useful measures of items that are not recognized in the financial statements, (3) to provide information to help investors and creditors assess risks and potentials of both recognized and unrecognized items, and (4) to provide important information in the interim while other accounting issues are being studied in more depth.[16] Because the existing accrual accounting system under GAAP is based on historical transaction data and emphasizes objectivity, verifiability, and conservatism, instead of unbiased estimation of future earnings, disclosure items can reveal, either directly or indirectly, relevant information about future earnings in addition to financial

[16] FASB. 1990. Disclosure of Information about Financial Instruments with Off-Balance-Sheet Risk and Financial Instruments with Concentrations of Credit Risk. Statement of Financial Accounting Standards No. 105. Norwalk, Conn.: FASB.

statements. As a result, in year t-1 investors can update and improve their expectations of earnings in year t. Under the three valuation assumptions, the revision can be observed in the form of abnormal stock returns.

The discussion above can be formalized using a model adapted from Holthausen and Verrecchia (1988). While Holthausen and Verrecchia (1988) consider the sequential release of information, a single-signal model is sufficient for an investigation of the return-earnings relation in its early stage because signals previously released are too noisy to provide information about unexpected earnings in the period studied. For simplicity, assume that the earnings generation process is a random walk such that:

$$EPS_t = EPS_{t-1} + e_t, \tag{2.1}$$

where e_t is normally distributed with a mean of 0 and a variance of v_e. Let D_{t-s} be a signal contained in a disclosure at t-s, such as a management discussion of a new product with analysts or the release of a quarterly report. It provides information about e_t such that:

$$D_{t-s} = e_t + d_{t-s}, \tag{2.2}$$

where d_{t-s} is a normally distributed random variable that is uncorrelated with e_t and has a mean of 0 and a variance of v_d.

Before the release of D_{t-s}, the expectation of e_t is zero. It can be shown that, after the release of D_{t-s}, the expectation of e_t is:

$$E(e_t | D_{t-s}) = \frac{v_e * D_{t-s}}{v_e + v_d}. \tag{2.3}$$

For simplicity, assume that D_{t-s} provides no additional information about EPS_{t-1}, ignore the time value of money between t-s and t-1, and normalize the share price before the release of D_{t-s} to one. The stock return associated with the release of D_{t-s} is therefore:

$$RET_{t-s} = \frac{1}{r} * \frac{v_e * D_{t-s}}{v_e + v_d}, \qquad (2.4)$$

where r is the cost of equity capital.

2.2.1 The Timing Hypothesis

In the above expression, the return associated with the release of D_{t-s} is an increasing function of its precision, $1/v_d$. The more precise the signal, the greater is the price revision. If firm A's disclosure practice is more informative than that of firm B, i.e., for a given value of s, $1/v_d(s, A)$ is always greater than $1/v_d(s, B)$, then the magnitude of $RET_{t-s}(A)$ is always greater than that of $RET_{t-s}(B)$ for the same realization of D_{t-s}. If RET_{t-s} must reach a minimum level of magnitude to be empirically observable, then it would be first observed for firm A. This leads to the first hypothesis, in its alternative form:

> *Ceteris paribus, the abnormal returns associated with unexpected accounting earnings of year t begins earlier for firms with more informative disclosures than for firms with less informative disclosures.*

2.2.2 Effects of Disclosures through Different Media

Information about e_t can be disclosed to the public through either the annual reports, quarterly reports, direct communications with investors, or a combination of the above. The concern is which media of disclosures are effective in conveying information about e_t to the investors in year t-1. In equation (2.3), let D_{t-s} represent the aggregate of all disclosures released in year t-1. Assuming that information disclosed before year t-1 is

not informative about e_t, which is consistent with findings in Freeman (1987) and Collins and Kothari (1989)[17], equation (2.4) can be rewritten as:

$$RET_{t-1} = \frac{1}{r} * \frac{v_e * D_{t-1}}{v_e + v_d} = \frac{1}{r} * \left[\frac{v_e * e_t}{v_e + v_d} + \frac{v_e * d_{t-1}}{v_e + v_d} \right]. \qquad (2.5)$$

Notice that, by definition, e_t and d_{t-1} are uncorrelated. As a result, the earnings response coefficient (ERC) in regression of RET_{t-1} on e_t is then:

$$ERC_{t-1} = \frac{1}{r} * \frac{v_e}{v_e + v_d}. \qquad (2.6)$$

It is easy to verify that ERC_{t-1} is an increasing function of $1/v_d$. Because more informative annual reports, quarterly reports and better investor relations provide more precise information about e_t, the relation in (2.6) leads to the second hypothesis:

> *Ceteris paribus, the ERC from regressing cumulative abnormal returns in year t-1 on unexpected earnings in year t is positively correlated with the informativeness of annual reports, the informativeness of quarterly reports, and the informativeness of investor relations.*

2.3 STATISTICAL METHODS AND VARIABLE MEASUREMENTS

Nine years of data, from 1984 to 1992, are used for hypothesis testing. A proxy for the overall informativeness of disclosures in the prior year is obtained for each observation based on the relative industry rankings of analysts' total evaluation scores in the AIMR Reports ($RIRT_{it-1}$). Proxies for the informativeness of disclosures through annual reports, quarterly reports and investor relations are based on the relative industry

[17] Freeman (1987) reports that abnormal returns begin to reflect earnings changes 22 and 19 months before fiscal year end for large firms and small firms respectively, which are consistent with results of figures 1 and 2 in Collins and Kothari (1989).

rankings of analyst evaluation scores for the three categories and are denoted as $RIRA_{t-1}$, $RIRQ_{t-1}$, and $RIRI_{t-1}$ respectively.

2.3.1 Hypothesis 2.1

Hypothesis one states that returns should anticipate earnings earlier for firms with more informative disclosures than for firms with less informative disclosures. To test hypothesis one, each annual subsample is divided into three portfolios, DH, DM and DL, according to $RIRT_{it-1}$, with DH being the most informative and DL the least informative. $RIRT_{it-1}$ is used because it captures the overall effectiveness of the firm's disclosure practice. A matched-pair design is used to document the difference regarding when returns start to reflect the change of earnings of year t for DH and DL portfolios. Statistical tests are based on the intertemporal distributions of the difference.

If earnings-relevant signals exist for multiple firms simultaneously, abnormal returns can be realized based on foreknowledge of such signals. A zero-investment hedge portfolio can be formed by taking an equally-weighted long position in firms with good news and a similar short position in firms with bad news, with the nature of the news derived from the signals. In empirical research, however, the signals themselves are difficult, if not impossible, to observe. As a result, ex-post earnings realizations are used to separate firms into goods news and bad news groups, as in Freeman (1987). The first test of hypothesis one will be based on the behavior of cumulative market-adjusted returns of such earnings-based hedge portfolios.[18]

[18] Since the hedge portfolio is formed by taking an equally-weighted long position in good news firms and an equally-weighted short position in bad news firms, cumulative market-adjusted return for the portfolios is the same as cumulative raw return in the first test of

Define UE_{it} as scaled unexpected earnings per share. Assuming that the earnings-generating process follows a random walk, UE_{it} can be obtained by subtracting primary earnings per share before extraordinary items (EPS) of year t-1 from that of year t and then scaling the difference by share price at the beginning of year t-1. Both EPS and share prices are adjusted for stock splits and stock dividends.

For each sample year t, hedge portfolios are constructed separately for DH and DL firms by taking long positions in firms with $UE_{it} > 0$, and short positions in firms with $UE_{it} < 0$. Equal weights are given to firms within the same news groups. Market-adjusted returns (MR) are calculated for each firm in each of the 36 months from the beginning of year t-1 to the end of year t +1. For firm i in sample year t, market-adjusted return in month τ is:

$$MR_{i\tau} = r_{i\tau} - r_{m\tau},$$

where $r_{i\tau}$ is actual return of firm i in month τ, and $r_{m\tau}$ is the CRSP equally weighted market index. The monthly market-adjusted returns for the two hedge portfolios can then be calculated. For instance, if the DH hedge portfolio contains j = 1, ..., J good news firms and j' = 1, ..., J' bad news firms, its monthly market-adjusted return in month τ is:

$$MR(DH)_{\tau} = \frac{1}{J} * \sum_{1}^{J} MR_{j\tau} - \frac{1}{J'} * \sum_{1}^{J'} MR_{j'\tau}.$$

Once monthly market-adjusted returns are obtained, cumulative market-adjusted returns (CMR), from the beginning of year t-1 to the end of month τ, are computed for each month, τ = 1, ..., 36, as:

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hypothesis one. The former is used to be consistent with the second test of hypothesis one, where the cumulative market-adjusted return is used.

$$CMR(DH)_{tn} = \sum_{1}^{n} MR(DH)_{tk}.$$

With CMR so defined, six-month cumulative market-adjusted return starting n months after the beginning of year t-1 is:

$$\Delta CMR(DH)_{tn} = CMR(DH)_{tn+6} - CMR(DH)_{tn}.$$

As an example, in sample year 1984, the six-month cumulative market-adjusted return for the DH hedge portfolio starting four months after the beginning of year t-1 (1983) is

$$\Delta CMR(DH)_{4} = CMR(DH)^{1984}_{10} - CMR(DH)^{1984}_{4}.$$

For the DL hedge portfolio, $MR(DL)_{tn}$, $CMR(DL)_{tn}$, and $\Delta CMR(DL)_{tn}$ are similarly defined. Under hypothesis one, the abnormal returns associated with accounting earnings of year t begin earlier for DH firms than for DL firms. This means that, empirically, CMR(DH) should exhibit a positive trend earlier than CMR(DL). The statistical test is based on the intertemporal distribution of the difference in the beginnings of positive trends for DL and DH hedge portfolios. Define the beginning of a positive trend for a hedge portfolio as the point in time from which cumulative market-adjusted returns remain positive over time until reaching its maximum. Assume that, in sample year t, positive trends start $m(DL)_t$ and $m(DH)_t$ months after the beginning of year t-1 for DH and DL portfolios respectively. Their difference is denoted as:

$$\Delta m_t = m(DL)_t - m(DH)_t.$$

For example, for sample year 1985, if positive trends start six and two months after the beginning of 1984 for the DL and DH portfolios respectively, then m(DL) = 6, m(DH) = 2, and $\Delta m_t = 4$, indicating that the positive trend starts four months earlier for the DH

portfolio. Under H1, Δm_t should be significantly positive. Since the distribution of Δm_t is unknown and the number of years is limited to nine, both the Wilcoxon signed rank test and the t test are conducted.

The first test of hypothesis one ignores the magnitude of UE_{it} and is limited by the definition of the beginning of a positive trend. The cumulative market-adjusted return could have increased monotonically for several months until being disrupted by a large negative random shock. On the other hand, a positive trend as defined above can remain tentative for a substantial period of time. To mitigate this limitation, hypothesis one is also tested using a second method. The following regression,

$$\Delta CMR(DH)_{itn} = \alpha_{tn} + \beta_{tn} UE_{it} + \varepsilon_{itn},$$

is conducted in each sample year separately for DH and DL firms for n = 0, 1,..., 24. In the regression, ΔCMR_{itn} is cumulative market-adjusted returns over a six-month moving window for firm i, similarly defined as $\Delta CMR(DH)$ and $\Delta CMR(DL)$. In sample year t, the first window starts from the beginning of year t-1 (n = 0), and the last window starts 24 months later (n = 24). The first n value for which β_{tn} is statistically positive at the 0.05 level (one-sided) is noted as $n(DH)_t$ for the DH firms and $n(DL)_t$ for DL firms respectively. Their difference is defined as $\Delta n_t = n(DL)_t - n(DH)_t$. Under hypothesis one, Δn_t should be significantly positive, which is tested based on the intertemporal distribution of Δn_t using both the Wilcoxon signed rank test and the t test.

2.3.2 Hypothesis 2.2

Hypothesis two posits that the ERC from regressing cumulative abnormal returns in year t-1 on unexpected earnings in year t is positively correlated with the

informativeness of annual reports, the informativeness of quarterly reports, and the informativeness of investor relations. It is tested via the following regression in which observations are pooled both cross-sectionally and intertemporally:

$$CMR_{it-1} = \alpha + \sum_{85}^{92} \lambda_t * D_t + \beta_1 UE_{it} + \beta_2 RIRA_{it-1} * UE_{it} + \beta_3 RIRQ_{it-1} * UE_{it} + \beta_4 RIRI_{it-1} * UE_{it} + \gamma_1 * LSIZE_{it-1} * UE_{it} + \gamma_2 * ANA_{it-1} * UE_{it} + \varepsilon_{it}.$$

where

CMR_{it-1} = market-adjusted returns in year t-1 for firm i cumulated from the fifth month of year t-1 to the fourth month of year t, obtained from CRSP tapes[19],

UE_{it} = the difference between earnings per share before extraordinary items of year t and that of year t-1, scaled by per share price at the beginning of year t-1, obtained from the Compustat tapes,

D_t = a dummy variable that equals one for year t, and zero otherwise,

$RIRA_{it-1}$ = relative industry ranking of the informativeness of annual report, for firm i in year t-1, to be defined in the next section,

$RIRQ_{it-1}$ = relative industry ranking of the informativeness of quarterly reports, for firm i in year t-1, to be defined in the next section,

$RIRI_{it-1}$ = relative industry ranking of the informativeness of investor relations, for firm i in year t-1, to be defined in the next section,

$LSIZE_{it-1}$ = the logarithm of $SIZE_{it-1}$, the market value at the beginning of year t-1 for firm i, obtained from Compustat tapes,

ANA_{it-1} = the total number of analyst forecasts made in year t-1 for EPS_{it-1} of firm i, obtained from IBES tapes,

ε_{it} = a random, normally distributed error term.

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[19] Equally-weighted market return index is used. The window is selected to capture disclosures made in year t-1 and exclude those released in other time periods. Note that annual and 10-K reports of year t-1 are not released until early months of year t. See Alford, Jones and Zmijewski (1994) for further reference.

$LSIZE_{it-1}$ and ANA_{it-1} are included to control for the potential effects of size and analyst following on firms' information environments. Under hypothesis two, β_2, β_3, and β_4 should be significantly positive.

2.4 SAMPLE AND VARIABLE DESCRIPTIONS

2.4.1 The AIMR Disclosure Data

The sample years in this study range from 1984 to 1992. The AIMR Reports, from 1983 to 1991, are used to obtain proxies for the informativeness of firms' disclosure practices in the year prior to each sample year. According to the AIMR Corporate Information Committee, each year an industry-specific subcommittee[20] evaluates the informativeness of selected firms' disclosures along three dimensions: annual published information, quarterly and other published information, and investor relations and other aspects. Characteristics and issues unique to the industry are taken into consideration in the evaluation process. Scores along these three dimensions are then weighted to obtain an overall score about the informativeness of the firm's disclosure practices. The weights are in general 40-50 percent for the annual published information, 30-40 percent for the quarterly and other published information, and 20-30 percent for investor relations and other aspects. While the majority of the subcommittees report both overall and category scores, some subcommittees publish only the overall scores. As a result, about one-third of firm years in the AIMR Reports have no category scores reported.

[20] The AIMR reports that these subcommittees are composed of leading analysts following the industries being evaluated.

