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Adverse selection costs and the dealers' bid-ask spread around earnings announcements : differential information and signal quality.

Niranjan H. Chipalkatti
University of Massachusetts Amherst

ADVERSE SELECTION COSTS AND THE DEALERS' BID-ASK SPREAD AROUND EARNINGS ANNOUNCEMENTS: DIFFERENTIAL INFORMATION AND SIGNAL QUALITY

A Dissertation Presented

by

NIRANJAN H. CHIPALKATTI

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Approved as to style and content by:

Carolyn M. Callahan, Chair

Hossein B. Kazemi, Member

Sidharth Sinha, Member

Bernard J. Morzuch, Member

Ronald Karren, Ph.D. Program Director
School of Management

DEDICATION

For Mom and Dad.

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ABSTRACT

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NIRANJAN H. CHIPALKATTI, B.COM., UNIVERSITY OF BOMBAY

Ph. D., UNIVERSITY OF MASSACHUSETTS

Directed by: Professor Carolyn Callahan

This study examines the behavior of the bid-ask spread and the adverse selection cost component surrounding second quarter earnings and subsequent dividend announcements of Over-The-Counter firms. It examines the efficiency of such announcements in reducing the relative information asymmetry in a firm's environment, given that the adverse selection cost component of the spread is positively associated with a dealer's perception of the relative level of information asymmetry. Specifically, the study analyzes the relationship between the adverse selection cost component of the spread and (i) the quality of earnings, and (ii) the pre-disclosure information environment of the firm.

Initial results indicate a decrease in the dealers' perception of the relative information asymmetry in the pre-announcement period possibly due to the "abstain or disclose" rule of the Security Exchange Commission. Further, there is evidence of a decrease in the adverse selection costs in the post-announcement period as new information gets impounded by the market.

The study demonstrates that the market maker perceives an increase in the level of informed trading in the event period of the low quality of earnings firms versus high quality of earnings firms. Further, contrary to expectations based on Miller and Rock (1985), there is evidence to indicate that subsequent dividend signals are not efficient in reducing the perceived levels of information asymmetry for earnings signals that are noisy.

The cross-sectional results for the differential information portfolios are sensitive to the choice of the quality of earnings measure. Adverse selection costs demonstrate increases surrounding the dividend signal of high differential firms with no significant change surrounding the earnings announcement. There is also evidence of reduced adverse selection costs associated with the earnings signal of low and medium differential firms with weak evidence of increases for the dividend signal.

A positive relationship between adverse selection costs and the timing of earnings reports and unexpected earnings was also indicated.

These findings suggest that earnings announcements are useful in reducing the information asymmetry between investors, conditional on the quality of the signal and the pre-disclosure information environment of the firm.

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CHAPTER 1

INTRODUCTION

This dissertation examines the impact of earnings announcements made by Over The Counter (OTC) firms on the information environment of those firms. The study assesses the reaction of the capital market to the information contained in second quarter earnings reports and subsequent dividend announcements by examining the behavior of the bid ask spread surrounding such announcements. Very broadly, it assesses whether the marginal information content of an earnings signal results in a change in the relative information asymmetry between investors operating in the capital market, i.e., whether public disclosure of earnings information provides useful information in a manner consistent with the Financial Accounting Standard Board's (FASB) objectives of financial reporting.

In the late 1960s, the emphasis in financial reporting was revised from its traditional measurement of economic income viewpoint to its current thrust on the provision of economic information. This shift was formalized in the FASB's Statement of Financial Accounting Concepts No. 1, "Objectives of Financial Reporting by Business Enterprises", (1978, p. 2), which indicated that "financial reporting should provide information that is useful to present and potential investors ...". This theme is consistent with a comment by Hirschleifer (1970,p. 311):

> In a world of uncertainty, information becomes a useful commodity - acquisition of information to eliminate uncertainty should then be considered as an alternative to productive investment subject to uncertainty.

Financial reports are a primary source of information to investors for their assessment of the relative risk and return on investment opportunities and assist, therefore, in the efficient functioning of the capital market. The FASB's "Objectives of Financial Reporting by Business Enterprises",(1978), clearly recognizes the role of financial information in shaping investor expectations about an enterprise's future cash flows and the resultant market prices of its securities. Hence, according to the FASB, financial reports should be useful to investors "in assessing the amounts, timing, and uncertainty of prospective cash receipts from dividends or interest" (FASB SFAC No. 1,1978,p. 19), and in assessing the enterprise's ability to generate enough cash to meets its operating needs and financial obligations. Further, because of investors' concerns about a firm's ability to generate favorable cash flows in the future, "the primary focus of financial reporting is information about an enterprise's performance provided by measures of earnings and its components" (FASB SFAC No. 1,1978,p. 19). This focus on earnings is reflected in the FASB's SFAC No. 1,(1978,p. 21):

> Investors, creditors, and others often use reported earnings and information about the components of earnings in various ways and for various purposes in assessing their prospects for cash flows from investments in or loans to an enterprise. For example, they may use earning information to help them (a) evaluate management's performance, (b) estimate "earnings power" or other amounts they perceive as "representative" of the long-term earning ability of an enterprise, (c) predict future earnings, or (d) assess the risk of investing in or lending to an enterprise. They may use the information to confirm, reassure themselves about, or reject or change their own or others' earlier predictions or assessments. Measures of earnings and information about earnings disclosed by financial reporting should, to the extent possible, be useful for those and similar uses and purposes.

As indicated before, financial reports are used by investors to assess the "earnings power" of a firm, i.e., to predict its long term earnings ability and potential to generate cash on a recurring basis in the future. Earnings measured by the principles of accrual accounting have been determined to be a "reliable and relevant indicator of future probabilities of cash inflows and outflows" (Bernstein,1978,p. 640) as compared to, say, information about current cash receipts and payments. However, accrual accounting has its shortcomings arising out of the flexibility the management has in its choice of accounting methods from the pool of generally acceptable accounting principles. In fact, the management can resort to income smoothing accounting adjustments and the reported earnings figure can be managed. Such accounting manipulations to the earnings stream will reduce the ability of investors to assess the earnings power of the firm. To be useful to investors therefore, accounting earnings information should possess certain qualitative characteristics.

It follows therefore that to be useful to investors accounting earnings information should have certain qualitative characteristics. The FASB established a hierarchy of qualities which accounting information should ideally possess (FASB SFAC No. 2, 1980). Within the context of the capital markets, financial accounting information should be "relevant" to investors. Such information can make a difference to investors by "improving their capacity to predict future cash flows or by providing them feedback on earlier expectations" (FASB SFAC No. 2, "Qualitative Characteristics of Accounting Information", 1980,p. 27).

Further, accounting information should be timely, i.e., available to all investors soon after the reported event. The larger the time span between any significant event and the public release of information, the lower the value of such information for any future action assuming that there may be a group of informed investors with selective and timely access to such valuable information.

In addition, accounting numbers should reliably measure all economic events having an effect on the financial position of a firm, i.e., accounting information should be representative, and have no bias (neutrality). Also, there should be a consensus that the economic events and resources measured by accounting techniques are true and fair representations of events (verifiability). Further, accounting reports should be consistent across time and comparable across firms.

In summary, the thrust of the FASB Statement on the qualitative aspects of accounting information is that financial reports, to be useful, should be timely, relevant and comparable rather than late, unclear and non-comparable (Hakansson,1990). To the extent financial reports possess the former qualities, they will preempt costly private information search and reduce the selective access to and the use of valuable information by a restricted group of informed investors.

This distinction between investors operating in the capital market based on their relative access to valuable information highlights the existence of information asymmetries in the capital markets. Such asymmetries in information are the major reason for systematic, ex-ante risk adjusted return differentials across investors (Lev, 1988). Specifically, investors having access to more information can earn higher risk adjusted returns at the expense of those investors who are less informed. Such informed investors typically consist of insiders and well-to-do investors with access to superior information analysis capabilities "who prefer to buy and sell on the basis of an informational advantage vis-a-vis the "ocean" of other investors" (Hakansson,1990,p. 40). Furthermore, the existence of information asymmetries among investors in the capital market questions its efficiency. Beaver's (1981) definition of an efficient market clearly implies a symmetric distribution of information among all investors in the system. It has been suggested that one of the broader roles of public information is the reduction of such asymmetries among investors (Beaver,1981; Strong and Walker,1987; Lev,1989).