2.4.2 Sample Selection Criteria and Procedure

Table 2.1A describes the sample selection process. Filters are imposed to eliminate or reduce potential confounding factors. The 1983-1991 AIMR Reports contain 4,390 firm-years, of which 168 firm-years are eliminated due to the unavailability of CRSP data.[21] The filtering process then eliminates 408 firm-years due to the lack of Compustat data, 1,036 non-NYSE firm-years to control for the effects of different stock exchanges (Grant 1980), 276 firm-years due to the lack of analyst following data per IBES tapes, 18 firm-years with UE_{it} larger than one, 564 firm-years with non-December 31 fiscal year end, 532 firm-years in which the industry subcommittees do not report category scores,[22] and finally, 39 firm-years with only two observations in their respective industry-year groups.[23]

The selection procedure described above yields a sample of 1,349 firm-years from 287 firms. As shown in Table 2.1B, the number of firms in each year ranges from 99 in 1986 to 214 in 1991, while the number of industries in each year ranges from 14 in 1986 to 26 in 1991. The number of observations in each industry-year group is three at the minimum by research design. It is 16 at the maximum, indicating that, in any given year, the sample is not dominated by a small number of industries.

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[21] Most are in either international banking or international pharmaceutical industries.

[22] This is due to three considerations. First, it is not clear why the subcommittees do not disclose the category rankings, and one possible reason is that the industries involved have information environments different from the remaining industries. Second, and more importantly, the majority of firm-years without category ranking data belong to financial services industries such as banking and insurance. Since financial services industries are regulated, their information environments are expected to be different from other industries. Finally, category scores are needed for the tests of hypothesis two.

[23] At least three observations are needed in each industry year to construct DL, DM, and DH portfolios.

Table 2.1A
Sample Selection Criteria and Procedure

	Number of firm-year
Firm-years covered in AIMR Reports, 1983-1991	4,390
Less firm-years:	
without CUSIPs	(168)
without Compustat data	(408)
with at least one monthly return from the 1st month of year t-1 to the last month of year t+1 missing from CRSP monthly return files	(1,036)
without analyst following data	(276)
with scaled unexpected earnings larger than one	(18)
with non-December 31 fiscal year ends	(564)
without AIMR category rankings	(532)
with less than three firms in annual industry groups	(39)
Firm-years included in the sample	1,349

Table 2.1B
Distribution of Firms and Industries

Year	Number of firms in the sample	Number of industries in the sample
1984	124	16
1985	128	17
1986	99	14
1987	109	14
1988	128	18
1989	160	22
1990	199	25
1991	214	26
1992	188	23
Totals	1,349	175

2.4.3 Summary Statistics of Variables

Because firms in different industries are evaluated by different subcommittees and members of the same subcommittees are not necessarily the same in different years, the raw scores reported by the subcommittees must be standardized to provide a meaningful proxy for disclosure practices in the year *prior to* the sample year. This is achieved by defining relative industry rankings of overall informativeness of disclosures ($RIRT_{it-1}$) as the following:

$$RIRT_{it-1} = \frac{RANKT_{it-1}}{N_{jt-1} - 1},$$

where N_{jt-1} is the number of firms for industry j in year t-1, and $RANKT_{it-1}$ is the rank, in ascending order, of firm i in year t-1 within industry j based on its overall disclosure score. $RIRA_{it-1}$, $RIRQ_{it-1}$, and $RIRI_{it-1}$ are similarly obtained as proxies for the informativeness of annual reports, quarterly reports, and investor relations.

As Lang and Lundholm (1994) note, relative industry ranking of disclosure scores reflects only intra-industry variation in disclosure informativeness. However, this limitation does not pose a problem for this study, particularly for hypothesis one. Because firms' information environments are affected by industry membership, inter-industry variation in disclosure informativeness must be controlled, even if proxies for disclosure informativeness are available across industries. The industry effect is mitigated by the following procedure. Each year, firms in the same industries are placed into one of three portfolios, DL, DM, and DH, based on the ascending order of their $RIRT_{it-1}$ values. The

number of firms in DL and DH are always kept the same.[24] Consequently, tests based on the differences in how the returns of DL and DH firms anticipate future earnings information are not likely to be severely affected by the industry effect.

Table 2.2 presents summary statistics for the variables. Most have been previously defined, except for the following:

Common Stock Beta ($BETA_{it-1}$) = beta of common stock calculated by regressing monthly returns on the NYSE equally-weighted monthly index, at the beginning of year t-1 and obtained from the CRSP tapes,

Book-to-Market Ratio (BM_{it-1}) = the book value of the firm i divided by the market value at the beginning of year t-1, obtained from the Compustat tapes,

Earnings-to-Price Ratio (EP_{it-1}) = EPS divided by per share price at the beginning of year t-1, obtained from the Compustat tapes.

These three variables are included because they have been used in previous studies as proxies for the cost of equity capital, which under several theories are directly or indirectly affected by disclosure informativeness. Descriptive statistics for $RIRT_{it-1}$, $RIRA_{it-1}$, $RIRQ_{it-1}$, and $RIRI_{it-1}$ are not included because statistics for relative rankings are not meaningful.

As Table 2.2 shows, the average firm in the sample is rather actively followed by the analysts. The mean (median) of ANA_{it} is 21.27 (21). This is of little surprise since many subcommittees exclude firms that are not evaluated by a minimum number of

[24] For instance, of the 11 airlines evaluated by the airline subcommittee in 1984, seven pass the sample selection procedure. Of the seven firms, the bottom two firms are assigned to DL, the top two firms to DH, and the rest to DM. Due to this procedure, DL and DH have exactly the same industry composition.

Table 2.2
Sample Summary Statistics, 1984-1992

				Percentiles				
	N	Mean	Std.Dev.	1%	25%	50%	75%	99%
ANA_{it-1}	1,349	21.274	9.202	4	14	21	27	43
$BETA_{it-1}$	1,310	1.015	0.303	0.403	0.816	1.019	1.195	1.853
BM_{it-1}	1,349	0.661	0.375	0.027	0.423	0.627	0.865	1.632
EP_{it-1}	1,349	0.062	0.135	-0.316	0.052	0.074	0.101	0.205
$SIZE_{it-1}$	1,349	4,670	7,874	114	895	2,140	4,929	41,546
UE_{it}	1,349	-0.005	0.106	-0.389	-0.029	0.005	0.021	0.273

Variables definitions:

ANA_{it-1} = the total number of forecasts made by analysts for EPS_{it-1} of firm i in year t-1,

$BETA_{it-1}$ = beta of common stock calculated by regressing monthly returns on the NYSE equally weighted monthly index, at the beginning of year t-1,

BM_{it-1} = the book value of the firm i divided by the market value at the beginning of year t-1,

EP_{it-1} = EPS divided by per share price at the beginning of year t-1 ,

$SIZE_{it-1}$ = the market value of the firm at the beginning of year t-1, in millions of dollars,

UE_{it} = unexpected earnings of firm i in year t scaled by stock price at the beginning of year t-1.

subcommittee members. Descriptive statistics also indicate that the distribution of $SIZE_{it-1}$ is skewed to the right, as indicated by a mean ($4,670 million) that is much larger than the median ($2,140 million), and a standard deviation ($7,874 million) that is greater than the mean. As a result, its logarithm is used in correlation analysis.

Table 2.3A reports both Pearson (below the diagonal) and Spearman rank (above the diagonal) correlation coefficients between variables in Table 2.2 along with $RIRT_{it-1}$. The two sets of correlation coefficients of $RIRT_{it-1}$ with other variables are similar and the discussions are based on Spearman rank correlation coefficients. Consistent with results reported in previous studies, $RIRT_{it-1}$ is positively correlated with both analyst following (p=0.0001, two-sided) and size (p=0.0028, two-sided). $RIRT_{it-1}$ is not correlated with UE_{it-1} (p=0.1075, two-sided), indicating that results in this study are unlikely to be affected by the empirical regularity that firms with good news tend to announce earnings earlier than those with bad news. Because the correlation between $RIRT_{it-1}$ and $BETA_{it-1}$ is not statistically significant (p=0.2683, two-sided), the use of market-adjusted returns is appropriate. $RIRT_{it-1}$ is marginally positively associated with EP_{it-1} (p=0.0757, two-sided). As discussed in Penman (1994), EP_{it-1} is substantially influenced by temporary deviations from permanent earnings and is a poor proxy of the cost of capital. Consequently, the positive correlation between $RIRT_{it-1}$ and EP_{it-1} should not be interpreted as evidence that firms with more informative disclosures on average have higher costs of capital. Interestingly, while $RIRT_{it-1}$ is not significantly correlated with BM_{it-1} (p = 0.1673, two-sided), it is significantly negatively correlated with BM_{it}

Table 2.3A
Correlation Coefficients between Dependent Variables[a]

	ANA_{it-1}	$BETA_{it-1}$	BM_{it-1}	EP_{it-1}	$RIRT_{it-1}$	$LSIZE_{it-1}$	UE_{it}
ANA_{it-1}		-0.2566	-0.1789	-0.0169	0.1296	0.7500	0.0167
		0.0001	0.0001	0.5354	0.0001	0.0001	0.5395
$BETA_{it-1}$	-0.2600		0.1718	0.0769	0.0306	-0.2918	-0.0808
	0.0001		0.0001	0.0054	0.2683	0.0001	0.0034
BM_{it-1}[b]	-0.1748	0.1776		0.3000	-0.0378	-0.2702	-0.0197
	0.0001	0.0001		0.0001	0.1673	0.0001	0.4708
EP_{it-1}	0.0766	-0.0094	-0.0476		0.0484	0.0541	-0.1735
	0.0049	0.7337	0.0819		0.0757	0.0472	0.0001
$RIRT_{it-1}$	0.1177	0.0096	-0.0470	0.0416		0.0813	0.0439
	0.0001	0.7277	0.0854	0.1269		0.0028	0.1075
$LSIZE_{it-1}$	0.7413	-0.3106	-0.2769	0.1633	0.0946		-0.0067
	0.0001	0.0001	0.0001	0.0001	0.0005		0.8046
UE_{it}	0.0193	-0.0917	-0.0993	-0.0834	0.0211	0.0269	
	0.4792	0.0009	0.0003	0.0022	0.4398	0.3233	

a. Both Pearson (below the diagonal) and Spearman rank (above the diagonal) correlation coefficients are presented. *p* values are reported below the coefficients. Number of observations ranges from 1,299 to 1,349.

b. 11 observations with $BM_{it-1} < 0$ are excluded.

Variable definitions:

$LSIZE_{it-1}$ = the logarithm of the market value of the firm at the beginning of year t-1,

$RIRT_{it-1}$ = relative industry ranking of overall disclosure informativeness in year t-1,

Refer to Table 2.2 for the definition of other variables.

(p=0.0121, two-sided)[25]. This is consistent with Barth and Sweeney (1995) and suggests that more forthcoming disclosures can lead to lower costs of equity capital.

Table 2.3B reports Pearson (below the diagonal) and Spearman rank (above the diagonal) correlation coefficients among the four measures of disclosure informativeness. The two sets of correlation coefficients are essentially the same and discussions are based on Spearman rank correlation coefficients. Because $RIRT_{it-1}$ is a weighted average of the other three, it is not surprising that it is highly correlated with $RIRA_{it-1}$, $RIRQ_{it-1}$, and $RIRI_{it-1}$. Consistent with Lang and Lundholm (1993), the three category relative industry rankings are all significantly correlated with one another at the 0.0001 level. The highest correlation is 0.6043 between $RIRA_{it}$ and $RIRQ_{it}$, and the lowest is 0.4462 between $RIRQ_{it}$ and $RIRI_{it}$. This indicates that firms tend to coordinate their disclosures through different channels.

2.5 EMPIRICAL RESULTS

All tests presented in this section are one-sided if the hypotheses are directional, and two-sided otherwise.

2.5.1 Testing of Hypothesis 2.1

Hypothesis one states that the abnormal returns associated with unexpected accounting earnings of year t begin earlier for firms with more informative disclosures than for firms with less informative disclosures. Figure 2.1 graphs the intertemporal averages of CMR(DH) and CMR(DL) from the beginning of year t-1 to April of year t+1. Hypothesis one is clearly supported. The positive trend for the average of CMR(DH)

[25] Not reported in Table 2.3A.

Table 2.3B
Correlation Coefficients between Informativeness Variables[a]

	$RIRT_{it}$	$RIRA_{it}$	$RIRQ_{it}$	$RIRI_{it}$
$RIRT_{it}$		0.8143	0.7684	0.7096
		0.0001	0.0001	0.0001
$RIRA_{it}$	0.8143		0.6043	0.4881
	.0001		.0001	0.0001
$RIRQ_{it}$	0.7678	0.6041		0.4462
	.0001	0.0001		0.0001
$RIRI_{it}$	0.7104	0.4885	0.4457	
	.0001	0.0001	0.0001	

a. Both Pearson (below the diagonal) and Spearman rank (above the diagonal) correlation coefficients are presented. *p* values are reported below the coefficients.

$RIRT_{it-1}$ = relative industry ranking (RIR) of overall disclosure informativeness for firm i in year t-1,

$RIRA_{it-1}$ = RIR of the informativeness of disclosures via annual reports for firm i in year t-1,

$RIRQ_{it-1}$ = RIR of the informativeness of disclosures via quarterly reports for firm i in year t-1,

$RIRI_{it-1}$ = RIR of the informativeness of disclosures via investor relations for firm i in year t-1.

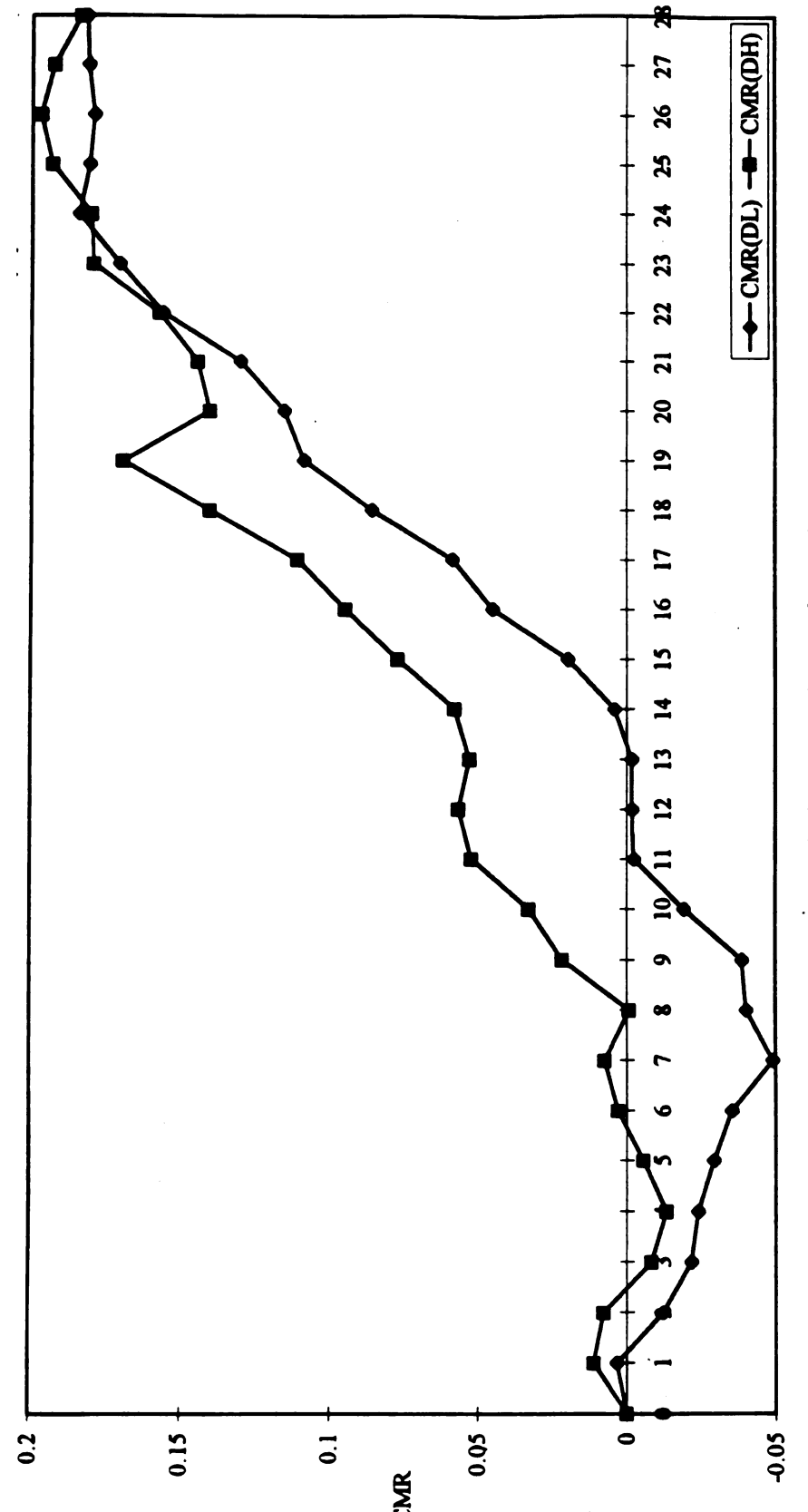

Figure 2.1
Average CMR for DL and DH Portfolios

starts four months after the beginning of year t-1 while the positive trend for the average of CMR(DL) does not begin until seven months after the beginning of year t-1. The cumulative market-adjusted returns over the positive-trend period for DL portfolio is 0.233, compared with that for the DH portfolio at 0.211. However, 33.2 percent of the overall returns in the positive-trend period are realized in year t-1 for the DH portfolio, compared with only 20.3 percent for the DL portfolio.

Table 2.4 presents results from regressing cumulative market-adjusted returns in six-month moving windows, denoted as ΔCMR_{itm} on UE_{it} for both DL and DH portfolios. The first window starts at the beginning of year t-1 and observations in different years are pooled together. Hypothesis one is again supported. The association between ΔCMR_{itm} and UE_{it} is significantly positive at the 0.05 level five months after the beginning of year t-1 for DH firms. On the other hand, for DL firms, the association between ΔCMR_{itm} and UE_{it} is not statistically positive at the 0.05 level until nine months after the beginning of year t-1.

Table 2.5A reports test results from both the t test and the Wilcoxon signed rank test based on the intertemporal distribution of the differences in the beginning of positive trends for DH and DL hedge portfolios. Under hypothesis one, the positive trend should start earlier for the DH than for the DL hedge portfolios. On average, the positive trend starts 4.22 months after the beginning of year t-1 for the DH hedge portfolio, compared to 6.56 months for the DL portfolio. The difference is 2.34 months and statistically significant at the 0.05 level under both tests.

Table 2.4
Results from Pooled Regressions for DL and DH Portfolios

n	DL			DH		
	β_n	Std. Err.	t	β_n	Std. Err.	t
0	-0.2015	0.0698	-2.8850	-0.0926	0.0890	-1.0410
1	-0.1925	0.0709	-2.7170	-0.1213	0.0858	-1.4140
2	-0.1261	0.0662	-1.9060	-0.1228	0.0805	-1.5250
3	-0.1628	0.0706	-2.3040	0.0495	0.0827	0.5980
4	-0.0292	0.0677	-0.4310	0.1011	0.0850	1.1900
5	-0.0184	0.0657	-0.2800	0.1991	0.0820	2.4280[a]
6	-0.0756	0.0664	-1.1380	0.1424	0.0788	1.8070[a]
7	-0.0017	0.0668	-0.0260	0.1347	0.0753	1.7900[a]
8	0.0424	0.0715	0.5940	0.1931	0.0807	2.3950[a]
9	0.1453	0.0781	1.8600[a]	0.2539	0.0866	2.9310[a]
10	0.1733	0.0750	2.3100[a]	0.4070	0.0849	4.7920[a]
11	0.1210	0.0751	1.6110	0.3741	0.0829	4.5140[a]
12	0.3021	0.0694	4.3500[a]	0.4377	0.0797	5.4930[a]
13	0.3614	0.0741	4.8740[a]	0.5436	0.0828	6.5630[a]
14	0.3548	0.0708	5.0130[a]	0.4605	0.0859	5.3590[a]
15	0.2936	0.0750	3.9160[a]	0.3664	0.0862	4.2500[a]
16	0.3095	0.0741	4.1770[a]	0.2923	0.0863	3.3870[a]
17	0.3938	0.0673	5.8500[a]	0.3534	0.0811	4.3590[a]
18	0.2715	0.0684	3.9690[a]	0.2440	0.0774	3.1540[a]
19	0.2276	0.0676	3.3680[a]	0.1416	0.0786	1.8010[a]
20	0.2298	0.0668	3.4390[a]	0.2585	0.0868	2.9800[a]
21	0.1839	0.0741	2.4820[a]	0.2791	0.0946	2.9500[a]
22	0.2163	0.0712	3.0380[a]	0.1733	0.0931	1.8620[a]
23	0.1980	0.0733	2.7010[a]	0.0798	0.0907	0.8800
24	0.2802	0.0752	3.7260[a]	0.1219	0.0899	1.3560

a. significantly positive with a p-value smaller than 0.05, one-sided.

Table 2.5A
Tests Based on the Beginnings of Positive Trends

Year	m_t(DL)	m_t(DH)	Δm_t	$\lvert\Delta m_t\rvert$	r_t[a]	z_t[b]	$r_t * z_t$
84	13	14	-1	1	2.5	0	0
85	5	4	1	1	2.5	1	2.5
86	7	0	7	7	7.5	1	7.5
87	9	10	-1	1	2.5	0	0
88	7	0	7	7	7.5	1	7.5
89	6	4	2	2	5	1	5
90	1	1	0	0	-	-	-
91	1	0	1	1	2.5	1	2.5
92	10	5	5	5	6	1	6
Average	6.56	4.22	2.34				
t / Sum			2.19[c]				31[c]

a. r_t is the rank of $\lvert\Delta m_t\rvert$ or $\lvert\Delta n_t\rvert$.

b. z_t equals one if Δm_t or Δn_t is positive, and zero otherwise.

c. significantly positive with a p-value of 0.05 or smaller, one-sided.

Table 2.5B presents results of tests of hypothesis one based on the intertemporal distribution of the differences in when β_{tn} in the following regression:

$$CMR_{tin} = \alpha_{tn} + \beta_{tn}UE_{ti} + \varepsilon_{tin},$$

is first statistically positive at the 0.05 level. Under hypothesis one, β_{tn} should be statistically positive earlier for the DH than for the DL portfolios. On average, cumulative market-adjusted returns over a six-month window are positively correlated with unexpected earnings of year t 4.34 months earlier for DH firms than for DL firms. The lead is statistically significant at the 0.05 level using either the t test or the Wilcoxon signed rank test.

Taken together, results reported in tables 5A and 5B strongly support hypothesis one.

2.5.2 Sensitivity Analysis for the Testing of Hypothesis 2.1

Some potential confounding factors, such as exchange and industry effects, fiscal year end differences, and fiscal year end changes, have already been controlled for through the research design. In general, such control mechanisms tend to bias against the maintained hypotheses by introducing noise to the relative industry ranking measures.[26]

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[26] For instance, Southwest Airline was ranked the fourth among eight airlines evaluated in 1990 for the lack of market and segment data and limited access to senior management. Such a ranking would put it in DM and exclude it from further analysis. However, two airlines with higher rankings are eliminated in the sample selection process for not being listed on the NYSE (British Airways PLC) and non-December fiscal year end (Delta). As a result, Southwest's ranking is elevated to the second highest, placing it as a DH firm in the 1991 sample. Classified as a bad news firm in 1991 (UE<0), its 13-month cumulative market-adjusted return starting from the beginning of 1990 is substantially positive, at 60 percent, distorting the cumulative market-adjusted returns for the DH hedge portfolio in the 1991 sample year. While such observations can be excluded as anomalies, they are kept in the sample to avoid making subjective judgments.

Table 2.5B
Tests Based on the Beginnings of Significantly Positive Correlation

Year	n_t(DL)	n_t(DH)	Δn_t	$\lvert\Delta n_t\rvert$	r_t[a]	z_t[b]	$r_t * z_t$
84	9	3	6	6	4.5	1	4.5
85	6	0	6	6	4.5	1	4.5
86	14	9	5	5	3	1	3
87	12[c]	4	8	8	7.5	1	7.5
88	10	1	9	9	9	1	9
89	9	7	2	2	1	1	1
90	14	7	7	7	6	1	6
91	2	10	-8	8	7.5	0	0
92	10	6	4	4	2	1	2
Average	9.56	5.22	4.34				
t / Sum			2.56[d]				37.5[d]

a. r_t is the rank of $\lvert\Delta m_t\rvert$ or $\lvert\Delta n_t\rvert$.

b. z_t equals one if Δm_t or Δn_t is positive, and zero otherwise.

c. month with the smallest p-value for n = 0, 1, ..., 24 (p = 0.066, one-sided) because no β_{tn} is significantly positive at the 0.05 level for the DL portfolio in sample year 1987.

d. significantly positive with a p-value smaller than 0.05, one-sided.

Two variables that are not controlled for by the research design are firm size and analyst following. As shown in Table 2.3, $RIRT_{it}$ is positively correlated with both $LSIZE_{it-1}$ (p=0.0028, two-sided) and ANA_{it-1} (p=0.0001, two-sided). This leads to the concern that the results reported above may in fact be attributable to size and analyst following effects, even though the magnitudes of the correlation coefficients are not substantial, only 0.0813 between $RIRT_{it-1}$ and $LSIZE_{it-1}$ and 0.1296 between $RIRT_{it-1}$ and ANA_{it-1}.

To examine the effect of size on sample firms' information environments, firms in the same industries are placed into one of three portfolios, SS (small), SM(medium), and SL (large), based on the ascending order of their market values at the beginning of year t. The numbers of firms in SS and SL are always kept the same. For firms in the middle-sized portfolio SM, $RIRT_{it-1}$ is not significantly correlated with either $LSIZE_{it-1}$ (p = 0.5237, two-sided) or ANA_{it-1} (p = 0.1243, two-sided) at conventional levels. Because the numbers of observations for DLSM and DHSM firms are small for individual sample years, observations in different years are pooled together, as in Freeman (1987). Arbitrage portfolios are them formed for the pooled sample by taking a long position in firms with good news and a short position for firms with bad news. The cumulative market-adjusted returns for both portfolios are graphed in Figure 2.2. Consistent with hypothesis one, the positive trend starts at least three months earlier for CMR(DHSM) than for CMR(DLSM). This suggests that the previously reported results for hypothesis one is unlikely to be caused by the lack of control for size or analyst following.

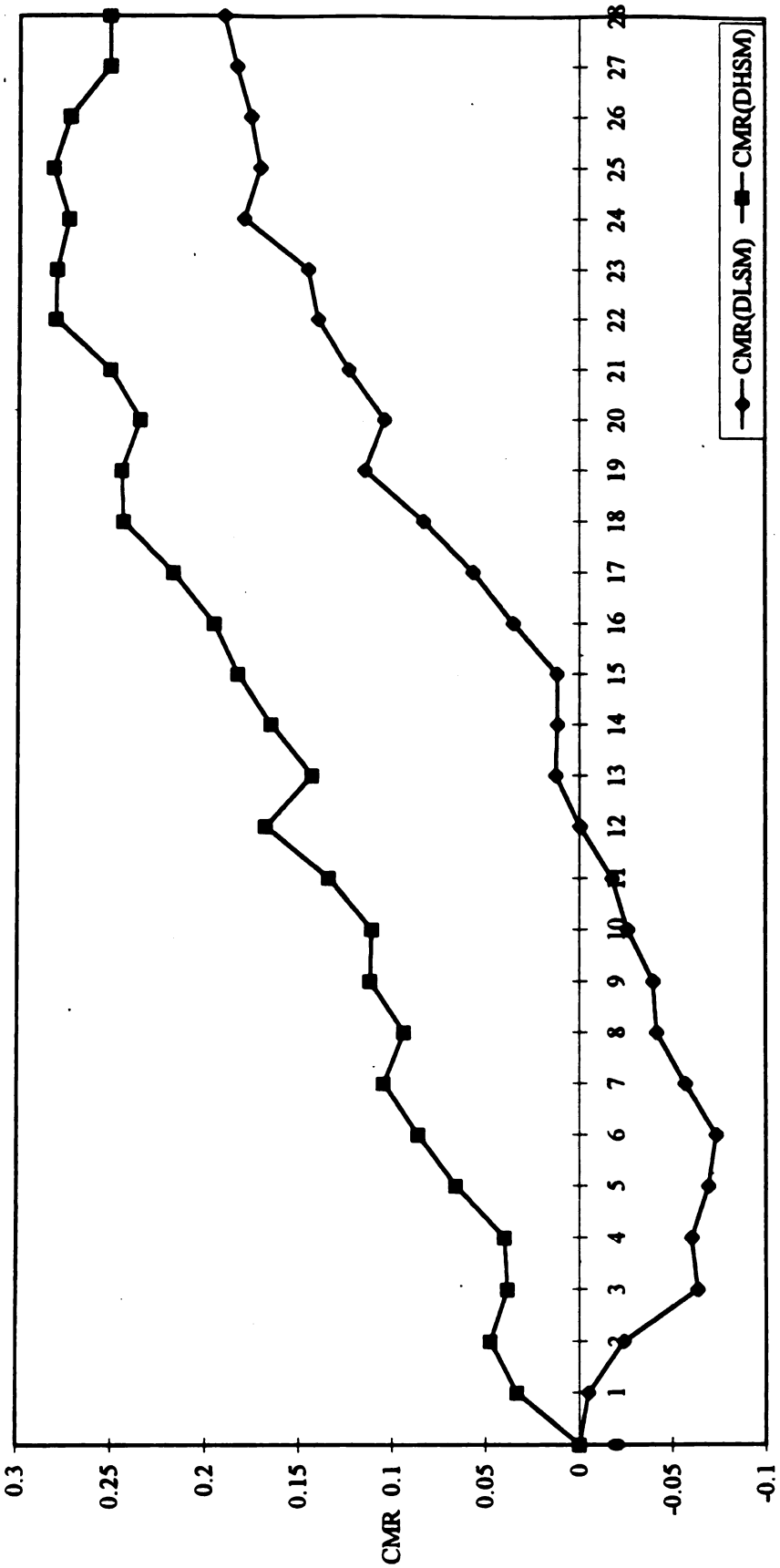

Figure 2.2
CMR for DLSM and DHSM Hedge Portfolios

2.5.3 Testing of Hypothesis 2.2

Hypothesis two investigates which categories of disclosures are effective in communicating firm-specific information to investors. Test results are presented in Table 2.6. Year dummies and an intercept are included in all regressions but are not reported because they do not relate to the hypothesis tested. In the table, Model 1 is a simple regression of CMR_{it-1} on UE_{it} with an adjusted R^2 of 0.0478. In Models 2 to 4, only one disclosure proxy at a time is included. The results indicate that both annual reports (t=2.29) and investor relations (t=3.95) are effective in communicating future earnings information to investors while quarterly reports (t=0.90) are not[27]. However, in Model 8, while all the three disclosure proxies are included in the regression at the same time, only β_4 is significantly positive at the conventional levels (t= 3.40), indicating that in year t-1 only investor relations assist investors in the formation of future earnings expectation, and that the positive effects of the annual reports indicated by results from Model 2 are caused by the correlation between $RIRA_{it-1}$ and $RIRI_{it-1}$. Results based on Model 9, which controls for the effects of size and analyst following, suggest that the effect of investor relations is not a disguised size or analyst following effect because β_4 is still significantly positive at conventional levels (t= 3.24).