Hakansson (1990) indicates if the financial reporting of a firm is inefficient, i.e. late, unclear, and non-comparable, it will provide trading opportunities for informed investors especially around earnings and other financial disclosures made by the firm. On a similar note, Lev (1989) operationalizes the quality of firm's earnings reports and the efficiency of its financial reporting in terms of the predictive ability of its reported earnings stream. If earnings reports of a firm historically tend to be of lower quality, i.e. have lower predictive ability, the information in the hands of informed traders, with their superior information analysis capabilities, will be more precise than that available to the unsophisticated investor. "For example, if reported earnings of a given firm were increased by an accounting change which is perceived to have no future cash flow or contractual implications, then informed investors can be expected to adjust earnings by eliminating the impact of accounting changes" (Lev,1989,p. 177).

In general, the more "noisy" the financial reports, i.e., the larger the perceived deficiencies in earnings reports, the larger will be the degree of adjustments to be made on the current earnings figures for the prediction of future earnings. Lev (1989) demonstrates that the predictive quality of earnings as measured by the variance of the perceived deficiencies in reported earnings is inversely related to the correlation between returns and unexpected reported earnings. Lev concludes that the quality of earnings is positively related to the predictive ability of earnings with respect to future earnings, i.e., the greater the predictive ability, the better the earnings quality. Hence, the predictive ability of earnings provides an operational framework to examine various quality of earnings related issues at the cross-sectional level.

Within the Miller and Rock (1985) framework, the more noisy an earnings announcement and the less effective it is in reducing the perceived information asymmetry in the environment, the greater will be the information content of the dividend signal. The information content of a subsequent dividend signal to the investors is also conditioned by the quality of the initial earnings signal. Hence earnings and dividends may be viewed as a sequence of joint signals within the framework of Miller and Rock

(1985), Ambarish, John and Williams (1987), and, Brown, Choi and Kim (1989). The management of a firm may be assumed to use an efficient mix of these two signals to minimize the associated costs of signaling. It follows that the quality of a firm's earnings announcements and the efficiency of its financial reporting can be examined by measuring the reaction of the capital market around the public announcement of earnings and subsequent dividend signal sequences.

Asymmetric information and the differential information content of disclosures like earnings or dividend announcements can also be viewed in terms of the quality of the firm's information environment. The quality of a firm's information environment relates to the amount of predisclosure information available for a firm through differential sources of information. The general conclusion of the research on the differential information content of earnings signals (Atiase,1985; Freeman,1987) and of dividend signals (Brown, Choi, and Kim,1989) is that such announcements are more important as information signals for small firms than for large firms. Earnings and dividend announcements of large firms tend to be preempted by other, alternative sources of pre-disclosure information resulting in a less pronounced market response around such announcements. Hence, the importance of earnings and dividends announcements for the reduction of information asymmetries is dependent on the quality of the firm's information environment, i.e., the amount of pre-disclosure information available for a firm. In fact, Seyhun (1986), Chiang and Venkatesh (1988), Lin and Howe (1990), and, Hasbrouck (1991) have found evidence that is consistent with the hypothesis that information asymmetries are larger for small market capitalization firms. Hence, this study will examine the relationship between the quality of a firm's information environment and the degree of information asymmetry, as well as the link between the quality of a firm's earnings signals and the pre-disclosure information environment of a firm.

Very broadly, this study will evaluate the efficiency of the earnings and dividend signal issued by firms in the OTC market. The study will examine whether quarterly earnings and dividend announcements provide useful information to investors, i.e., information which is timely, relevant and comparable. To the extent such quarterly earnings and dividend announcements are late, unclear, and non-comparable, they will provide a window for informed investors to trade at the expense of the relatively uninformed investors. This study will use the market microstructure to capture the effect of such informed trading around quarterly earnings and dividend announcements, and to measure the usefulness and efficiency of these announcements.

The market microstructure and, specifically, the bid-ask spread as a factor affecting the transaction price and volume behavior of securities has become a subject of increasing academic research. "There is an accelerating awareness of the potential implications of market microstructure for making valid inferences about market behavior, including the adjustment of prices to information as it enters the public domain" (Brown,1989,p. 214). The dealers' perception of the relative information asymmetry in the firm's information environment determines the size of the adverse selection cost component of the bid-ask spread. The increased arrival of informed traders, according to Glosten and Milgrom (1985), will result in the widening of the spread by the market makers due to an increase in the adverse selection costs faced by them.

This study, therefore, will examine the behavior of the bid-ask spread and the adverse selection cost component surrounding second quarter earnings and dividend announcements. The behavior of the spread especially the adverse selection cost component around the announcements will reflect on their efficiency, i.e., their timeliness, relevance, and comparability. To the extent such earnings and dividend signals efficiently reduce the information asymmetry in the environment, there may be a decrease in the adverse selection cost component of the spread. On the other hand, to the extent such earnings and dividend signals are not efficient, i.e. are late, unclear, and non-comparable, there may be an increased arrival of informed traders accompanied by a widening of the bid-ask spread, and an increase in the adverse selection cost component proportional to the level of information asymmetry perceived by the market maker.

Hence, the more noisy the earnings signal, the less useful it is to the uninformed investors. This will further aggravate the information asymmetries in the environment and increase the trading opportunities to informed traders especially surrounding earnings and dividend announcements. According to Glosten and Milgrom (1985), the arrival of informed traders with more precise information will result in the widening of the spread by the market makers as they perceive an increase in the adverse selection costs. Therefore, the study will look at the contemporaneous association between the quality of earnings reports and the behavior of the bid-ask spreads and the adverse selection cost component around second quarter earnings and dividend announcements. This will help to focus on the relevance of earnings quality in reducing information asymmetries and enhancing market efficiencies.

The dealer's perception of the relative information asymmetry surrounding earnings and dividend announcements may also be affected by the quality of the firm's information environment. As indicated before , there is evidence that suggests that information asymmetries increase as the market capitalization of the firm decreases. The lack of alternate sources of pre-disclosure information may exacerbate the existing information asymmetries in a firm's information environment. This issue, relating information asymmetry and the differential information content of earnings and subsequent dividend signals, is also examined within the context of the market microstructure. Specifically, this study examines the behavior of bid-ask spreads and the adverse selection cost component surrounding second quarter earnings and subsequent dividend announcements across differential information environments.

In general, the study intends to demonstrate the link between the quality of the earnings signal and the pre-disclosure information environment of a firm, and, the market microstructure. The objectives of this study are to examine the behavior of the bid-ask spread and the adverse selection cost component surrounding second quarter earnings and subsequent dividend announcements. The relationship between earnings and dividend announcements and a firm's information environment have been highlighted by Diamond and Verrecchia (1991) who demonstrate that revealing public information (and reducing information asymmetries) can reduce a firm's cost of capital and increase the liquidity of its securities. Specifically, this study will examine the role of earnings quality and its relevance for reducing information asymmetries in the environment. Other refinements will include adjustments for the quality of the firm's information environment, i.e., the amount of predisclosure information available for a firm. The study looks at the relevance of the differential information environment of a firm in reducing the perceived information asymmetries among investors.

CHAPTER 2

LITERATURE SURVEY

There is considerable evidence that suggests that earnings announcements contain information that is useful to investors. Ball and Brown (1969) found a positive relationship between the sign of the unexpected annual earnings component and excess returns. Beaver, Clarke and Wright (1979) extended the results of Ball and Brown and demonstrated a significant relationship between the magnitude of annual earnings changes and the size of the abnormal returns. Beaver (1968) found significant increases in trading volume and security return variability in the earnings announcement week. These results suggest that earnings reports have information content and that investors shift their portfolios around such announcements. In their study on quarterly earnings announcements, Hagerman, Zmijewski and Shah (1984) demonstrated a significant association between earnings forecast errors and abnormal returns. Similarly, Patell and Wolfson (1984) find significant changes in the intra-day security price variability surrounding the trading hour of the earnings announcement consistent with the information content hypothesis. Consistent with the discounted cash flow hypothesis, Cornell and Landsman (1989) find a significant association between revisions in quarter ahead and year ahead forecasts and, excess returns at the time of quarterly earnings announcements. Their results suggest that earnings announcements contain information not only about current performance but are,also, used by financial analysts to revise future estimates of a firm's earnings. Easton (1985) results suggest that accounting earnings are good predictors of future dividend realizations and that current earnings have significant explanatory power over current dividends on this issue. Further, Easton (1985,p. 75) suggests that the information in accounting earnings is "apparently useful in interpreting the information in current dividends". However, in recent paper Bernard and Thomas (1989) find evidence which suggests that the changes in market price surrounding quarterly earnings announcements may not fully reflect the information contained in current earnings regards the future earnings potential.