Results presented in Table 2.6 also suggests that the effect of size on firms' information environments reported in previous studies (see, for example, Freeman 1987, Collins and Kothari 1989, Kothari and Sloan 1992), which do not control for the effect of

[27] It should be noted that same result could obtain if $RIRQ_{it}$ fails to capture cross-sectional variations of the informativeness of quarterly reports. The same caveat applies to other tests of hypothesis two.

Table 2.6
Tests for the Effects of Disclosures through Different Media[a]

	UE_{it}	UE_{it} *$RIRA_{it-1}$	UE_{it} *$RIRQ_{it-1}$	UE_{it} *$RIRI_{it-1}$	UE_{it} *$LSIZE_{it-1}$	UE_{it} *ANA_{it-1}	Adjusted R^2
Model 1	0.285	-	-	-	-	-	0.0478
	(4.91)						
Model 2	0.128	0.414	-	-	-	-	0.0508
	(1.42)	(2.29)					
Model 3	0.205	-	0.184	-	-	-	0.0477
	(1.91)		(0.90)				
Model 4	-0.026	-	-	0.721	-	-	0.0581
	(-0.27)			(3.95)			
Model 5	-0.404	-	-	-	0.104	-	0.0518
	(-1.48)				(2.58)		
Model 6	0.087	-	-	-	-	0.011	0.0494
	(0.69)					(1.78)	
Model 7	-0.444	-	-	-	0.118	-0.003	0.0512
	(-1.44)				(1.88)	(-0.28)	
Model 8	0.035	0.223	-0.358	0.746	-	-	0.0579
	(0.31)	(0.89)	(-1.32)	(3.40)			
Model 9	-0.484	0.170	-0.319	0.712	0.081	0.000	0.0593
	(-1.51)	(0.67)	(-1.17)	(3.24)	(1.26)	(0.03)	

a. Values of t statistics are reported in brackets.

disclosures, may in part be caused by the fact that larger firms tend to have better investor relations. In Model 5, where only $LSIZE_{it-1}$* UE_{it} is included (in addition to UE_{it}), γ_1 is significantly positive (t = 2.58), which is consistent with prior evidence that investors can form more precise earnings expectation for larger than for smaller firms in year t-1. In Model 7, where ANA_{it-1}*UE_{it} is also included in the regression, the size effect is still significant with a t value of 1.88. However, in model 9, where disclosure variables are included in the regressions, the size effect is no longer significant at conventional levels (t = 1.26).

2.5.4 Sensitivity Analysis for the Testing of Hypothesis 2.2

Bernard (1987) showed that, in cross-sectional regressions of return on unexpected earnings, the cross-sectional dependence of returns may cause the levels of statistical significance for the regression coefficients to be overstated. To alleviate this potential problem as well as the concern that the results in Table 2.6 may have been affected by a small number of outliers, annual regressions based on Model 9 are conducted for each sample year and hypothesis two is then tested using the intertemporal distribution of the coefficients in the nine sample years. The results are essentially the same as reported in Table 2.6, with investor relations as the only statistically significant effect (t = 2.062).

Collins and Kothari (1989) provide evidence that the ERC varies systematically with the book-to-market ratio and equity beta. To make certain that the results reported in Table 2.6 are not caused by the lack of control for these two variables, a regression that includes the three disclosure proxies, the logarithm of size, analyst following, book-to-

market ratio, and equity beta is re-estimated. The results remain essentially the same as reported in Table 2.6.

Finally, while the results reported in Table 2.6 are based on regressions where the CRSP equally weighted market index is used in the calculation of the CRSP cumulative market adjusted returns, they remain essentially the same if the value weighted index is used instead.

Chapter 3

PREEMPTION, SIGNAL INFORMATIVENSSS, AND THE INCREMENTAL INFORMATION CONTENT OF THE ANNUAL AND 10-K REPORTS

This chapter examines the effects of preemption and signal informativeness on the incremental information content of annual and 10-K reports. It is organized as follows. Section 3.1 provides background and motivation. Section 3.2 uses a model adapted from Holthausen and Verrecchia (1988) to develop hypotheses. Section 3.3 outlines methods for hypothesis testing and variable measurements. Section 3.4 describes the sample and variables. Empirical results are presented in Section 3.5.

3.1 BACKGROUND AND MOTIVATION

Under the current financial reporting system in the United States, publicly-traded firms must provide shareholders with the ARS and file the 10-K with the SEC. These reports represent the formal public release of a firm's detailed financial statements. Moreover, they contain disclosures mandated by the Financial Accounting Standards Board (FASB) and/or the SEC, and other voluntary disclosures. Such disclosures include, but are not limited to, management discussions of past and expected firm performances, segmental data, accounting policy choices and changes, research and development, and the auditor's opinion. Therefore, even though ARS and 10-K are not released to the public until several weeks after the announcements of summary earnings information, they may still contain incremental information that is useful for market

participants to revise their expectations for future earnings. Such a conjecture is consistent with results reported in previous survey studies. Lees (1981), for instance, finds that analysts cite ARS and 10-K as important sources of firm information. Knutson (1992) reports that analysts perceive ARS as the most important reporting document.

Despite the perceptions of analysts, a group of primary users of financial reports, prior studies on the incremental information content of annual and 10-K reports have been inconsistent. Foster and Vickrey (1978) report evidence that 10-Ks released at least 10 days after the filing of ARS contain incremental information. However, most later studies have been unable to reach the same conclusion. Foster et al. (1983) find no abnormal price volatility in the week of 10-K release after the release of ARS, which represents a reversal of the conclusion in Foster and Vickrey (1978). Foster, Jenkins, and Vickrey (1986) do not find unusual price volatility in the week of ARS release, which may or may not have been preceded by the release of 10-K. Cready and Mynatt (1991) reports that "No evidence of a price response and little evidence of a volume of shares response at annual report dates is found." Stice (1991) finds no abnormal returns behavior on 10-K and 10-Q dates that precede earnings announcement dates by at least four days, but detects abnormal returns behavior on the later earnings announcement dates. Easton and Zmijewski (1993) examine the incremental information content of ARS, 10-K and 10-Q with a very large sample that covers SEC filings from 1966 to 1985. They report that, overall, there exists little evidence of incremental information around ARS and 10-K disclosure dates. More recently, Lang and Lundholm (1994) find that analyst forecasts are not more accurate for firms with more forthcoming annual and 10-K reports after

controlling for the informativeness of quarterly reports and investor relations.[28] On the other hand, Han and Huang (1995) find that security returns on the earlier of the release dates of either the ARS or 10-K are positively associated with an indicator of future earnings growth, but the significant association is attributed mainly to small firms. Taken together, the collective evidence from prior research weighs against the existence of incremental information associated with the release of the ARS and 10-K.[29]

Several research design issues may contribute to previous studies' inability to document abnormal returns behavior on the ARS and 10-K release dates. First, the lack of control for the cross-sectional differences in previously released information reduces the power of statistical analysis. Managers communicate with investors through media other than the ARS and 10-K, such as conversations with financial analysts, press releases, and quarterly reports. The existence of more timely alternative sources of earnings-relevant information means that returns can incorporate certain information about future earnings well before the release of annual and 10-K reports. Han, Jennings, and Noel (1992), for instance, report that there exists a significant association between security returns and revisions in the probability of bankruptcy due to non-earnings data, but market participants have largely revised their estimate of the probability of bankruptcy prior to the earlier of the SEC receipt dates of the ARS and 10-K.

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[28] It should be noted that the event period in Lang and Lundholm (1994) precedes the release of the ARS and 10-K.

[29] There exists an extensive literature providing evidence that the information in disclosures contained in the ARS and 10-K are useful for the valuation of firms. See footnote 1 in Barth and Sweeney (1995) for examples. However, since most papers in this literature are association or level studies, it remains unclear whether the market derives the information from the disclosures or from other sources that may not even originate from the firms.

Second, most prior studies treat annual and 10-K reports from different firms as if they contain the same amount of information, which introduces noise into statistical tests. The ARS and 10-K across firms differ in the amount and quality of information they contain. It is conceivable that the ARS and 10-K from a subset of firms provide incremental information to the market because the disclosures in these reports are more informative than disclosures in similar reports from other firms. Because firms tend to coordinate disclosure policies, i.e., firms with more informative ARS and 10-K tend to have more informative interim disclosures and better investor relations, the informativeness of the ARS and 10-K and that of prior disclosures must be controlled simultaneously to be effective.

The third issue relates to the specification of the event dates on which the information in the ARS and 10-K first becomes known to the market. In general, they are assumed to be the earlier of the SEC receipt dates of the ARS and 10-K. However, some firms disclose information in the ARS and 10-K prior to the SEC receipt dates through news releases. Wilson (1987) reports that in the 1981-82 period, 63 percent of firms in his sample made such news releases. Of those releases, 79 percent contained earnings, revenues and additional information such as segment data, and 13 percent contained preliminary earnings statements and balance sheets. Moreover, some firms send their ARS and 10-K to investors and analysts before sending them to the SEC. Han, Jennings, and Noel (1992) report that only 63 percent of firms that responded to their survey indicated that they do not send their ARS or 10-K to either shareholders or analysts/brokers more than three days before mailing it to the SEC. On the other hand, investors' response to

information in the ARS and 10-K may be delayed until days after their receipt by the SEC. In general, the ARS and 10-K are not made available to the public by the SEC until several days after the receipt dates.[30] Furthermore, because the information in the financial statements and disclosures is contextual and firm-specific, it may take market participants a certain period of time to first interpret and assimilate and then respond to the information.

In this paper, I attempt to overcome these limitations by explicitly controlling cross-sectional differences in prior information and the informativeness of the ARS and 10-K. I also empirically investigate the conjecture that the ARS and 10-K, or the information in them, may have been released to the market prior to the SEC receipt dates, and the possibility of a delayed market response to the information in the ARS and 10-K.

3.2 HYPOTHESIS DEVELOPMENT

The above discussion on the effects of cross-sectional differences in prior information and the informativeness of the ARS and 10-K on information content tests can be formalized with a model adapted from Holthausen and Verrecchia (1988). Figure 3.1 illustrates the sequence of events modeled below, including fiscal year ends (FYE) in years t-1, t and t+1 as well as earnings announcement dates (EAD) in years t and t+1. Assume that the earnings generation process is a random walk such that:

$$EPS_{t+1} = EPS_t + e_{t+1}, \tag{3.1}$$

[30] Refer to Easton and Zmijewski (1993) for more information on this issue.

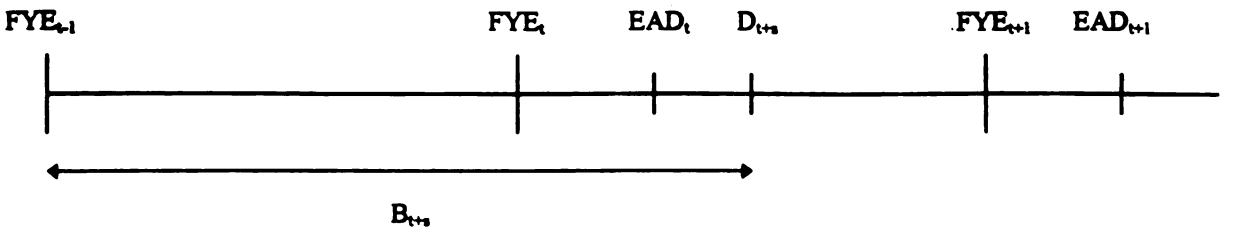

Figure 3.1
Sequence of Events Modeled

where e_{t+1} is normally distributed with a mean of 0 and a variance of v_e.[31] Let B_{t+s} be the aggregate of information released before t + s and takes the form:

$$B_{t+s} = e_{t+1} + b_{t+s}, \tag{3.2}$$

where b_{t+s} is normally distributed, uncorrelated with e_{t+1}, and has a mean of 0 and a variance of v_b.[32] In reality, B_{t+s} includes, but is not limited to, earnings realizations, quarterly reports, news releases, and analyst earnings forecasts prior to t + s. Let D_{t+s} be new information in the ARS or 10-K released at t + s. It provides information about e_{t+1} such that:

$$D_{t+s} = e_{t+1} + d_{t+s}, \tag{3.3}$$

where d_{t+s} is a normally distributed random variable that is uncorrelated with e_{t+1} and has a mean of 0 and a variance of v_d. In general, d_{t+s} and b_{t+s} are correlated with a covariance of c. Intuitively, this means some information in D_{t+s} has been preceded by previously released information. For instance, some of the information contained in the ARS and 10-K may has been preceded by quarterly reports and/or management discussions with analysts.

It can be shown that, before the release of D_{t+s}, the expectation of e_{t+1} for investors who can observe B_{t+s} is:

$$E(e_{t+1}|B_{t+s}) = \frac{v_e * B_{t+s}}{v_e + v_b}. \tag{3.4}$$

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[31] Because EPS_t is known before the release of the ARS and 10-K, this assumption is equivalent to assuming that EPS_{t+1} has a normal distribution with an unconditional mean of EPS_t and a variance of v_e.

[32] Because t + s represents the release dates of the earlier of the ARS and 10-K of year t, the value of s should normally be between zero and one.

After the release of D_{t+s}, the expectation of e_{t+1} for investors who can observe both B_{t+s} and D_{t+s} is be:

$$E(e_{t+1}|B_{t+s},D_{t+s})=\frac{v_e(v_d-c)B_{t+s}+v_e(v_b-c)D_{t+s}}{(v_e+v_b)(v_e+v_d)-(v_e+c)^2}. \qquad (3.5)$$

The revision of the expectation of e_{t+1} due to the release of D_{t+s} is then:

$$E(e_{t+1}|B_{t+s},D_{t+s})-E(e_{t+1}|B_{t+s})=\frac{v_e(v_d-c)B_{t+s}+v_e(v_b-c)D_{t+s}}{(v_e+v_b)(v_e+v_d)-(v_e+c)^2}-\frac{v_e*B_{t+s}}{v_e+v_b}. \qquad (3.6)$$

For simplicity, ignore the time value of money between t+s and t, and normalize the share price before the release of D_{t+s} to one. Stock return associated with the release of D_{t+s} is therefore:

$$RET_{t+s}=\frac{1}{r}*\left[\frac{v_e(v_d-c)B_{t+s}+v_e(v_b-c)D_{t+s}}{(v_e+v_b)(v_e+v_d)-(v_e+c)^2}-\frac{v_e*B_{t+s}}{v_e+v_b}\right], \qquad (3.7)$$

where r is the cost of equity capital.

In the above expression, the return associated with the release of D_{t+s} depends on its precision, $1/v_d$, the extent to which it has been preceded by B_{t+s} due to the correlation between b_{t+s} and d_{t+s}, the precision of B_{t+s} measured by $1/v_b$, and the variance of the earnings process due to the existence of noise. It can be simplified under the assumption that the information contained in the ARS and 10-K subsumes all the information about e_{t+1} that has been previously released.[33] Under the assumption, equation (3.7) can be rewritten as the following:

[33] Such an assumption is reasonable since the ARS and 10-K are the most comprehensive financial reporting documents about publicly listed firms. Mathematically, this means that $c= v_d$ and $v_b > v_d$.

$$RET_{t+s} = \frac{1}{r} * \left[\frac{v_e * D_{t+s}}{v_e + v_d} - \frac{v_e * B_{t+s}}{v_e + v_b} \right], \tag{3.8}$$

3.2.1 Abnormal Volatility

It can be shown that the variance of RET_{t+s}, conditional on having first observed B_{t+s}, is:

$$Var(RET_{t+s}) = \frac{1}{r} * \left[\frac{v_e^2}{v_e + v_d} - \frac{v_e^2}{v_e + v_b} \right] \tag{3.9}$$

It is a decreasing function of $1/v_b$, the informativeness of prior information, and an increasing function of $1/v_d$, the informativeness of the ARS and 10-K. This indicates that abnormal returns variance is most likely to be observed for firms with less informative prior disclosures and more informative ARS and 10-K, leading to the first hypothesis in its alternative form:

> *For firms with more informative ARS and 10-K and less informative prior disclosures, abnormal stock returns exhibit abnormal volatility on the earlier of the dates when the ARS and 10-K are released.*

3.2.2 Abnormal Returns

Equation (8) can be rewritten as the following:

$$RET_{t+s} = \frac{1}{r} * \left[\frac{v_e}{v_e + v_d} - \frac{v_e}{v_e + v_b} \right] * e_{t+1} + \frac{1}{r} * \left[\frac{v_e * d_{t+s}}{v_e + v_d} - \frac{v_e * b_{t+s}}{v_e + v_b} \right], \tag{3.10}$$

where e_{t+1} is not correlated with either d_{t+s} or b_{t+s}. Equation (10) shows that, on average, if the ARS and 10-K for year t indeed provide information about e_{t+1}, then the abnormal returns in the event period should on average be positive for firms with positive unexpected earnings in year t+1, and negative for firms with negative unexpected earnings in year t+1. Moreover, such effects should be most pronounced for firms with more

informative ARS and 10-K and less informative prior disclosures. This leads to the second hypothesis:

> *For firms with more informative ARS and 10-K and less informative prior disclosures, the abnormal stock returns on the earlier of the ARS and 10-K release dates are, on average, positive for firms with positive future unexpected earnings and negative for firms with negative unexpected future earnings.*

3.2.3 The ERC

Equation (3.10) also indicates that, in a regression of RET_{t+3} on e_{t+1}, the ERC is an increasing function of $1/v_d$ and a decreasing function of $1/v_b$. This leads to the third hypothesis:

> *Ceteris paribus, the ERC from regressing abnormal returns on the earlier of the ARS and 10-K release dates on future unexpected earnings is an increasing function of the informativeness of the annual report and a decreasing function of the informativeness of prior disclosures.*

The above hypothesis will also be tested in the period immediately before the event period to investigate the conjecture that market participants may already have had access to the ARS and 10-K or the information in these reports before their receipt and release by the SEC. It will also be tested in the period immediately after the events period to detect the possibility of a delayed market response to the information in the ARS and 10-K.

3.3 STATISTICAL METHODS AND VARIABLE MEASUREMENTS

3.3.1 Proxies for the Informativeness of Disclosures

Proxies for the informativeness of disclosures through the ARS, 10-K, and prior disclosures are based on analysts' evaluation scores for the sample firms' annual and 10-K reports, quarterly reports, and investor relations as published in the AIMR Reports. According to the AIMR Corporate Information Committee, an industry-specific

subcommittee composed of leading analysts following the industry evaluates, on an annual basis, the informativeness of selected firms' disclosures along three dimensions: annual published information, quarterly and other published information, and investor relations and other aspects. Characteristics and issues unique to the industry are taken into consideration in the evaluation process. Scores along these three dimensions are then weighted to obtain an overall score about the informativeness of the firm's disclosure practices. The weights are in general 40-50 percent for the annual published information, 30-40 percent for the quarterly and other published information, and 20-30 percent for investor relations and other aspects. While the majority of the subcommittees report both overall and category scores, some subcommittees publish only the overall scores. As a result, about one-third of firm years in the AIMR Reports have no category scores reported and are therefore not included in the sample.

Because firms in different industries are evaluated by different subcommittees and members of the same subcommittees are not necessarily the same in different years, the raw scores reported by the subcommittees must be standardized to provide meaningful proxies for disclosure informativeness. This is achieved by defining relative industry rankings for the ARS and 10-K ($RIRA_{it}$) as the following:

$$RIRA_{it} = \frac{RANKA_{it} - 1}{N_{jt} - 1},$$

where N_{jt} is the number of firms for industry j in year t, and $RANKA_{it}$ is the rank, in ascending order, of firm i in year t within industry j based on analysts' evaluation score for the ARS and 10-K. Analysts' evaluation scores for quarterly reports and investor relations are combined to obtain a weighted score for disclosures released prior to the

release of the earlier of the ARS and 10-K, and relative industry rankings for prior disclosures ($RIRP_{it}$) are then obtained similarly as $RIRA_{it}$. $RIRQ_{it}$ and $RIRI_{it}$ are also similarly defined as $RIRA_{it}$ as proxies for the informativeness of quarterly reports and investor relations.

3.3.2 Dependent Variables

Dependent variables for statistical analysis are defined following Patell (1976). Let $\tau = 0$ represent the three-day event period centered around the date on which either the ARS or 10-K, whichever is earlier, is received by the SEC. The test interval, composed of three-day periods and indexed by τ, ranges from $\tau = -5$ to $\tau = +5$. The following market model is first estimated over an estimation interval consisting of 60 three-day periods prior and 60 three-day periods following the test interval:

$$R_{it\tau} = \alpha_{it} + \beta_{it} R_{mt\tau} + e_{it\tau}, \text{ where}$$

$R_{it\tau}$ = the return for firm i in sample year t for period τ, obtained by summing up daily returns from the CRSP daily returns tapes,

$R_{mt\tau}$ = the equally-weighted market return index in sample year t during period τ, obtained by summing up equally weighted daily market return index from the CRSP daily returns tapes

$e_{it\tau}$ = a random, normally distributed error term.

Let T_{it} be the number of observations in the regression, and s_{it}^2 be the variance of $\varepsilon_{it\tau}$ estimated from the above regression. The abnormal returns for period $\tau = -5, \ldots, +5$ in the test interval are calculated from:

$$u_{it\tau} = R_{it\tau} - (\alpha_{it} + \beta_{it} R_{mt\tau}).$$

As in Patell (1976), the following variable is distributed as a Student t statistic with T_{it} - 2 degrees of freedom:

$$V_{it\tau} = \frac{u_{it\tau}}{s_{it}\sqrt{C_{it\tau}}},$$

where $C_{it\tau}$ is an adjusting factor for making predictions outside the estimation interval. The average of $V_{it\tau}$ for a given value of τ over all firm-years is denoted as V_τ. The distribution of $V_{it\tau}$ means the following variable should have a normal distribution:

$$Z_{V_\tau} = \frac{\sum_i \sum_t V_{it\tau}}{\sqrt{\sum_i \sum_t \frac{T_{it}-2}{T_{it}-4}}}.$$

Also, the following variable:

$$U_{it\tau} = \frac{u_{it\tau}^2}{C_{it\tau} s^2_{it}} \cdot \frac{T_{it}-4}{T_{it}-2},$$

has an expectation of one and an variance of $2(T_{it}-3)/(T_{it}-6)$. This means that the following variable has an approximately unit Normal distribution:

$$Z_{U_\tau} = \frac{\sum_i \sum_t (U_{it\tau}-1)}{\sqrt{\sum_i \sum_t \frac{2(T_{it}-3)}{T_{it}-6}}},$$

where U_τ is the average of $U_{it\tau}$ for a given value of τ over all firm-years.

3.3.3 Hypothesis 3.1

To test hypotheses one, I first divided the full sample into two portfolios according to the informativeness of the ARS and 10-K, with AH being the more informative and AL the less informative. This is achieved by putting observations with $RIRA_{it}$ above or equal

to their respective industry-year medians in AH, and the rest in AL. A similar procedure is performed to divide the full sample into another two portfolios based on the informativeness of prior disclosures, with PH being the more informative and PL the less informative. Consequently, portfolio PLAH contains firms with less informative prior disclosures and more informative ARS and 10-K.

Under H1, the abnormal returns of firms in the portfolio PLAH should exhibit abnormal volatility in the event period. This is tested by whether U_0 is significantly larger than one.

3.3.4 Hypothesis 3.2

Define UE_{it+1} as scaled unexpected earnings of firm i in year t + 1. Assuming that the earnings-generating process follows a random walk, UE_{it+1} can be obtained by subtracting primary earnings per share before extraordinary items (EPS) of year t from that of year t + 1 and then scaling the difference by share price at the beginning of year t + 1. Both EPS and share prices are adjusted for stock splits and stock dividends, obtained from the Compustat tapes.

Under H2, for observations in the portfolio PLAH, the abnormal stock returns in the event period are, on average, positive for firms with UE_{it+1} larger than zero and negative for firms with UE_{it+1} smaller than zero. This is tested by whether V_0 is significantly positive for the subset of firms in portfolio PLAH with positive UE_{it+1} (UEP) and significantly negative for the subset of firms in portfolio PLAH with negative UE_{it+1} (UEN).

3.3.5 Hypothesis 3.3

Hypothesis three is tested using the following regression in which observations are pooled both cross-sectionally and intertemporally at the same time during the event period, $\tau = 0$:

$$u_{it0} = \alpha + \beta_1 UE_{it+1} + \beta_2 RIRA_{it} * UE_{it+1} + \beta_3 RIRP_{it} * UE_{it+1} + \gamma * LSIZE_{it} * UE_{it+1} + \varepsilon_{it}.$$

In this regression, $LSIZE_{it}$ is the logarithm of $SIZE_{it}$, the market value for firm i at the end of year t, and ε_{it} is a random, normally distributed error term. Other variables are as previously defined. Under hypothesis three, β_2 is positive and β_3 is negative. $LSIZE_{it}$ is included in the regression to control the effects of other variables that may affect firms' information environment, but no prediction is made for the regression coefficient.

To investigate the conjecture that market participants may already have had access to the ARS and 10-K or the information in these reports before their receipt and release by the SEC, the above regression will be estimated with abnormal returns accumulated over τ = -5, ..., -1. The possibility of a delayed market response to the information in the ARS and 10-K will be examined by repeating the above regression with abnormal returns accumulated over τ = +1, ...,+5.

3.4 SAMPLE AND VARIABLE DESCRIPTIONS

3.4.1 Sample Selection Criteria and Procedure

Table 3.1A describes the sample selection process. The 1980-1984 AIMR Reports contain 2,190 firm-years with CUSIP numbers identifiable from the CRSP tapes. The following eight selection criteria reduce this initial sample to its final total of 933. (1) The industry subcommittees must report category scores. (2) The SEC receipt dates

Table 3.1A
Sample Selection Criteria and Procedure

	Number of firm-year
Firm-years covered in AIMR Reports, 1983-1991, with CUSIPs from CRSP tapes	2,190
Less firm-years:	
without category scores	(772)
without either the SEC ARS or 10-K receipt date	(323)
with at least one daily return in the 393 trading days centered around the event date missing	(62)
without either annual earning announcement date or the next first quarter earnings announcement date	(9)
with an earnings announcement that is less than eight days away from the event date	(22)
with at least one daily return in the 393 trading days centered around the annual earnings announcement date missing	(3)
without Compustat data to obtain UE_{it+1}	(65)
with less than two firms in annual industry groups	(1)
Firm-years included in the sample	933

for the ARS and 10-K are both available. (3) All daily returns in a 393-day period centered around the event date are available from the CRSP daily returns tapes. (4) Annual earnings announcement dates are available from either the Compustat tapes or the Wall Street Journal Index. (5) No earnings announcement occurs less than eight days away from the event date. (6) All daily returns in a 393-day period centered around the fourth-quarter earnings announcement date are available from the CRSP daily returns tapes. (7) Data are available from the Compustat tapes for the calculation of UE_{it+1}. (8) There are at least two observations in the industry-year. Criterion (1) is imposed because proxies are needed for both the informativeness of prior disclosures and the ARS and 10-K. Criteria (3) and (6) are imposed to exclude firms that are either not listed until shortly before or delisted right after the sample year. Criterion (5) is to eliminate potential confounding effects attributable to earnings announcements. Criterion (8) makes the calculation of relative industry rankings possible. All the other criteria are selected for data availability.

As shown in Table 3.1B, the number of firms in each year ranges from 157 in 1980 to 204 in 1983, while the number of industries in each year ranges from 19 in 1980 and 1981 to 24 in 1984. The number of observations in each industry-year group is two at the minimum and 19 at the maximum, indicating that, in any given year, the sample is not dominated by a small number of industries.

3.4.2 Summary Statistics

Table 3.2 presents summary statistics for the variables. Descriptive statistics for $RIRA_{it}$, $RIRQ_{it}$, $RIRI_{it}$ and $RIRP_{it}$ are not included because statistics for relative rankings

Table 3.1B
Distribution of Firms and Industries

Year	Number of firms in the sample	Number of industries in the sample
1980	157	19
1981	187	19
1982	195	21
1983	204	21
1984	190	24
Totals	933	104

Table 3.2
Sample Summary Statistics, 1980-1984

			Percentiles				
Variable	Mean	Std.Dev.	1%	25%	50%	75%	99%
Reporting lag from FYE to EAD[a]	37.1	11.9	17	28	36	45	68
Reporting lag from FYE to SEC ARS receipt date[b]	81.5	13.1	49	74	81	89	117
Reporting lag from FYE to SEC 10-K receipt date[c]	85.5	8.3	57	84	88	90	93
$DEVE_{it}$	0.632	0.482	0	0	1	1	1
$DEXE_{it}$	0.975	0.155	0	1	1	1	1
$DFYE_{it}$	0.741	0.439	0	0	1	1	1
$SIZE_{it}$	2,160	3,709	58	433	979	2,151	17,999
UE_{it+1}	-0.005	0.270	-0.535	-0.027	0.005	0.018	0.354

a. = the lag from a firm's fiscal year end (FYE) to its annual earnings announcement date (EAD), obtained from the SEC filing date data base at the University of Chicago, same data source for b and c.

$DEVE_{it}$ = a dummy variable that equals one if the SEC receives the ARS of firm i for fiscal year t earlier than the 10-K, and 0 otherwise, obtained from the SEC filing date data base at the University of Chicago.

$DEXE_{it}$ = a dummy variable that equals one if firm i is listed in the NYSE and AMEX at the end of fiscal year t, and 0 otherwise, obtained from the CRSP tapes.

$DFYE_{it}$ = a dummy variable that equals one if firm i has a December FYE in year t, and 0 otherwise, obtained from the Compustat tapes.

$SIZE_{it}$ = the market value of firm i at the end of year t, in millions of dollars, obtained from the Compustat tapes.

UE_{it+1} = unexpected earnings for firm i in year t + 1, obtained by subtracting primary earnings per share before extraordinary items of year t from that of year t + 1 and then scaling the difference by share price at the beginning of year t + 1. Both EPS and share prices are adjusted for stock splits and stock dividends and obtained from the Compustat tapes.

are not very meaningful. Following Easton and Zmijewski (1993), reporting lags are defined as the number of calendar days from the firms' fiscal year end. The mean (median) annual earnings announcement lag is 37.1 (36) days. The mean (median) reporting lag is 81.5 (81) days for the ARS, and 85.5 (88) days for the 10-K.[34] About 63.2 percent of ARS filings occur before 10-K filings. Only 2.5 percent of firm-years are listed on the NASDAQ stock exchange, making it not feasible to study this sub-sample separately. Slightly less than three quarters of firm-years have a December fiscal year end. The distribution of $SIZE_{it}$ is skewed to the right, as indicated by a mean ($2,160 million) that is much larger than the median ($979 million), and a standard deviation ($3,709 million) that is greater than the mean. As a result, it logarithm, $LSIZE_{it}$, is used in correlation analysis.