Current research has also focussed on the empirical determinants of the earnings response coefficient, i.e., the beta coefficient in the linear regression between unexpected returns and unexpected earnings. Collins and Kothari (1989) demonstrate that the earnings response coefficient increases as market capitalization of a firm decreases. They also find an association between earnings growth and the response coefficient. Kormendi and Lipe (1987) and Easton and Zmijewski (1989) find that the earnings response coefficient is positively associated with earnings persistence. Imhoff and Lobo (1992) demonstrate that the earnings response coefficient is negatively associated with ex ante uncertainty in a firm's information environment. Lipe (1990) shows that the response coefficient is an increasing function of the ability of past earnings (versus alternate sources of information) to predict future earnings. The ability of the market to assess the permanent element of the earnings stream and, also, the predictive ability of earnings depends on the quality of a firms earnings reports. Similarly, the market's perception of the ex ante uncertainty prior to firm's earnings announcement may also be a function of the precision and the "informedness" (Holthausen and Verrecchia,1990) of its earnings signals, i.e., their quality.

This study examines the impact of the second quarter earnings and subsequent dividend signals in the OTC market on the bid-ask spread and the adverse selection cost component of the spread. It postulates a relationship between the reaction of the capital market at the micro-structure level and (i) the quality of the earnings signal, (ii) the magnitude of the pre-disclosure information available for a firm, and, (iii) the signal sequencing. Studies that relate to the quality of a firm's differential information environment reflect on the extent to which earnings and dividend signals are preempted by other sources of pre-disclosure information. Similarly, signal sequencing studies examine the extent to which dividend and earnings signals preempt each other. On the other hand, the association between the precision of the earnings report, specifically its ability to predict the future earnings of the firm, and the bid-ask spread focuses on the relevance of earnings quality in reducing information asymmetries between informed and uninformed investors. In general, the lower the quality of earnings reports, the larger should be the ex-ante information asymmetries in the environment. Studies that relate to the quality of earnings are looked at next.

2.1 Quality of Earnings Disclosures

Lev (1989,p. 177) points out "that adjustments to reported data are an essential element of financial statement analysis". According to Lev the more noisy the reported earnings figures and the larger the variance of such adjustments made by the investors to the reported earnings figures, the lower will be the predictive ability of reported earnings. This is because the larger such deficiencies in the earnings figures, the lower will be the coefficient of determination of the abnormal returns-unexpected earnings regression.

To the extent that reported earnings figures contain some "noise" (e.g. accounting policy changes, extra-ordinary items, discontinued operations, etc.), sophisticated investors will make adjustments to the reported earnings figures and use such adjusted figures to make predictions about future earnings. Hence, for all investors, the quality of such reported earnings figures improves if they contain less "noise", i.e., they have better predictive content. The predictive ability of earnings is a way to operationalize the quality of earnings issue. The better the quality of earnings, the smaller will be the extent of the losses unsophisticated investors will suffer in the hands of more informed investors with superior information analysis ability. To the extent that better quality earnings disclosures reduce ex-ante information asymmetries, it reduces the adverse selection problem of the market maker.

Hakansson (1989) points out that there is a conflict between these two groups of investors:

(1) the uninformed investors: the less well-to-do investors who subscribe to investment services and the non-subscribing investors who have a small set of resources; and,

(2) the informed investors: the management (insiders), the talented information-searchers, and the well-to-do among the subscribers to investment services. This latter group, according to Hakansson (1989,p. 40), prefers "to buy and sell on the basis of an informational advantage vis-a-vis the "ocean of other investors".

The former group has the incentive to require timely, relevant, and comparable financial disclosures whereas the latter group has the incentive to retain a late, unclear, non-comparable type of financial disclosure. Hakansson observes that the power to influence business practices and laws is typically vested in the hands of the second group even though it represents a minority, and hypothesizes that financial reporting is inefficient in the U.S.A primarily because of this lobby. Based on this primary hypothesis, Hakansson conjectures that accounting policy proposals that restrict insider trading and require the immediate disclosure of significant events on a "best estimate" basis will be resisted by this lobby, as well as, attempts to restrict managements' range of choice with respect to accounting methods and its discretion in applying that method. The author provides anecdotal evidence to support his conjectures. Hakansson suggests that investor-manager contracts should be re-worded so as to provide a disincentive to inefficiencies in financial reporting and concludes that it is necessary to narrow the window between the occurrence of a significant event affecting a company and its publication.

Bernstein (1978) highlights the fact that accrual accounting is the most relevant and reliable framework for judging the future cash flows of a firm. Accrued earnings help in the assessment of a firm's "earning power", a concept which focusses on the stable and persistent element of the earnings stream of a firm over a future time span. The evaluation of the persistent element of the earnings stream and its effect on future cash flows is what relates the quality of earnings issue to the earnings power concept (Bernard and Stober,1989). In fact, Bernard and Stober (1989,p. 627-28) operationalize the quality of earnings variable in terms of the market's reaction to unexpected cash flows. They hypothesize that unexpected accruals will have smaller impact on prices than unexpected cash flows of the same magnitude "since accruals are either subject to manipulation, or represent only indirect links to future cash flows".

Bernstein (1978,p. 617) lists the following factors which affect the quality of earnings disclosures:

(i) the accounting and computational discretion that management has over choosing alternative accounting principles;

(ii) the degree to which the management has made "adequate provision for the maintenance of assets, and, the maintenance and enhancement of present and future earnings". Bernstein recommends financial analysts look at discretionary expenses like repairs and maintenance, advertising, research and development outlays as a percentage of sales. Also, he suggests an analysis of the provisions for bad debts, slow moving inventories, etc.. All these numbers can be utilized by managers to "manage" reported earnings.

(iii) the stability and the predictability of earnings, which is directly related to the quality of the reported earnings figures.

Thorton O'Glove (1987), in his book on "The Quality of Earnings", lists items that make earnings figures in accounting reports noisy and contribute to reducing their quality and hence require thorough investigation:

(1) Non-operating and/or non-recurring income items: Strictly, these items relate to income which is not earned from the normal and usual operations of the firm. While the definition is clear, O'Glove points out that there are times when the classification can be ambiguous and can result in a divergence of opinion among analysts regards the normal operating earnings of the firm. To compound the problem, most of the times the details of the non-operating and/or the non-recurring item are available in footnotes, supplementary information, letters to shareholders, etc..

(2) Declining and increasing expenses: O'Glove mentions that one has to look at current earnings figure conditioned by the type of expenses that are increasing or decreasing. For example, increasing advertising expenses may imply higher future cash flows. While advertising expenses might hurt the current earnings figures, they might help bring in future revenues. Similarly, declining raw material costs benefit the bottom line after a lag, while declining

allowances for uncollectibles may have an adverse effect on future cash flows.

(3) Changes in accounting policy: O'Glove highlights the need to compare a firm's shareholder reports with its tax reports to get a true picture of a firm's growth based earnings in a year. According to O'Glove (1987,104), "under the umbrella of generally accepted accounting principles, a company can utilize accounting methods that accelerate revenues for book reporting purposes. When a corporation does this, it may start out with less aggressive accounting policies and then change to more aggressive ones to maintain the facade of growth".

(4) Cashflow related issues: O'Glove points out that a good way to estimate future cash flows is to examine a firm's accounts receivables and inventory trends, and also to investigate its interest payments and its debt structure of the firm. If there is a slowdown in a firm's sales and its cash flows, this might affect a firm's interest paying ability. O'Glove points out that stagnating firms with free cash flow tend to give higher dividends than growth firms. Such firms often resort to share repurchases to hike their earnings per share.