Table 3.3 reports both Pearson (below the diagonal) and Spearman rank (above the diagonal) correlation coefficients among the informativeness proxies as well as $LSIZE_{it}$. The two sets of correlation coefficients are essentially the same and the discussions are based on Spearman rank correlation coefficients. Consistent with results reported in previous studies, all the informativeness variables are significantly correlated with $LSIZE_{it}$. This indicates that larger firms tend to have more informative disclosures and justifies the inclusion of $LSIZE_{it}$ in regression analysis as a control variable. Consistent with Lang and Lundholm (1993), firms tend to coordinate their disclosures through different channels. The three category relative industry rankings are all

[34] These statistics are comparable to, but slightly smaller than, those reported in Easton and Zmijewski (1993).

Table 3.3
Pearson and Spearman Correlation Coefficients[a]

	$RIRA_{it}$	$RIRQ_{it}$	$RIRI_{it}$	$RIRP_{it}$	$LSIZE_{it}$
$RIRA_{it}$		0.5977	0.5160	0.6250	0.1648
		0.0001	0.0001	0.0001	0.0001
$RIRQ_{it}$	0.5985		0.4628	0.7821	0.1210
	0.0001		0.0001	0.0001	0.0002
$RIRI_{it}$	0.5154	0.4632		0.8326	0.1242
	0.0001	0.0001		0.0001	0.0001
$RIRP_{it}$	0.6248	0.7825	0.8330		0.1471
	0.0001	0.0001	0.0001		0.0001
$LSIZE_{it}$	0.1781	0.1257	0.1335	0.1537	
	0.0001	0.0001	0.0001	0.0001	

a. Both Pearson (below the diagonal) and Spearman rank (above the diagonal) correlation coefficients are presented. *p* values are reported below the coefficients.

$RIRA_{it}$ = the relative industry ranking for the informativeness for firm i's ARS and 10-K in year t based on analysts' evaluation scores as in the AIMR Reports,

$RIRQ_{it}$ = the relative industry ranking for the informativeness for firm i's quarterly reports in year t based on analysts' evaluation scores as in the AIMR Reports,

$RIRI_{it}$ = the relative industry ranking for the informativeness for firm i's investor relations in year t based on analysts' evaluation scores as in the AIMR Reports,

$RIRP_{it}$ = the relative industry ranking for the informativeness for firm i's disclosures prior to the release of the earlier of the ARS and 10-K in year t, based on a weighted average of analysts' evaluation scores for quarterly reports and investor relations.

$LSIZE_{it}$ = the logarithm of $SIZE_{it}$ as defined in Table 3.2.

significantly correlated with one another at the 0.0001 level. The highest correlation is 0.5977 between $RIRA_{it}$ and $RIRQ_{it}$, and the lowest is 0.4628 between $RIRQ_{it}$ and $RIRI_{it}$.

3.5 EMPIRICAL RESULTS

This section reports empirical results for tests of hypotheses one, two, and three. When appropriate, tests are performed for both the annual earnings announcement (AEA) and the SEC receipts of the earlier of ARS and 10-K (REC) for comparison and additional insights. All *p* values and levels of significance are one-sided if directional predictions are made, and two-sided otherwise. For tests involving $Z_{U\tau}$ and $Z_{V\tau}$, t-test results based on the empirical cross-sectional distributions of $U_{it\tau}$ and $V_{it\tau}$ are reported in brackets, in addition to results based on their theoretical distributions. To reduce the effects of nonlinearity in the returns-earnings relation, UE_{it+1} values above the 99 percentile are set at the 99 percentile value. Similarly, UE_{it+1} values below the one percentile are set at the one percentile value.

3.5.1 Hypothesis 3.1

Figure 3.2 graphs U_τ in the test interval for both AEA and REC based on the full sample, as reported in Table 3.4. For AEA, U_0 is larger than U_τ in any other period in the test interval. Its value of 1.48 is statistically significantly at conventional levels, with a $Z_{U\tau}$ ($t_{U\tau}$) value of 10.40 (5.80). For REC, however, no clear pattern emerges for U_0 in the test interval. Its value of 0.96 is also smaller than its theoretical expectation of one, though the difference is not statistically different[35].

[35] It is also smaller than U_τ in seven of the other 10 periods in the test interval.

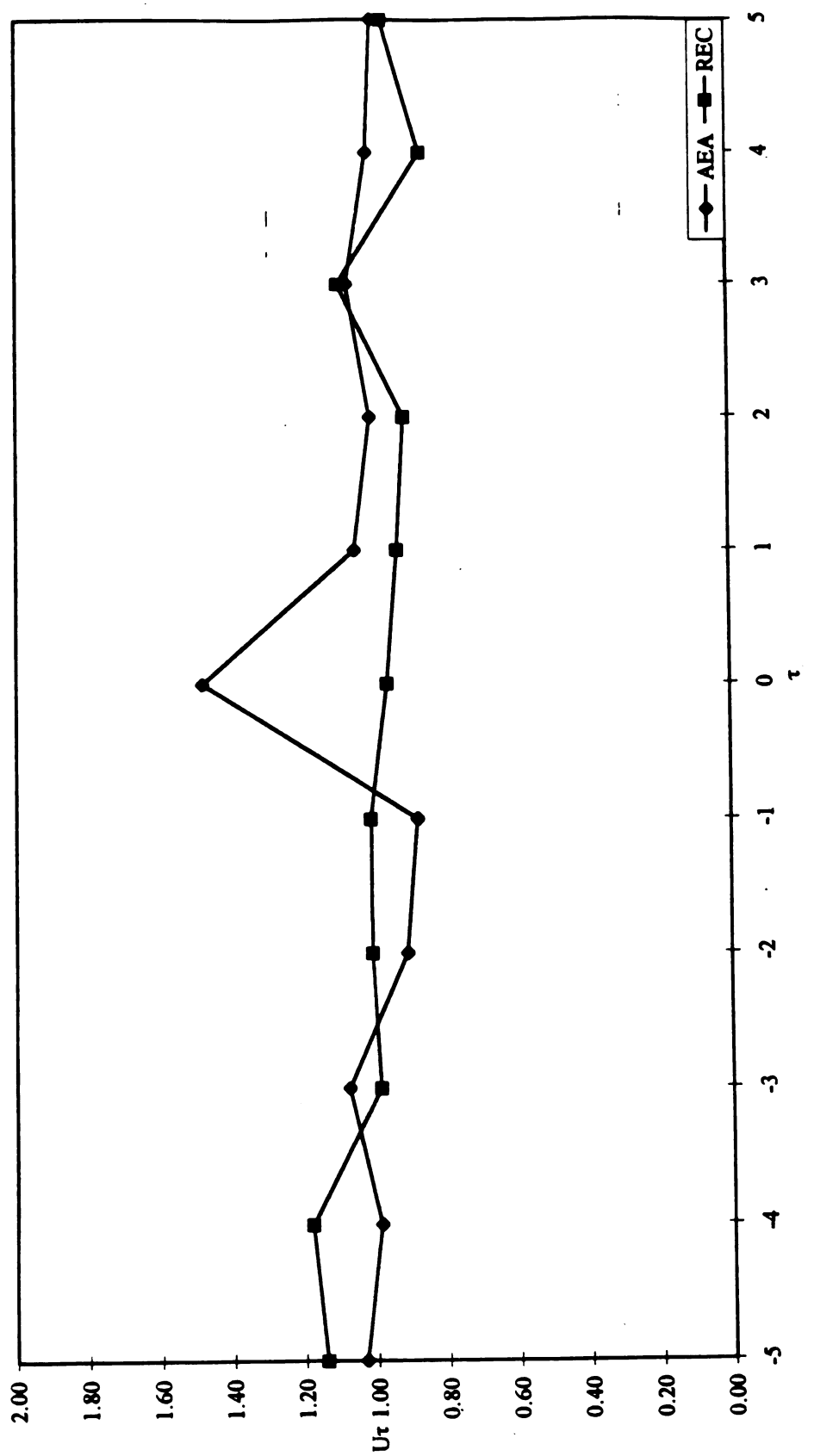

Figure 3.2
Values of Uτ for REC and AEA for the Full Sample

Table 3.4
Values of U_τ for REC and AEA for the Full Sample

	REC (SEC Receipt)			AEA (Annual Earnings Announcement)		
Period	U_τ	Z_{U_τ}	t_{U_τ}	U_τ	Z_{U_τ}	t_{U_τ}
-5	1.14	3.03	2.02	1.03	0.68	0.45
-4	1.18	3.89	0.94	0.99	-0.25	-0.18
-3	0.99	-0.28	-0.21	1.08	1.62	0.99
-2	1.01	0.18	0.14	0.91	-1.94	-1.77
-1	1.01	0.24	0.12	0.88	-2.58	-2.43
0	0.96	-0.79	-0.63	1.48	10.40	[illegible]
+1	0.93	-1.41	-1.09	1.05	1.15	0.94
+2	0.91	-1.85	-1.48	1.01	0.17	0.14
+3	1.10	2.12	1.50	1.07	1.55	0.95
+4	0.86	-2.93	-2.77	1.01	0.32	0.21
+5	0.97	-0.62	-0.47	1.00	0.00	0.00

Results in Table 3.5, which are for AEA, provide some assurance that $RIRP_{it}$ is indeed a valid proxy for the informativeness of prior disclosures not attributable to its correlation with firm size. First presented are the values of U_τ for PL and PH portfolios. The U_0 value for the PL portfolio is 1.70, significantly larger than that for the PH portfolio at 1.29 as indicated by a t test (t = 2.47, not reported in Table 3.5). The last five columns are the values of U_τ for the portfolios SS (with $SIZE_{it}$ below and equal to the median) and SL (with $SIZE_{it}$ above the median) respectively. A t test indicates that the U_0 value of 1.52 for the SS portfolio is not significantly larger than that for the SL portfolio at 1.45 (t = 0.409, not reported in Table 3.5).

Table 3.6 reports test results for hypothesis one based on firm-years in the portfolio PLAH, i.e., observations with less informative prior disclosures and more informative annual reports. The U_0 value for the portfolio is 0.75, significantly smaller, instead of larger, than its theoretical value of one, as indicated by a Z_{U_τ} (t_{U_τ}) value of -1.95 (-2.97). Moreover, there is no evidence that abnormal returns are more volatile than other periods in the test interval. The value of U_0 is smaller than nine of the 10 other U_τ values in the test interval. This compares to a U_0 value of 2.10 for AEA, which is significantly larger than one at conventional levels.[36] In sum, there is no evidence supporting the existence of unusual returns volatility in the three-day event period in the subsample that such an effect is most likely to exist.

[36] The second highest U_τ in the AEA test interval is 1.20 for $\tau = -3$.

Table 3.5
Values of U_τ for AEA with Full Sample Partitioned by $RIRP_{it}$ and $SIZE_{it}$

	Portfolios by $RIRP_{it}$						Portfolios by $SIZE_{it}$					
	PL (less informative, N=433)			PH (more informative, N=494)			SS (smaller, N=467)			SL (larger, N=466)		
Period	U_τ	$Z_{U\tau}$	$t_{U\tau}$	U_τ	$Z_{U\tau}$	$t_{U\tau}$	U_τ	$Z_{U\tau}$	$t_{U\tau}$	U_τ	$Z_{U\tau}$	$t_{U\tau}$
-5	1.04	0.66	0.37	1.02	0.30	0.26	1.09	1.32	0.71	0.98	-0.37	-0.37
-4	1.10	1.44	0.90	0.89	-1.71	-1.50	1.03	0.44	0.29	0.95	-0.80	-0.65
-3	1.20	2.90	1.44	0.97	-0.51	-0.42	1.06	0.95	0.51	1.09	1.34	0.98
-2	0.98	-0.26	-0.20	0.85	-2.42	-2.62	0.86	-2.20	-1.94	0.96	-0.54	-0.51
-1	0.99	-0.19	-0.15	0.79	-3.37	-4.07	0.87	-2.04	-1.83	0.89	-1.61	-1.60
0	1.70	10.33	5.10	1.29	4.53	2.95	1.52	7.86	4.18	1.45	6.82	4.02
+1	1.10	1.52	1.18	1.01	0.14	0.13	1.08	1.18	0.99	1.03	0.44	0.36
+2	1.08	1.18	0.93	0.94	-0.88	-0.76	1.00	-0.07	-0.06	1.02	0.32	0.29
+3	0.95	-0.76	-0.58	1.18	2.85	1.52	1.04	0.65	0.36	1.10	1.54	1.04
+4	0.99	-0.08	-0.05	1.03	0.51	0.37	0.91	-1.37	-1.17	1.12	1.83	1.04
+5	1.03	0.40	0.27	0.98	-0.37	-0.28	1.09	1.34	0.84	0.91	-1.33	-1.19

Table 3.6
Values of U_t for REC and AEA for Portfolio PLAH

Period	REC (SEC Receipt)			AEA (Annual Earnings Announcement)		
	U_t	Z_{U_t}	t_{U_t}	U_t	Z_{U_t}	t_{U_t}
-5	1.07	0.53	0.46	1.12	0.94	0.78
-4	0.96	-0.32	-0.17	1.14	1.12	0.93
-3	1.10	0.77	0.44	1.20	1.56	1.25
-2	0.77	-1.78	-2.27	1.07	0.55	0.37
-1	0.86	-1.11	-0.84	1.09	0.70	0.50
0	0.75	-1.95	-2.97	2.10	8.57	[illegible]
+1	0.68	-2.46	-3.47	1.07	0.54	0.40
+2	1.01	0.07	0.04	0.90	-0.79	-0.83
+3	1.08	0.65	0.51	0.91	-0.67	-0.54
+4	1.00	-0.02	-0.01	1.00	0.02	0.02
+5	1.16	1.27	0.63	0.75	-1.97	-2.66

3.5.2 Hypothesis 3.2

Figure 3.3 plots V_τ in the test interval for both AEA and REC with the full sample divided into portfolios UEN and UEP, as reported in Table 3.7. The last six columns are results for AEA. The value of V_0 is -0.29 for UEN, significantly negative at conventional levels with a Z_{V0} (t_{V0}) value of -5.65 (-4.83). Also for AEA, the value of V_0 is 0.11 with regard to UEP, significantly positive at conventional levels with a Z_{V0} (t_{V0})value of 2.56 (2.08). These results indicate that the annual earnings announcements can assist investors in updating their expectations for EPS_{it+1}.

Figure 3.4, which parallels Figure 3.3 but is for REC, is based on the first six columns of Table 3.7. For portfolio UEN, there is no evidence supporting the existence of incremental information content due to the release of the earlier of the ARS and 10-K. The value of V_0 is positive, instead of negative as expected. However, for portfolio UEP, its V_0 value of 0.09 is significantly positive at the 0.05 level, with a Zv_0 (t_{V0}) value of 2.21 (2.27). This suggests that, for the full sample, the ARS and 10-K contain incremental information for the future earnings of firms in the "good news" portfolio.

Table 3.8A reports V_τ values for AEA in the test interval. In the table, UEN is further separated into two portfolios, UENPL and UENPH, based on $RIRP_{it}$. The same procedure applies for UEP. As expected, the V_0 value for UENPL is -0.40, smaller (more negative) than that for UENPH at -0.18. A t test indicates that the difference is significant at the 0.05 level (one-sided, not reported in Table 3.8A). The V_0 value for UEPPL is 0.20 and, as expected, larger (more positive) than that for UEPPH at 0.03. The difference is significant at the 0.05 level via a t test (one-sided, not reported in Table

Table 3.7
Values of V_τ for REC and AEA with Full Sample Partitioned by the Sign of UE_{t+1}

	REC (SEC Receipt)						AEA (Annual Earnings Announcement)					
	UEN (N=385)			UEP (N=548)			UEN (N=385)			UEP (N=548)		
Period	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$
-5	-0.09	-1.83	-1.67	0.03	0.63	0.60	0.05	0.95	0.92	-0.06	-1.29	-1.28
-4	0.09	1.80	1.50	0.02	0.55	0.54	0.01	0.25	0.26	-0.01	-0.17	-0.17
-3	0.00	-0.02	-0.02	0.04	0.91	0.90	0.12	2.35	2.34	0.00	-0.09	-0.09
-2	0.01	0.14	0.13	0.10	2.23	2.33	-0.06	-1.18	-1.30	-0.01	-0.20	-0.20
-1	0.04	0.81	0.79	0.02	0.48	0.48	0.12	2.36	2.53	0.03	0.69	0.73
0	0.02	0.34	0.34	0.09	2.21	2.27	-0.29	-5.65	-4.83	0.11	2.56	2.08
+1	0.03	0.68	0.73	0.02	0.49	0.49	-0.03	-0.63	-0.62	0.06	1.33	1.28
+2	0.05	1.07	1.06	0.04	0.82	0.89	0.06	1.17	1.14	0.02	0.46	0.46
+3	0.05	1.05	0.99	0.06	1.41	1.35	-0.03	-0.62	-0.64	0.09	2.14	1.97
+4	0.06	1.27	1.36	0.12	2.77	2.99	0.02	0.29	0.29	0.07	1.68	1.66
+5	0.05	1.01	1.06	0.04	1.00	0.99	0.02	0.45	0.42	0.00	-0.09	-0.09

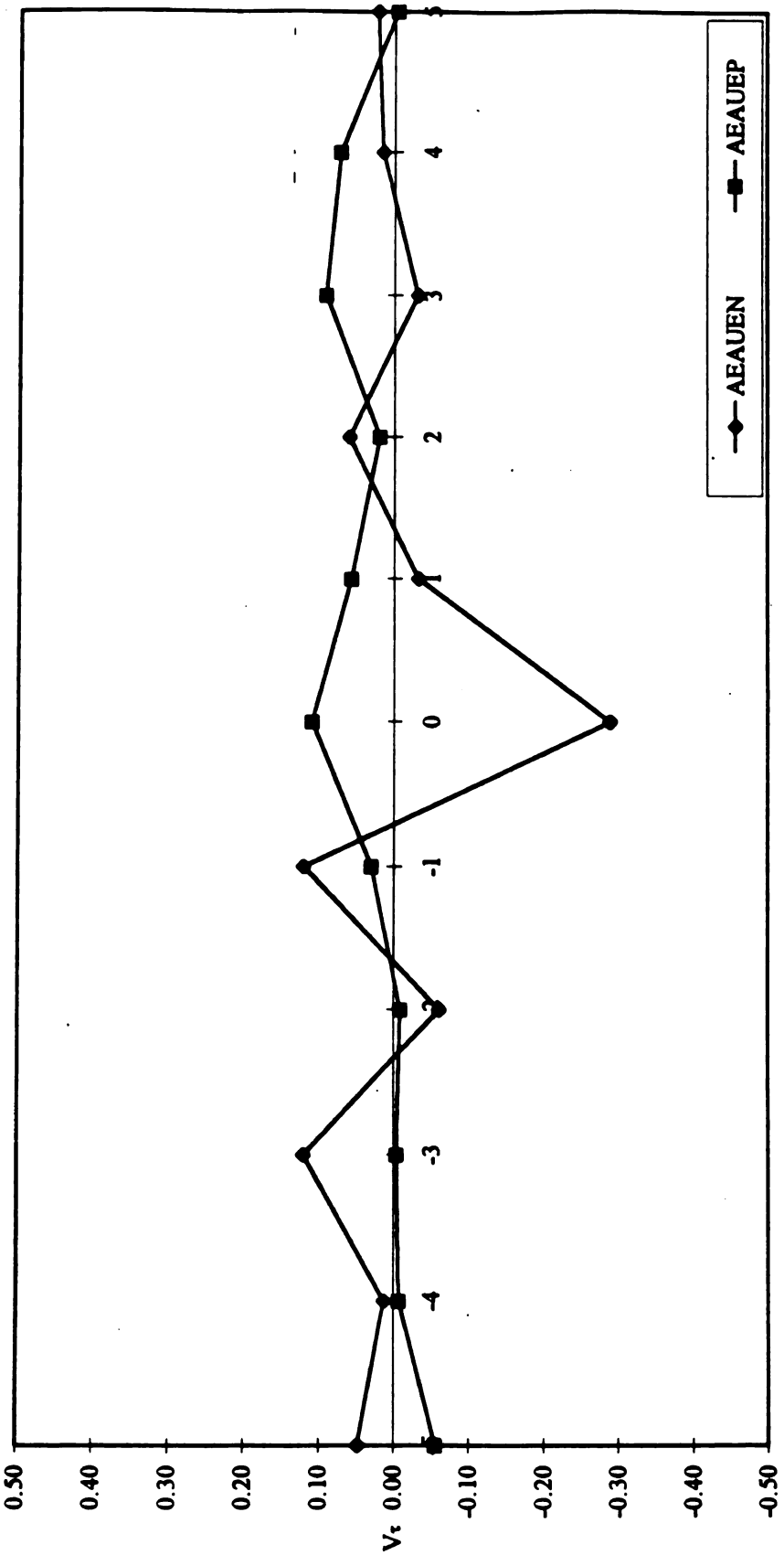

Figure 3.3
Values of Vτ for AEA with Full Sample Partitioned by the Sign of UE_{t+1}

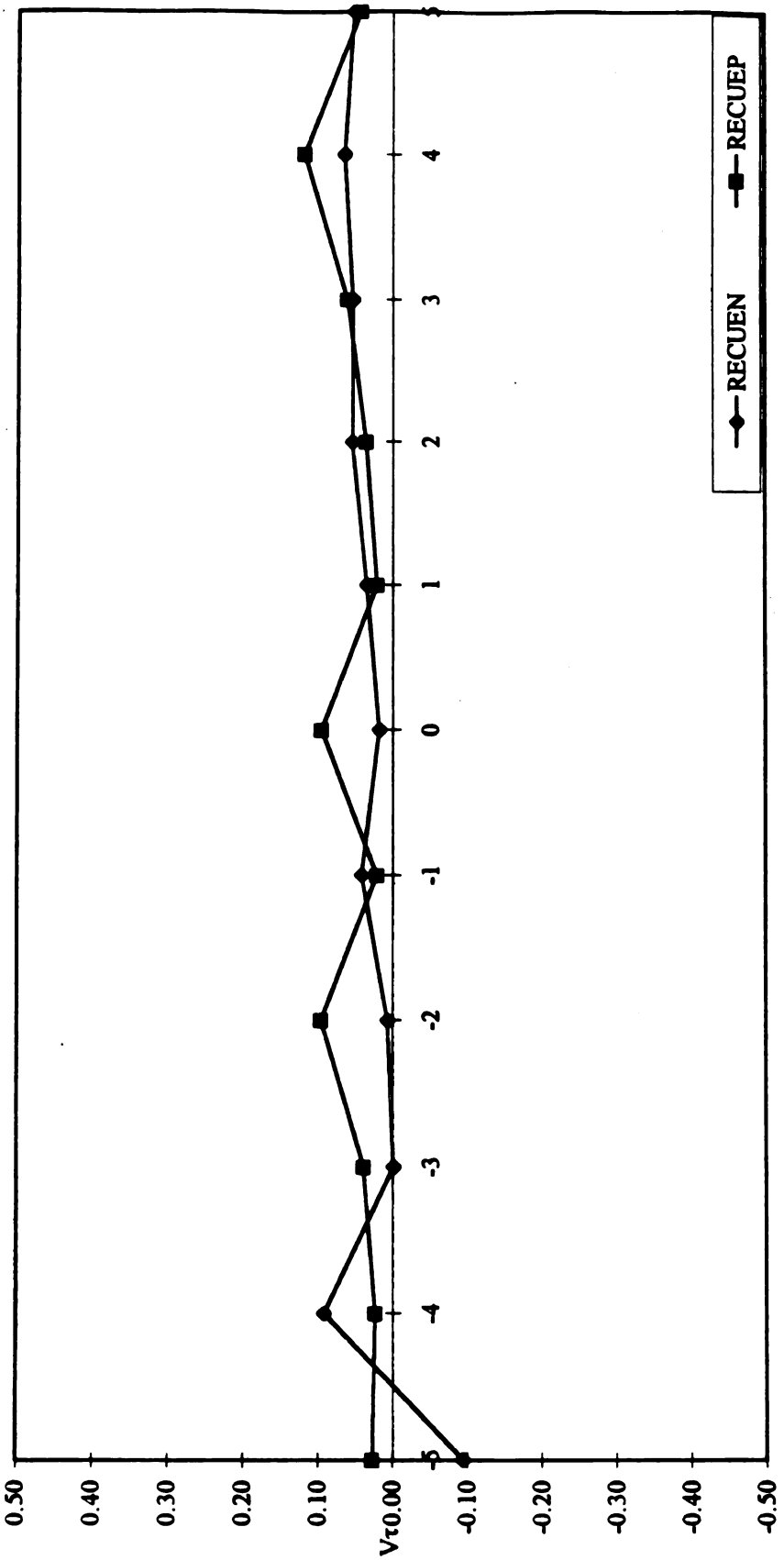

Figure 3.4
Values of Vτ for REC With Full Sample Partitioned by the Sign of UE_{a+1}

Table 3.8A
Values of V_τ for AEA with Full Sample Partitioned by the Sign of UE_{it+1} and $RIRP_{it}$

	UEN						UEP					
	PL (less informative, N=189)			PH (more informative, N=196)			PL (less informative, N=250)			PH (more informative, N=298)		
Period	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$
-5	0.06	0.81	0.78	0.04	0.52	0.51	-0.08	-1.33	-1.31	-0.03	-0.53	-0.52
-4	0.03	0.47	0.46	-0.01	-0.11	-0.13	-0.09	-1.45	-1.34	0.06	1.09	1.10
-3	0.14	1.98	1.80	0.10	1.34	1.50	-0.04	-0.58	-0.53	0.02	0.41	0.39
-2	-0.06	-0.80	-0.86	-0.06	-0.86	-0.98	0.03	0.50	0.48	-0.04	-0.73	-0.76
-1	0.16	2.18	2.18	0.08	1.16	1.35	0.06	0.94	0.95	0.00	0.08	0.09
0	-0.40	-5.46	-4.41	-0.18	-2.54	-2.34	0.20	3.22	2.47	0.03	0.52	0.45
+1	-0.08	-1.06	-1.04	0.01	0.16	0.16	0.07	1.03	0.96	0.05	0.85	0.85
+2	0.01	0.19	0.17	0.10	1.45	1.50	0.10	1.58	1.56	-0.05	-0.83	-0.85
+3	-0.05	-0.66	-0.74	-0.02	-0.22	-0.21	0.07	1.04	1.01	0.11	1.94	1.72
+4	0.02	0.21	0.20	0.01	0.21	0.21	0.02	0.32	0.33	0.12	1.98	1.90
+5	0.03	0.36	0.34	0.02	0.26	0.25	0.06	0.95	0.98	-0.06	-0.99	-1.04

3.8A). Table 3.8B presents results for "bad news" and "good news" observations further partitioned based on size. The values of V_0 are -0.291 and -0.287 for UENSS and UENSL portfolios, essentially the same. For UEPSS and UEPSL portfolios, the values are 0.14 and 0.08 respectively, the difference between which is insignificant at conventional levels (not reported in Table 3.8B). In sum, results in Tables 3.8A and 3.8B are consistent with those in Table 3.5 and provide further assurance that $RIRP_{it}$ is a valid proxy for prior information.

Table 3.9 presents test results for hypothesis two based on firm-years in portfolio PLAH. Consistent with test results for hypothesis one, there is no evidence supporting the existence of incremental information content associated with the SEC receipts of the earlier of the ARS and 10-K for observations in this portfolio. The V_0 value for the "bad news" portfolio is 0.11, instead of negative as predicted. The V_0 value for the "good news" portfolio is 0.04, positive but not statistically significant, which is inconsistent with results in Table 3.7. For comparison, the V_0 values during the annual earnings announcement period for the "bad news" and "good news" portfolios are -0.55 and 0.33 respectively, both of which are significant at the 0.05 level.

3.5.3 Hypothesis 3.3

Table 3.10 reports test results for hypothesis three, which predicts that in a regression of abnormal returns in the event period on UE_{it+1}, the ERC should be an increasing function of $RIRA_{it}$ if the ARS or 10-K released in the event period provides incremental information to the market. It also predicts that the ERC should be a decreasing function of $RIRP_{it}$, which proxies for the informativeness of prior information.

Table 3.8B
Values of V_τ for AEA with Full Sample Partitioned by the Sign of UE_{it+1} and $SIZE_{it}$

	UEN						UEP					
	SS (smaller, N=216)			SL (larger, N=169)			SS (smaller, N=251)			SL (larger, N=297)		
Period	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$	V_τ	$Z_{V\tau}$	$t_{V\tau}$
-5	0.13	1.95	1.91	-0.06	-0.78	-0.75	-0.06	-0.90	-0.85	-0.05	-0.92	-0.96
-4	0.04	0.53	0.55	-0.02	-0.23	-0.25	0.07	1.06	1.00	-0.07	-1.21	-1.19
-3	0.17	2.55	2.50	0.05	0.66	0.68	0.01	0.16	0.15	-0.02	-0.27	-0.25
-2	-0.08	-1.16	-1.28	-0.04	-0.47	-0.51	-0.03	-0.42	-0.44	0.01	0.11	0.11
-1	0.11	1.55	1.66	0.14	1.80	1.95	0.03	0.54	0.59	0.03	0.44	0.46
0	-0.29	-4.25	-3.56	-0.29	-3.71	-3.27	0.14	2.20	1.78	0.08	1.45	1.18
+1	-0.05	-0.71	-0.67	-0.01	-0.15	-0.15	0.10	1.60	1.58	0.02	0.32	0.31
+2	0.07	1.10	1.11	0.04	0.53	0.49	0.04	0.66	0.66	0.00	0.01	0.01
+3	-0.09	-1.27	-1.31	0.04	0.51	0.53	0.13	2.00	1.88	0.06	1.06	0.96
+4	-0.02	-0.29	-0.29	0.06	0.77	0.76	0.04	0.61	0.66	0.10	1.72	1.59
+5	0.14	2.03	1.83	-0.13	-1.62	-1.66	0.02	0.28	0.28	-0.02	-0.37	-0.39

Table 3.9
Values of V_τ for REC and AEA with Portfolio PLAH Partitioned by the Sign of UE_{it+1}

	REC (SEC Receipt)						AEA (Annual Earnings Announcement)					
	UEN (N=45)			UEP (N=78)			UEN (N=45)			UEP (N=78)		
Period	V_τ	Z_{V_τ}	t_{V_τ}	V_τ	Z_{V_τ}	t_{V_τ}	V_τ	Z_{V_τ}	t_{V_τ}	V_τ	Z_{V_τ}	t_{V_τ}
-5	-0.25	-1.62	-1.43	0.03	0.26	0.27	0.14	0.94	0.82	0.02	0.16	0.16
-4	0.09	0.58	0.58	0.08	0.67	0.70	0.25	1.66	1.42	-0.10	-0.83	-0.85
-3	-0.10	-0.67	-0.66	-0.09	-0.76	-0.72	0.14	0.91	0.93	-0.04	-0.35	-0.30
-2	-0.13	-0.87	-0.93	0.08	0.70	0.85	-0.15	-1.01	-1.09	0.06	0.51	0.47
-1	-0.23	-1.52	-2.04	0.08	0.74	0.74	0.13	0.85	0.75	0.06	0.52	0.54
0	0.11	0.72	0.82	0.04	0.37	0.43	-0.55	-3.62	-2.70	0.33	2.84	2.02
+1	0.07	0.45	0.59	-0.04	-0.38	-0.45	-0.11	-0.75	-0.72	-0.04	-0.35	-0.34
+2	0.00	0.00	0.00	0.10	0.90	0.89	-0.18	-1.21	-1.23	0.10	0.83	0.92
+3	0.19	1.26	1.14	0.03	0.30	0.30	-0.25	-1.66	-1.67	0.02	0.20	0.22
+4	-0.09	-0.62	-0.67	0.27	2.31	2.32	-0.03	-0.21	-0.18	-0.05	-0.48	-0.52
+5	0.16	1.02	1.10	0.05	0.40	0.35	-0.03	-0.17	-0.19	0.15	1.27	1.58

Table 3.10
Regression Results in AEA and REC Periods

	REC (SEC Receipt)			AEA (Annual Earnings Announcement)		
	Estimate	Standard Error	t	Estimate	Standard Error	t
Intercept	.0024	.0014	2.42	-0.0013	0.0013	-1.00
$\beta 1$	-.0214	.0504	-0.43	-0.0731	0.0605	-1.21
$\beta 2$	.0134	.0434	0.32	0.1025	0.0522	1.96
$\beta 3$	-.0354	.0404	-0.87	-0.1114	0.0491	-2.27
γ	.0084	.0094	0.90	0.0213	0.0109	1.96
adjusted-R^2	-0.001	-	-	0.016	-	-
F statistic	0.767	-	-	4.826	-	-

This means that in the regression, β_2 is expected to be positive and β_3 is expected to be negative.