(5) Big baths: O'Glove points out (based on an article by R. J. Swieringa) that restructuring costs are charged against income in the year in which the decision to restructure is taken. As a result the actual restructuring costs are

matched with the decision and not charged in the period when restructuring occurs and the benefit is realized by the firm. This can result in an apparently healthy post-restructuring earnings trend which may not be realized in terms of future cash flows.

Similarly, Hector (1989) suggests that managers obscure the true earnings picture, (a) by taking a big bath, which enables them to take major write-offs in one period and benefit from the associated restructuring in the years to come. The management, then, takes credit for a turnaround in these future years; (b) by smoothing quarterly profits, (c) deferring costs like software development costs to future periods, (d) by recognizing revenues much before the firm is likely to receive the money for them, like in long term contracts, which can result in a cash crunch not reflected in the earnings figures, (e) by hiding inventory, for e.g. by pushing sales to its dealers, which would be reflected by a disproportionate rise in accounts receivables, (f) by dabbling with depreciation, and (g) by touting one time gains as permanent structural changes.

Tinic (1990) in his perspective paper on the stock markets fixation on accounting numbers comments on Hand's (1990) extended functional fixation hypothesis. According to Tinic (1990,p. 787), the extended functional fixation hypothesis is a modified form of the functional fixation hypothesis and implies that "prices of some stocks at some points in time may be determined by unsophisticated marginal investors who are fixated on bottom line accounting earnings". In particular, Tinic (1991,p. 787) points that "stocks of small capitalization firms, which tend to be more heavily owned by individual investors, as particularly likely to be priced by fixated investors who do not understand the effects of accounting procedures on reported earnings".

Hand (1990), in his test of the extended functional fixation hypothesis, proposes that when responding to accounting data, the stock price reaction may be either set by the sophisticated investors or the unsophisticated investors. The probability that the stock price is set by unsophisticated investors is a function of the proportion of such investors of the total investors. In fact, Hand provides some empirical evidence that is inconsistent with the efficient market hypothesis that there should not be any stock price reaction to accounting reports with no real gains. He finds support for the extended functional fixation hypothesis that unsophisticated investors set the price. Hand's study concludes that firms used the reported accounting earnings gain from the debt-equity swap to smooth unexpected and transitory decreases in their (economic) earnings stream. The future cash flow implications of such gains should have been impounded in the stock prices at the time of the debt-equity swap announcement considering that they are not real gains but merely book profits. However, on the contrary, Hand finds evidence that unsophisticated investors, who are fixated to the earnings number, misinterpret this gain at the time of the earnings announcement as a real increase in the future cash potential of the firm. This is because the unsophisticated investors, who may set the price of a stock, often do not understand the real implications of an accounting procedure on earnings.

Elliot and Philbrick (1990) find that financial analysts forecast errors and the dispersion of forecasts is greater in years of accounting changes than in non-change years. Also, their results suggest that financial analysts view a change in accounting methods as being consistent with income smoothing. Their evidence points to lower predictive ability of earnings, given income smoothing i.e. lower quality of earnings disclosures.

Briloff's (1982,p. 12) much publicized Anacomp article in Barrons, based on information already in the public domain, indirectly comments on the quality of earnings issue:

> What intrigues me about Anacomp is less its impressive growth than the use the company has made of generally accepted accounting principles...in my study of Anacomp's financials, I found manifestations of front-end loading of revenues, the inclusion of questionable items of revenues, the avoidance of proper recognition of costs, and the deferral of recognized costs for inordinately long periods....Accounting practices implemented by Anacomp over the past several years have had a salutary impact on reported earnings.

On the day Briloff's article was published, Anacomp's security price declined by approximately 14% and trading volume increased seven-folds. Foster (1987) notes that on an average there was a drop of 8.11% in the security price of firms subject to Briloff's criticisms, the day the articles were published in Barrons. Using a post-announcement period benchmark of 30 trading days, Foster concludes that this drop reflected a permanent revaluation of the firm by the market. This study highlights the fact that poor quality of earnings signals increases the possibility that uninformed (and unsophisticated) investors may not be able to perceive the deficiencies in the earnings reports thus aggravating any pre-existing information asymmetries.

In summary, the quality of the earnings signal of a firm is positively associated with the predictive ability of the earnings stream. The larger the noise in earnings reports, the lower is the predictive ability of the earnings stream and the ability of investors to analyze the permanent component in earnings. As indicated before, the results of Kormendi and Lipe (1987) and Lipe (1990) demonstrate that the earnings response coefficient (and therefore the information content of earnings announcements) is positively associated with earnings persistence and its predictive ability. Hence, the lower the quality of earnings, the less will be the utility of such announcements to uninformed and unsophisticated investors.

This dissertation also examines the role of alternate sources of pre-disclosure information and the preemptive role of signal sequences. A review of related studies follows.

2.2 Differential Information

The uninformed can attempt to learn some of the information of the informed by observing price changes. Price therefore serves as an additional (though noisy) information signal; it transmits information from the informed to the uninformed, apart from its traditional Walrasian role of clearing markets (Grossman and Stiglitz, 1976,1980 ; Verrecchia,1982). Grossman and Stiglitz (1976) point out that trading activity by the informed traders results in the partial revelation of their information to the uninformed and, hence, there is a potential limit to their gains from trade. As it is easier to detect informed trading in small, thinly traded firms than in large, heavily traded firms, the potential profit for informed traders is larger for large firms than for small firms. Further, the informativeness of the security prices increases as (i) the number of traders who actively participate in the market of a security increases, and (ii) the proportion of the informed traders increases (Grossman and Stiglitz, 1976,1980). Atiase (1985) hypothesized and demonstrated that large firms have a larger number of differential sources of pre-disclosure information as compared to small firms, and, hence, the stock price revisions surrounding earnings announcements of small firms are larger than those of the large firms. Earnings announcements seem to be more important information signals for small firms than for large firms. Private information search and production activity (through the services of financial intermediaries like financial analysts etc.) increased with firm size because according to Atiase (1985), marginal trading profits net of search costs increased in direct proportion to firm size. " For e.g., the knowledge that a large firm's common stock is 'mispriced' by 1% could be used to earn a greater profit than information that would generate a 1% adjustment in the market value of a small firm's equity" (Freeman,1987,p. 196). All this has become encapsulated as the "differential information hypothesis" and typically variables like firm size and number of analysts following have been used as control variables for the pre-disclosure information environment of a firm. The hypothesis itself is based on the economic intuition that one can get increasing returns to scale from information. "The cost of information per unit of scale declines as the scale increases, whereas the value of information per unit of scale does not change" (Lev 1988,6). Similarly, according to Bhushan (1989), ceteris paribus, the demand for analyst services for the same reason is likely to be an increasing function of firm size because the benefits from information acquisition increase with size.

Atiase (1985,1987) formally tested the differential information hypothesis that the pre-disclosure information available for a firm varies inversely with the firm's size and that the amount of pre-disclosure information available for a firm is also a function of the exchange in which the firm is listed. Specifically, OTC firms have lower amounts of pre-disclosure information available than the NYSE firms of the same size. This result confirmed the results of Grant (1980), who had arrived at the same conclusion.

Brown and Barry (1984) empirically demonstrate the existence of a size based premium as well as a premium associated with the period of listing of a firm which is not accounted for by the standard capital asset pricing model. Subsequently, Barry and Brown (1985) theoretically demonstrated that there was a higher degree of estimation risk associated with the security returns of firms with low amounts of pre-disclosure information and that this risk premium was not captured by the standard Capital Asset Pricing Model. They suggested three empirical proxies for estimation risk, namely, period of listing, the actual number of observations of data available, and the divergence of analysts' opinion.

In the same line, Arbel, Carvell, and, Strebel (1983) had shown that there is a premium attached to the returns of firms which are neglected by financial analysts. This premium was subsequently shown to be an estimation risk factor by Barry and Brown (1985). In a similar tone, Kross and Schroeder (1988) demonstrate that the amount of media coverage, measured as the column-inches dedicated to that firm the Wall Street Journal Index, is inversely proportional to size, and that the stock price reactions to earnings announcements are greater for firms with lower media coverage.