Results for the annual earnings announcement period are reported in the last three columns. They are intended to serve as a benchmark for the specification of the regression model and to provide additional insights into returns behavior in the period. The value of β_1 is -0.0731, which is not significantly different from zero (t = -1.21, two-sided)[37]. As expected, β_3 is significantly negative at the 0.05 level (t = -2.27, one-sided), suggesting that more informative prior disclosures can assist investors in forming expectation about UE_{it+1} before the release of EPS_{it}. Interestingly, β_2 is significantly positive at the 0.05 level (t = 1.96, one-sided), suggesting that some firms release either non-audited ARS and 10-K or some earnings relevant information contained in these reports[38]. The estimate for γ is significantly positive with a *p* value of 0.051 (two-sided). This is consistent with either that more information is made available about EPS_{it+1} for larger firms in the period, or that the earnings process is more predictable for larger firms, or both.

Unreported sensitivity analysis is conducted to provide assurance that these results are robust. A test in the spirit of White (1980) fails to reject the null hypothesis that the first and second moments of the model are well specified (p = 0.4801). Results are

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[37] Note that because of the inclusion of $LSIZE_{it}$ in the regression, no observation in the sample has an ERC that equals β_1. In a simple regression of u_{it0} on UE_{it+1}, the β_1 value of 0.0384 is significantly positive (t = 3.02, two-sided), which are consistent with results reported in Table 3.10.

[38] Another possibility is that the earnings process is more predictable for firms with more informative ARS and 10-K than for firms with less informative ARS and 10-K. However, this is rather unlikely because if $RIRA_{it}$ is a proxy for earnings predictability and/or quality, $RIRP_{it}$ is also likely to be a proxy for the same construct, and β_3 would be positive instead of negative as predicted.

essentially the same if the effects of equity beta and book-to-market ratio on the ERC are controlled for in the regression.[39] Similar results obtain if u_{it0} is replaced by V_{it0} as the independent variable in the regression, or if UE_{it+1} values above the 99 percentile and below the one percentile are deleted.

The first three columns of Table 3.10 report test results in the period when the SEC receives the earlier of the ARS and 10-K. The regression has an adjusted R^2 of -0.001. Its F statistic is 0.767, which is not significant at conventional levels. β_3 is negative as predicted but is not significantly different from zero (t = -0.87, one-sided). More importantly, β_2 is not significantly positive as predicted (t = 0.32, one-sided). In sum, consistent with test results for hypotheses one and two, results in Table 3.10 show no evidence supporting the existence of incremental information content associated with the SEC receipts of the earlier of the ARS and 10-K.

3.5.4 Prerelease before SEC Receipt Dates

One possible explanation for the absence of abnormal returns behavior during the SEC ARS and 10-K receipt periods is that firms may have released these reports and/or the most relevant information in these reports to shareholders and analysts before submitting them to the SEC. This is tested by regressing abnormal returns accumulated over τ = -1, ..., -5 on UE_{it+1}. The sample size is reduced to 913 because 20 observations with annual earnings announcements in τ = -3, ..., -5 are removed.

Table 3.11 reports the test results. The regression has an adjusted R^2 of 0.008 and an F statistic of 2.849. The value of β_1 is 0.0882 and not significantly different from

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[39] Collins and Kothari (1989) indicate that the ERC varies systematically with equity beta and the book-to-market ratio.

zero ($t = 0.81$, two-sided). The value of β_2 is 0.3089, significantly larger than zero at the 0.01 level ($t = 3.23$, one-sided). The β_3 value is -0.1487, consistent with prediction and significant at the 0.05 level ($t = -1.65$, one-sided), suggesting that, on average, more information about EPS_{it+1} has been preempted for firms with more informative prior disclosures than for firms with less informative prior disclosures in fiscal year t. The value of γ is -0.0223, not statistically different from zero.

Sensitivity analysis not reported in tables indicates that these results are not attributable to model misspecifications. (1)A test as suggested by White (1980) fails to reject the null hypothesis that the first and second moments of the model are well specified ($p = 0.5830$). (2)The results remain qualitatively similar if the effects of equity beta and book-to-market ratio on the ERC are controlled for in the regression, if u_{it0} is replaced by V_{it0} as the independent variables in the regression, or if UE_{it+1} values above the 99 percentile and below the one percentile are deleted from the sample. (3)The null hypothesis that the distribution of u_{it0} is normal is rejected at the 0.0001 level for the 913 observations used in the regression, but the same hypothesis can not be rejected at conventional levels if seven observations with u_{it0} values three standard deviations away from the mean are deleted. The results based on the remaining observations are stronger. (4) Results from univariate regressions of u_{it0} on UE_{it+1} are consistent with multivariate regression results reported in Table 11. The adjusted-R^2 values for both the full sample and subsamples PLAL, PHAL and PHAH are negative. On the other hand, for subsample

Table 3.11
Regression Results in Periods before AEA and REC

	REC (SEC Receipt)			AEA (Annual Earnings Announcement)		
	Estimate	Standard Error	t	Estimate	Standard Error	t
Intercept	0.0050	0.0024	2.12	0.0008	0.0023	0.34
$\beta 1$	0.0882	0.1096	0.81	-0.0518	0.1084	-0.48
$\beta 2$	0.3089	0.0957	3.23	-0.1606	0.0946	-1.70
$\beta 3$	-0.1487	0.0900	-1.65	-0.0331	0.0890	-0.37
γ	-0.0223	0.0197	-1.13	0.0141	0.0195	0.72
adjusted-R^2	0.008	-	-	0.007	-	-
F statistic	2.849	-	-	2.674	-	-

PLAH, i.e., observations with less informative prior disclosures and more informative ARS and 10-K, the adjusted-R^2 value is 0.1210. The value of β_1 is 0.3213, which is significantly positive at the 0.0001 level (t = 4.22, one-sided). Further analysis indicates that these univariate results for PLAH are not caused by a small number of influential observations.

The significantly positive value of β_2 indicates the ERC is, on average, larger for firms with more informative ARS and 10-K than for firms with less informative ARS and 10-K. For firms that release their ARS and 10-K to investors (but not the SEC) in this period, this provides direct evidence supporting the existence of incremental information in these reports. For firms that release the most relevant information in these reports but not the reports themselves, this result can be interpreted as indirect evidence supporting the existence of incremental information in these reports, i.e., the market would react to the release of these reports later had the information not been released in this period. Taken together, the result provides evidence that the informativeness of the ARS and 10-K systematically affect returns behavior in this period.

The same regression is also performed for the period right before the annual earnings announcement periods, and results are also presented in Table 3.11. β_3 is negative but not significantly different form zero (t = -0.37, one-sided), and γ is positive but not significantly different form zero (t = 0.72, two-sided). The value for β_2 is -0.1606, which is significantly different from zero at the 0.10 level (t = -1.70, two-sided). Further analysis (not reported in Table 3.11) indicates that this is likely due to the correlation

between the informativeness of the ARS and 10-K and that of the quarterly report[40]. The fact that β_2 is not significantly positive in the pre-AEA period is not surprising. Firms rarely release information in the ARS and 10-K before annual earnings announcements. Moreover, this also provides some assurance about the validity of $RIRA_{it}$ as a proxy for the informativeness of the ARS and 10-K.[41]

3.5.5 Delayed Responses

Because it may take several days for the SEC to make the ARS and 10-K available to the public, and that investors may need time to access and analyze the information in the reports, it is conceivable that the market may respond to the information in the reports days after their receipt by the SEC. This is tested by regressing abnormal returns accumulated over $\tau = +1, \ldots, +5$ on UE_{it+1}. The sample size is reduced to 919 because 14 observations with earnings announcements for the first quarter of year t+1 in $\tau = +3, \ldots, +5$ are removed. A similar regression, with abnormal returns accumulated after the annual earnings announcement period, is also performed for comparison. Results for both regressions are reported in Table 3.12. No supporting evidence for delayed market responses is found in either case. In both regressions, the adjusted R^2 values are negative, and the values of β_2, β_3, and β_4 are not statistically different from zero.

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[40] The regression is re-estimated with $RIRP_{it}*UE_{it+1}$ replaced by $RIRQ_{it}*UE_{it+1}$ and $RIRI_{it}*UE_{it+1}$. The value of β_2 is -0.0860 and not significantly different from zero (t = 0.42). The coefficient for $RIRQ_{it}*UE_{it+1}$ is -0.2794 and significantly negative with a t statistic of -2.87.

[41] If β_2 for the pre-REC period is significantly positive due to the correlation of $RIRA_{it}$ with some omitted variables, then it is also expected to be significantly positive in the pre-AEA period.

Table 3.12
Regression Results in Periods after AEA and REC

	REC (SEC Receipt)			AEA (Annual Earnings Announcement)		
	Estimate	Standard Error	t	Estimate	Standard Error	t
Intercept	0.0094	0.0023	4.16	0.0048	0.0022	2.19
$\beta 1$	0.1340	0.1050	1.28	-0.0050	0.1021	-0.05
$\beta 2$	0.0461	0.0937	0.49	-0.1287	0.0910	-1.41
$\beta 3$	-0.0460	0.0876	-0.53	0.0174	0.0852	0.20
γ	-0.0216	0.0188	-1.15	0.0125	0.0183	0.68
adjusted-R^2	-0.0023	-	-	-0.0003	-	-
F statistic	0.467	-	-	0.0934	-	-

Chapter 4

SUMMARY AND CONCLUDING REMARKS

This chapter provides summary and concluding remarks for this dissertation.

4.1 SUMMARY AND CONCLUDING REMARKS FOR THE FIRST PAPER

The first paper examines the effects of corporate disclosures on market expectations of future earnings by addressing two interrelated research questions, which are (1) whether stock prices anticipate earnings information earlier for firms with more informative disclosures than for firms with less informative disclosures, and (2) which alternative disclosure media contribute to such an earlier anticipation. Results for the first research question support Healy and Palepu's (1993) suggestion that disclosures constitute a unique, nonsubstitutable source of such information. The market-adjusted returns of firms with more informative disclosures start to reflect earnings changes about three months ahead of those of firms with less informative disclosures. The lead is statistically significant and still present after controlling for firm size and the degree of analyst following. Tests for the second research question find that such an earlier anticipation of prices over earnings mainly results from more informative investor (analyst) relations, instead of annual reports, quarterly reports, analyst following, or other factors proxied by firm size. The size effect becomes statistically insignificant after the effects of disclosures are controlled. These findings indicate that investor relations are more

effective than quarterly and annual reports in communicating firm-specific information to investors. They also suggest that policy makers such as the FASB and SEC should encourage firms to make more voluntary disclosures so that investors can form better expectations about firms' future performances.

A direct extension of this paper is to study the effects of corporate disclosures on firms' cost of equity capital. To date, evidence for this issue is still very limited. The most direct evidence is provided by Botosan (1995), who finds that greater voluntary disclosure is associated with a lower cost of equity capital after controlling for cross-sectional variation in systematic risk and size, but a measure other than market value must be used to proxy size. She attributes part of the weakness of statistical results to the small sample size of 122 observations, but voices concern that pooling firm years from different industries may introduce potential confounding effects. The larger sample size and the use of relative industry ranking of disclosures in this paper can potentially overcome both problems.

4.2 SUMMARY AND CONCLUDING REMARKS FOR THE SECOND PAPER

In the second paper, I investigate the incremental information content of annual and 10-K reports with a research design that explicitly controls the cross-sectional differences in information disclosed prior to the release of these reports and the informativeness of these reports themselves. I also empirically examine alternative explanations that may account for the absence of abnormal returns behavior associated with the SEC receipt and release of these reports, such as prerelease by firms of these reports or the most relevant information they contain, and delayed market responses.

For annual earnings announcements, I find results that are consistent with theoretical predictions in Holthausen and Verrecchia (1988) and prior empirical studies. The magnitude of market response, measured as either squared market model errors, abnormal returns, or the ERC from regressing abnormal returns on unexpected earnings, is smaller for firms with more informative interim disclosures. Moreover, the ERC is also significantly higher for firms with more informative ARS and 10-K, indicating that the informativeness of the ARS and 10-K systematically affects returns behavior in this period. I also find evidence that is consistence with the existence of incremental information content of these reports in the period immediately prior to the SEC receipt dates. The ERC from regressing abnormal returns accumulated in this period on future unexpected earnings is significantly higher for firms with more informative ARS and 10-K reports, and significantly smaller for firms with more informative prior disclosures. This supports the conjecture that firms have either released these reports themselves or the information in these reports to the market before filing them with the SEC. Such an interpretation is further supported by the fact that no abnormal returns behavior has been detected in the three-week period immediately after the three-day SEC receipt period. On the other hand, results in the SEC receipt period provide little evidence for the incremental information content of the ARS and 10-K. While one test supports the existence of incremental information for observations in the "good news" portfolio, all other tests fail to document any corroborating evidence.

This paper provides evidence that the informativeness of disclosures contained in ARS and 10-K systematically affects returns behavior in both the earnings announcement

period and the period prior to the SEC receipt of these reports. These results explain the failure of previous studies in detecting abnormal returns behavior on the SEC receipt dates and are consistent with the existence of incremental information in these reports. This paper has also extended extant studies that use firm size as a proxy for the availability of prior information to investigate market reaction to annual earnings announcements by providing direct evidence that the magnitude of the response is negatively associated with the informativeness of prior disclosures.

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