The study by McNichols and Manegold (1983) looks directly at the effect on security price variability of a change in the disclosure environment of a firm. The implicit assumption in their study is that financial disclosure through annual reports and interim reports enriches the information environment of a firm and, hence, reduces the estimation risk associated with the firm's returns. Their study shows that the variability of security returns after annual earnings announcements decreases once the firm initiates more timely interim reporting.

Bamber (1986) demonstrated that the trading reaction, measured by the unexpected trading volume, to unexpected earnings shocks in earnings announcements is larger for small firms than for large firms, after controlling for the magnitude of unexpected earnings. This seems to suggest that the lower the degree of predisclosure information in the environment for a firm, the greater will be the extent of the belief revisions regards the future earnings potential of the firm around annual earnings announcements.

Freeman (1987) directly tests the association between accounting earnings and security returns for large and small firms. Unlike Atiase's (1985) cross-sectional study, Freeman's study uses a time-series approach. His results demonstrate that the prices of large firms impound the information associated with permanent changes in the earnings stream three months earlier than the prices of small firms. Also, the magnitude of such revisions is greater for small firms, which have significant price revisions even after the fiscal year-end.

Patell and Wolfson (1982) document that the variance of returns increases substantially on the day before the earnings announcement as per the Wall Street Journal and on the day of the announcement. Earlier, Beaver (1968) demonstrated that returns variability was 67% higher in the week of the earnings announcement. Chari, et al (1988) document that small firms have a larger returns variability around annual earnings announcements than large firms. This inverse relationship is consistent with the results of Atiase (1985, 1987).

In his model, Bhushan (1989) lists firm characteristics which determine the number of financial analysts following a firm. According to Bhushan, the number of financial analysts following a firm will be an increasing function of firm size as the aggregate demand for information analysis will also increase with size. This is because the benefits from information acquisition are likely to be an increasing function of firm size. Dempsey (1989) points out that while firm size is an endogenous proxy for predisclosure information environment, the number of financial analysts following a firm are an exogenous proxy for the same. Like Bhushan (1989), Dempsey (1989) argues that only one of the many determinants of analysts following is firm size.This implies that financial analyst following, as an exogenous proxy variable for differential information environment, may have some incremental explanatory power over and above that associated with firm size. Dempsey's results confirm this intuition and also demonstrate that thinly monitored large firms have significantly larger price revisions surrounding earnings announcements than widely monitored small firms. This implies that analysts following and firm size are not equivalent proxies for the quality of the firm's information environment.

Collins, Kothari, and, Rayburn (1987) show that price-based expectation models perform better for large firms than for small firms. Their results suggest that the security prices of large firms impound information about permanent changes in earnings earlier than the security prices of small firms. This is because of the larger number of differential sources of such information available for large firms. For small firms, however, earnings announcements remain the most important source of information of such changes in the permanent earnings stream.

Studies which examine the preemptive role of dividends and earnings signals are looked at next.

2.3 Signal Sequencing

This study will also examine the behavior of the bid-ask spread around the announcement dates of signal sequences, i.e., a sequence of a first earnings announcement followed by a second dividend announcement.

In view of the relative noisiness of both earnings and dividend signals, investors may view these announcements as joint signals and may look for some consistency in them. Kane, Lee and Marcus (1984) found evidence of an interaction effect between earnings and dividend announcements when examining the abnormal returns in the announcement month. However, their sample was restricted to only earnings and dividends announcements made within ten days of each other, and they did not investigate the signal sequencing issue. Easton (1991) found evidence consistent with this interaction effect in the Australian market where earnings and dividends are always announced simultaneously.

Miller and Rock (1985) point out that in a world of asymmetric information the Miller-Modigliani dividend invariance theorem does not hold. A firm's dividend announcement signals to the market the firm's current earnings and, in turn, plays a role in the estimation of its future earnings potential. In the Miller and Rock framework, the greater the asymmetry of information surrounding the earnings announcements, the greater the importance of the dividend announcement as an information signal. The more noisy the earnings announcement, the greater will be the significance of the information content of a dividend signal. Further, the greater the persistence in the earnings stream, the larger the price reaction around dividend announcements. In a recent paper, Howe and Lin (1992) find a significant negative relation between the bid-ask spread and the dividend yeild. This relationship demonstrates that the announcment of dividends conveys information to the market and reduces the information asymmetry in the environment and, consequently, the spread. The theoretical work of Ambarish, John and Williams (1987) provides a framework to analyze two signals like an earnings announcement and a dividend announcement as a dual signal or a signal sequence in this fashion. Within their framework, signals like dividends and earnings announcements (Ambarish, John and Williams look at dividends and investment announcements) can be jointly used by insiders to signal the firm's future cash flows. An efficient mix of these signals can be used to minimize the costs of signalling, namely, increased dividend payout and reduced investments in positive net present value projects.

The extent of "signal mitigation" by the first signal, in a sequence of two signals, is an issue in such signal sequencing studies. Brown, Choi and Kim (1989) investigate the impact of signal sequencing on the information content of earnings and dividends. They find evidence of the differential information hypothesis even for dividend signals. Specifically, they find that dividend changes are more informative for small firms and that signal sequencing impacts the information content of small firm announcements. The authors demonstrate that the information content of a subsequent earnings announcement by a small firm is preempted by a preceding dividend announcement. Preceding earnings signals of small firms, however, only partially mitigate subsequent dividend signals, which suggests that dividend signals contain information not available in the earnings announcement.

In summary, the literature demonstrates a systematic, positive association between firm size, analysts following and the pre-disclosure information environment of a firm. Earnings announcements of firms in the high differential information environment, i.e. large capitalization firms or firms with a large number of analysts following them, are preempted by other alternate sources of information. On the other hand, for firms in the low differential information environment earnings announcements are the primary source of information for investors and this may aggravate existing information asymmetries in a firm's information environment. Similarly, signal sequencing studies suggest that a subsequent dividend signal does have incremental information content and that the capital market reaction to such an announcement is a function of the relative noisiness of the preceding earnings signal. There is evidence, however, that the impact of the subsequent signal is dependent on the predisclosure information environment of a firm.

This study will also examine the systematic differences in informed trading across certain cross-sectional variables like the quality of the firm's information environment and to earnings disclosures. Previous studies have documented systematic differences in the level of informed trading, specifically in the form of insider trades, across firm size. This literature is looked at next.

2.4 Insider Trading and Firm Size

Seyhun (1986) finds a significant negative relationship between abnormal returns to insiders and firm size. According to Seyhun, conditional on trading, insiders in small firms earn substantially greater abnormal returns than insiders in large firms i.e. the former set impose larger adverse information costs on the uninformed traders. Further, the probability of trading against insiders (measured as the ratio of the dollar value of insider trade to the dollar value of all trading) is significantly and inversely related to firm size. This also suggests that the bid-ask spread of smaller firms will have a higher adverse selection cost component than the bid-ask spread of large firms. Further, Seyhun's results suggest that insiders purchase stock prior to the release of unfavorable information. In his study, Seyhun finds significant increases in abnormal returns after insider purchases and significant decreases in abnormal returns after insider sales. Also, there was a significant stock price decline prior to insider purchases and significant abnormal stock price increase prior to insider sales. This, according to Seyhun, suggests that insiders refrain from purchasing (selling) stock until after unfavorable (favorable) information is released.

Chiang and Venkatesh (1988) find weak evidence to support their contention that insiders of small firms benefit from the greater information asymmetry for small firms. They speculate that this is because small firms have a smaller set of insiders who retain more information and hence cause greater adverse selection problems.

Ajinkya and Jain (1989) demonstrate that the mean percent of outstanding shares traded (the ratio of trading volume in dollars to shares outstanding) decreases with firm size. This variable has been previously used in various micro-structure studies (Stoll,1976; Glosten and Harris,1988) to proxy for the level of information driven trading for a firm, and is consistent with the result of Seyhun (1986) that the probability of informed trading increases as firm size decreases. Similarly, Hasbrouck (1991) finds evidence consistent with the hypothesis that information asymmetries are larger for small firms. However, in contrast, Lin and Howe (1990) find no conclusive evidence of this relationship between insider abnormal returns and firm size for OTC firms.

In summary, therefore, there is some evidence which suggests that the probability of insider trading increases with firm size.

The basic objective of this study is to examine the relationship between the efficiency of second quarter earnings announcements (and subsequent dividend announcements) and information asymmetries in a firm’s information environment by examining the reaction of the capital market at the micro-structure level. Essentially, it focuses on the behavior of the bid-ask spread and, especially, on the adverse selection component of the same, which, in general, relates to the information asymmetries in a firm’s environment. The literature relating to the market micro-structure of the study and, especially, the adverse selection cost component of the bid-ask spread is reviewed next.

2.5 The Bid-Ask Spread

The market makers in the OTC market are dealers who specialize in maintaining a continuous two-sided competitive market for a security. The market makers buy and sell shares (from traders) at their bid and the ask price, respectively. Apart from this, market makers also function as price stabilizers and as processors of information (Schwartz,1987;Amihud,et al.,1985) and serve as the vital link between the market microstructure and the pricing of a security. The quoted bid-ask spread of the market maker is determined by the market maker after taking into account all the fixed and variable costs involved in market making. Stoll (1978) notes that the dealer incurs three types of costs:

(a) order processing costs - the costs of carrying out a transaction, which include variable costs of labor, communication, clearing and record-keeping, and other fixed costs.

(b) inventory holding costs - these refer to the price risk and the opportunity costs of holding inventories of a stock.

(c) information costs - the dealer has an adverse selection problem due to the possibility that some other trader may have more information about the security than the dealer does.

2.6 Adverse Selection Cost Component of the Spread

The adverse information cost theory was first advocated by Walter Baghehot (1971). According to this theory, the market maker makes money from the liquidity traders and loses money to informed transactors. While "dealers and specialists may have an advantage over many public traders, they do not, however, have a advantage over all traders. Some public traders receive news and transmit orders to the market before the dealer has learned of the informational change. When this happens the public trader profits at the dealer's expense " (Schwartz,1987,p. 399). Schwartz calls this the cost of ignorance on the part of the market maker. In general, the theoretical work by Copeland and Galai (1983), Glosten and Milgrom (1985), and, Easley and O'Hara (1987) seems to suggest that the market maker will widen the bid-ask spread when there is an increase in the probability that the next trader he deals with is an informed trader or when the quality of the information available to the informed trader improves. Under such circumstances, Glosten and Milgrom (1985) demonstrate that the market maker will increase the ask price and decrease the bid price to cover the increase in the adverse selection costs due to the increase in the information asymmetry in the environment. Stoll (1989) estimates that the adverse selection cost component is about 43% of the spread for his sample of OTC firms. The approach taken by the information cost theorists suggests that the bid-ask spread would exist even if the market makers' order processing costs and inventory holding costs were zero and/or competition drives these costs to zero.

2.6.1 Adverse Selection and the Behavior of the Spread

Copeland and Galai (1983) demonstrate that the equilibrium bid-ask spread of a market maker is one which maximizes gains from liquidity traders and minimizes losses from informed traders. They point out that there is a trade-off the market maker has to make between the dealings with informed traders and transactions with liquidity traders. "If he sets the bid-ask spread too wide, he loses expected revenues from liquidity traders but reduces potential losses to informed traders. On the other hand, if sets a spread which is too narrow the probability of losses incurring to informed traders increases but is offset by the potential revenues from liquidity trading" (Copeland and Galai,1983,p. 1460). This proposition assumes that the probability of liquidity trading will fall as the spread increases, a notion that has important empirical implications while modelling trading volume.

In their paper, Copeland and Galai take an ex-post view (Glosten,1987) of the market maker's adverse selection problem. According to them, market makers lose to the informed traders and recover these losses from the uniformed liquidity traders by charging them the adverse information cost component of the spread. They assume that the informed traders possess non-public information which " allows them to have a better estimate of the future security price than either the dealer or the liquidity traders" (Copeland and Galai,1987,p. 1458) and provides them an option to trade on their unique information conditioned on the current market valuation of the security price.

Copeland and Galai use an open-quote interval model to provide some insights on the effect of non-synchronous trades on the spreads. In an open quote interval model, it is assumed that the market maker waits for some interval of time until the next trader arrives to trade with him, or some new information enters the market. At this time the market maker revises his quotations. The authors show that for low trading volume firms the adverse information costs of the market maker are higher, given that the chances of an information event occurring without the market maker becoming aware of it are greater. Hence, as the expected duration between trades decrease and trading volume increases, the spreads will decrease to reflect the lower adverse information costs faced by the market maker.

Glosten and Milgrom (1985) also look at the dynamic properties of the spread and, especially, the role of the specialist in processing private information. Unlike

Copeland and Galai (1983) they take an ex-ante view of the adverse selection component of the spread (Glosten,1987). The adverse selection component of the spread is modelled as the revision in the expectations of the specialist in response to a buy or sell transaction, considering that the specialist is uncertain about whether the next investor he deals with would be an informed trader or otherwise. Also, unlike Copeland and Galai who assume that prices will instantaneously reflect the information driving the transaction, Glosten and Milgrom allow further trading before prices reflect the underlying information. The authors demonstrate that with a risk-neutral specialist in a competitive environment with adverse selection and with no transaction costs, there will be a positive spread to cover the adverse selection costs as well as the fee for immediacy. The adverse selection costs arise because of the adverse selection problem faced by the specialist in the presence of informed traders who know the "true" value of the firm the specialist deals in. This "true" value, in the Glosten and Milgrom scenario will be revealed to the uninformed traders and the specialist at some later time when the firm makes a public announcement. At this point of time the market will arrive at a new consensus on the market value of the firm, and the information asymmetries in the environment will be resolved. Glosten and Milgrom have a broader definition of an informed trader, namely, traders who have differential access to private information, or who do superior analysis of public information. The ask price of the specialist, under these circumstances, is the expected value of the firm after a specialist sale and similarly, the bid price of the firm is the specialist's expectation of the true value of the firm given a specialist buy.

In their proposition 2, Glosten and Milgrom demonstrate that the transaction prices of a security form a martingale with respect to all public information and, information known to the specialist. This implies that an investor cannot earn abnormal returns by using the information in the hands of the specialists and that the first differences of the transaction price process (i.e. returns) will be serially uncorrelated. What this proposition suggests is that the adverse selection component of the spread does not cause the observed negative serial correlation in returns but is the result of the inventory holding and order processing cost components of the spread. Further, in their proposition 4, Glosten and Milgrom demonstrate that, over time, the expectations of the specialists and the informed traders regards the underlying value of the firm will converge as the number of trades increase, and by this process the market will impound the information of the informed traders. Also, as the number of trades increase, the prices will impound more information and the spreads will become smaller.

Proposition 5 of Glosten and Milgrom relates to the determinants of the size of the spread, given the adverse selection scenario, and confirms the results of Copeland and Galai(1983):

> For any given time t, the ask price A increases and the bid price B decreases when, other things being equal, (i) the insider's information at time t becomes better (i.e., finer), (ii) the ratio of the informed to the uninformed arrival rates at t is increased, or (iii) the elasticity of uninformed supply and demand at time t increases.

This means that if the probability of dealing with an informed trader is small, then, the specialist needs to make only small revisions in his expectations about the value of the firm conditional on a sale or a buy transaction. However, if the probability that the next arrival is informed is high, the specialist would need to revise his expectations by a larger amount conditional on whether the transaction is a buy or a sale, i.e., the spread would be widened by the specialist. However, if liquidity traders have relatively inelastic demand for the security, then, the specialist need not widen the spread by as much.

In sum, Glosten and Milgrom theoretically derive the existence of a non-zero adverse selection cost component of the spread in the presence of informed traders. They also demonstrate that the adverse selection cost component will increase with an increase in the arrival rate of informed traders with more precise information.

Easley and O'Hara (1987) extend the theory of Copeland and Galai (1983), and, Glosten and Milgrom (1985) by including trade size as a variable involved in informed trading. In their work, Easley and O'Hara decompose the adverse selection problem faced by the specialist into (i) the uncertainty that the specialist faces regards whether the next trader is an informed trader, and (ii) the uncertainty that the specialist faces regards whether any information has been selectively released or extracted. They show that informed traders would prefer to trade in larger blocks at a given price. The larger the trade size, the more likely it is that the specialist is dealing with an informed trader. Hence, the specialist is likely to widen the spread in face of such a large, block trade. This, according to Easley and O'Hara, is an explanation for the fact that, typically, block buys are made at higher prices and block sales are made at lower prices than other normal transactions.

Loux (1989) also finds that the spread declines at a decreasing rate as the tendency of liquidity traders to trade in small transaction sizes, proxied by the stocks average trade size, increases. Further, as the proportion of large trade increases, spreads increase. Such an increase in the proportion of large trades reflects an increased probability of facing an informed trader who prefer large, block trades. Consistent with the results of Seyhun (1986), Loux finds that the probability of trading with an insider decreases as firm size increases.

In a recent paper, Umlauf (1991) detects the existence of information asymmetries between secondary and primary dealers in the secondary market for U.S. government securities, and finds evidence that the bid-ask spreads of the secondary dealers are larger than those of the primary dealers.

The theoretical work of Copeland and Galai (1983), Glosten and Milgrom (1985) and Easley and O'Hara (1987) relates to the quoted spread. Other theoretical papers have dealt with the realized spread and its relationship to the quoted spread by analyzing the serial covariance of transaction prices. This distinction between the quoted spread and the realized spread, and its implication to the adverse selection component was examined by Stoll (1989) and is looked at next.

2.6.2 Adverse Selection and the Serial Covariance of Transaction Prices

Roll (1984) estimated the realized spread to be related to the negative serial covariance of returns. Roll ignores the existence of adverse selection costs and assumes a constant spread in an informationally efficient market with no new information arrivals. Glosten (1987), pointed out that the negative serial covariance in returns is due to the inventory holding and order processing costs which cause transaction prices to reverse. The adverse selection cost component is related to transaction price changes which are permanent. Glosten shows that Roll's estimate of the realized spread is upwardly biased as Roll ignores the existence of the adverse selection component.

Stoll (1989) decomposes the spread into all of its components, while assuming a constant spread and an efficient market. He looks at two parameters, π, the probability of a price reversal, and $(1 - \delta)$, the amount of price reversal as a fraction of the total spread and analyzes the behavior of the components of the spread in terms of these parameters. He calculates the covariance of transaction prices and the covariance of quoted prices and analyzes them in terms of the contribution of each of the components of the spread. Stoll demonstrates that the adverse selection cost component does not cause covariance in transaction and quoted prices. He further demonstrates that the realized spread is $2(\pi - \delta) S$, where S is the total spread, and that the adverse selection cost component of the spread is equal to the quoted spread less the realized spread.

2.6.3 Cross-sectional Determinants of the Spread

Empirical work on the order processing costs and the inventory holding costs has been quite extensive, and the variables used to model these two components of the transaction cost fall into four categories (based on Morse and Ushman, 1983): (a) price;

(b) trading characteristics (for e.g., number of shareholders, trading volume, number of institutional investors);

(c) competition (for e.g., number of competing dealers, number of other markets the security is traded in); and,

(d) risk (for e.g., return variance, systematic and unsystematic risk).

Stoll (1978) developed a log-linear model of the total proportional spread which explained 82% of the cross-sectional variation in the bid-ask spreads of his sample of NYSE firms. His independent variables were:

(1) The variance of the stock's returns which reflected the marketability risk borne by the dealer and, also, proxied for the non-diversifiable risk of holding a stock of that security. For a risk-averse dealer, the greater the risk, the larger will be the spread. Also, the greater the risk, the larger are the chances of informed trading (Barnea and Logue,1975). This variable had a significant positive coefficient.

(2) The trading volume of the stock which proxied for the holding period of the dealer. In general, the greater the volume of trade, the easier it is for the market maker to

reverse his position and the shorter is his holding period. This variable had a significant negative coefficient.

(3) A turnover variable to reflect the adverse information costs. Stoll defined the ratio of the trading volume of shares to the dollar value of shares outstanding as the 'turnover' of a stock. The higher the information-based trading in the stock, the larger will be the turnover of the stock. This variable had a significant positive coefficient.

(4) Price, to reflect the minimum holding cost of a stock. For high priced stocks this minimum cost is spread over a larger number of dollars. Further, the minimum spread of one-eight causes the proportionate spread to be higher for low priced shares than for high priced shares. Stoll found that price is negatively related to proportional spread.

(5) A competition variable proxied by the number of dealers in the stock. This variable had a significant negative coefficient suggesting that the greater the competition, the lower would be the spreads. Stoll pointed out that this variable could also proxy for the capital-backing provided by the market makers of that security.

Branch and Freed (1977) also modeled the spread of NYSE and AMEX stocks. In their log-linear model they used the following variables: (i) trade volume, which had a significant negative coefficient, (ii) number of exchanges in which the stock is traded, which had a negative coefficient, (iii) risk, which had a positive coefficient, and,(iv) monopoly power of a dealer, which had a positive coefficient. All variables had significant coefficients except the competition variable (the number of exchanges traded in) and the monopoly power variables for AMEX stocks. Their R^2s were 49% for NYSE and 68% for AMEX stocks.

Glosten and Harris (1988) cross-sectionally modeled the components of the spreads. They initially decomposed the spreads into their components, by using time series analysis. They then used a system of four equations with four dependent variables, which were modeled as a function of the following variables:

(a) the holding and order processing cost components as a function of trade frequency and a security's risk;

(b) the adverse selection proportion as a function of insider ownership and the number of non-insider owners;

(c) the average trade volume as a function of the total spread and the number of non-insiders;

(d) the average volume of trade as a function of the adverse selection component and the average holdings of non-insiders.

They show that the adverse selection costs are positively related to information based activity.

2.6.4 Event Studies on the Spread

Morse and Ushman (1983) examined the behavior of the bid-ask spread surrounding earnings announcement dates and large price change dates. They found little evidence of an increase in the spreads around such periods. Their results were weak for the earnings announcement dates and marginal for large price change dates.

Venkatesh and Chiang (1986) look at the behavior of the total proportional spread and the adjusted spread (after adjusting for the holding costs) around quarterly earnings announcement dates and dividend announcement dates. They divide their announcement sample into three categories:

(i) joint announcements : these are announcements of earnings and dividends made on the same day (30 NYSE firms);

(ii) first announcements: these are announcements of either dividends (earnings) in the quarter which are (1) not preceded by either dividends or earnings announcements in the 30 days prior to the selected announcements, and (2) succeeded by another earnings (dividends) announcement by at least 10 days after this announcement (49 NYSE firms);

(iii) second announcements: these are the announcements of earnings or dividends made at least 10 days after a first announcement (40 NYSE firms).

Venkatesh and Chiang carry out tests on the proportional spread and the adjusted proportional spread prior to each announcement. Their estimate of the adjusted proportional spread is made by controlling for the holding cost components of the spread using average trading volume and standardized price variability as covariates. They hypothesize an increase in the information asymmetry prior to the announcements and an associated shift in the mean adjusted spread during the seven days prior to the information event conditional on the whether the event is a joint, first or a second announcement. Venkatesh and Chiang find that the total proportional spread and the adjusted proportional spread (adjusted for holding costs) increase before the second announcements only. This, according to them, reflects the increased arrival of informed traders prior to the second announcements.

Skinner (1991) finds evidence similar to Morse and Ushman (1983). In his study, he finds weak evidence of any increase in the bid-ask spread prior to an earnings announcement as well as a decrease after the announcement. However, he finds that the bid-ask spread increases immediately after earnings announcements that convey large earnings surprises to the market. Note that Skinner examines the percentage bid-ask spread and does not try to isolate the behavior of the adverse selection cost component of the spread.

Barclay and Smith (1988) find evidence to suggest that open market repurchase of shares by firms results in an increase in the bid-ask spread. The presence of informed managers in the open market increases the adverse selection costs of the market makers who consequently, widen the spread. The authors conclude that firms prefer to reward investors with cash dividends rather than resorting to share repurchase strategies in order to minimize the trading costs for the uniformed investors.

Rao, Tripathy, and Dukes (1991) study the impact of option listing on the size of the bid-ask spread. They find that the adverse selection cost component of the spread declines when a firm's share is listed on the option market. This is because, according to the authors, the market makers can effectively hedge themselves against informed trading by dealing in the option market especially around earnings announcement. Further, informed traders may prefer to operate in the options market and, hence, reduce adverse selection costs on the stock exchange transactions. Recently, Fedenia and Grammatikos ((1992) find that the spread of NYSE stocks decrease and those of OTC stocks increase with option listing.

Conrad and Niden (1990) examine the behavior of the bid-ask spread and other variables surrounding corporate acquisition announcements of NYSE target firms. They report significant increases in the spread prior to such announcements and a significant decrease after such announcements possible due to increased liquidity trading. In their cross-sectional analysis, however, they find no evidence that the adverse selection cost component of the spread increases prior to the acquisition announcements. In contrast, Foster and Vishwanathan (1990) find that adverse selection costs and inventory holding costs increase seven days prior to the announcement of takeovers for NYSE and AMEX firms. They find that this increase in costs is the greatest when the bidder firm is not listed on a United States stock exchange. Further, these cost components decline after the takeover announcement. In a related study, Conrad, Mandelker, Niden, Rosenfield and Shastri (1992) find a significant increase in trading volume and bid-ask spread of target OTC firms immediately preceding the acquisition announcements. This suggests an increase in the adverse selection costs in this period. The authors, also, propose an alternate explanation which is based on profit-maximizing behavior of existing market makers prior to the entry of additional market makers into the system. Jennings (1991) documents changes in the bid-ask spread for target NYSE and AMEX firms at an intra-day level on the day of the takeover announcement. In his study, he finds some evidence of an increase especially for NYSE firms prior to announcement as well as just after the anouncement. An intraday analysis of spread components demonstrates that adverse selection cost is heightened prior to the announcement.

Tripathy and Rao (1992) find a decline in spread prior to the announcement of seasoned equity offerings. The results, however, demonstrated dramatic differences when the sample was split based on size of the issues. The authors find that for large (small) issues average excess spreads are significantly negative (positive) in the pre-announcement period. However, the excess spread declines further after the announcement only for the large issues.

Note that while Conrad and Niden (1990), and Conrad, et. al. (1992) look at total bid-ask spreads Morse and Ushman (1983), Skinner (1991), and Rao (1992) look at percentage bid-ask spreads. However, none of these studies attempt to directly isolate the behavior of the adverse selection cost component. The studies by Barclay and Smith (1988), Venkatesh and Chiang (1986), Rao, Tripathy and Dukes (1991) and Foster and Vishwanathan (1990) have attempted to isolate the adverse selection cost component in their studies. In addition, the first three studies also use the percentage bid-ask spread.

Theoretical work on the adverse selection cost component of the bid-ask spread implies that it is proportional to the relative information asymmetry perceived by the market maker, and that it increases with the increased arrival of informed traders with more precise information. The existence of this component has been demonstrated at the cross-sectional level by Stoll (1978), Branch and Freed (1977) and Glosten and Harris (1988). The results of various event studies are mixed. Venkatesh and

Chiang (1986) find some evidence of increased adverse selection costs prior to second announcements in signal sequences. On the other hand, the results of Skinner (1991) suggest no such increase in the adverse selection costs prior to corporate earnings announcements. Similarly, the results for the target firms of takeover announcements provide mixed evidence. Given that one of the functions of the public disclosure of earnings is the reduction of ex-ante information asymmetries (Diamond and Verrecchia,1991), the examination of the time-series behavior of the adverse selection cost component surrounding such disclosures will provide direct evidence on this issue.

2.7 Conclusion

There has been extensive theoretical work and empirical work on the determinants of the bid-ask spread and, specifically, on the adverse selection cost component of the spread. This component is known to be associated with the market maker's perception of the relative asymmetry of information in the firm's environment. Further, there is reason to believe, based on the review of the differential information literature, that the adverse selection problem faced by the market maker may decrease for firms with better quality of information environments, and also for firms whose earnings reports are less noisy. This study empirically tests these issues by examining the behavior of the bid-ask spread and the adverse selection component surrounding second quarter earnings and subsequent dividend announcements across differential information environments. The study also examines the relationship between spread, adverse selection costs and the quality of a firm's earnings reports.

The remainder of the dissertation is organized as follows: In Chapter 3, the hypotheses are developed and stated. Further, Chapter 3 outlines the methodology to be used in the study. Chapter 4 lists and then discusses the results of this study. Chapter 5 highlights the implications and contributions of this study to the capital market literature in accounting.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 The Research Hypotheses

The quoted bid-ask spread of the market maker is determined by the market maker after taking into account all the fixed and variable costs involved in market making. These costs include (a) order processing costs, (b) inventory holding costs, and (c) adverse selection costs, arising out of the possibility that some traders who deal with the market maker have more information about the "true" price of the security than the market maker.

As indicated previously, the presence of asymmetric information in the market results in an adverse selection problem for the market maker. The adverse selection cost component of the spread reflects the losses the market maker suffers from more informed traders and recovers from liquidity traders. In addition to the holding and order processing costs, the market maker's spread is set to maximize the difference between the expected gains from the uninformed, liquidity traders and the expected losses from the information motivated traders (Copeland and Galai, 1983; Glosten and Milgrom, 1985; Easley and O'Hara, 1987; Stoll, 1989). Note that the implicit assumptions in the adverse selection theory are that the market participants are anonymous and fall into two categories, namely, the informed traders and the uninformed, liquidity traders, and that the market maker is relatively less informed than the set of informed traders. The adverse selection costs of the market maker will increase as the proportion of informed traders who decide to trade on their information increases. The theoretical work on the behavior of bid-ask spreads suggests that the market maker will widen the bid-ask spread given an increase in the asymmetric information in the environment specifically when there is an increase in the arrival rates of the informed traders or when there is an improvement in the quality of their information (Glosten and Milgrom, 1985).

It has been suggested by Glosten and Harris (1988) and Venkatesh and Chiang (1986) that such perceived increases in information asymmetry might take place prior to anticipated firm specific information events like earnings and dividend announcements, takeover attempts, etc.. A public disclosure will render the unique information possessed by the informed traders valueless which, then, provides an incentive to these traders to trade on the information prior to such public announcements preferably through large block trades (Easley and O'Hara,1987). Hence, the first hypothesis relates to the contemporaneous association between spread and quarterly earnings and dividend announcements.

H1: There will be no significant change in the bid-ask spread around second quarter earnings and dividend announcement dates.

As indicated before, it is expected that the bid-ask spread will increase prior to earnings and dividend announcements due to an increase in the adverse selection cost component of the spread. Further, even the inventory holding cost component of the spread will increase with the increase in the variability of returns (Chari,et al 1988) around such announcement dates, especially on the day before the announcement date as per the Wall Street Journal Index, and, the day of the announcement (Patell and Wolfson,1982). The bid-ask spread will subsequently decrease with the reduction in the variability of returns and the increase in trading volume. Also, as the new information gets impounded in the security prices, the adverse selection cost component of the spread will decrease subsequent to the earnings announcement (Glosten and Milgrom, 1985). However, this decrease in the adverse selection cost component will depend on the quality of the firm's information environment and the noisiness of the firm specific information releases. This relationship between the bid-ask spread and the quality of the firm's information environment, and the relative precision of the earnings reports is looked at next.

There is substantial evidence in the differential information literature in accounting on the relationship among firm size, the firm's pre-disclosure information environment, and the magnitude of the market's reaction to an earnings announcement. The results of Atiase (1985), Freeman (1987), Collins, Kothari and Rayburn (1987), Beaver, Lambert and Ryan (1987), Collins and Kothari (1989), and Bhushan (1989) all seem to suggest that historical accounting earnings figures tend to reflect permanent earnings changes with a lag, especially for large firms . That is, for large firms information about permanent earnings changes are impounded in prices earlier than in the earnings figures, due to the informativeness of the security price of large firms. For small firms, however, the primary source of information on permanent earnings changes are historical earnings announcements. Specifically, less pre-disclosure information is available for small firms.

The adverse selection problem of the dealer could, therefore, be affected by the quality of the firm's information environment. Some indirect evidence of this can be found in Ajinkya and Jain(1989) who demonstrate that the mean percent of outstanding shares traded (i.e. the value of shares traded divided by the value of the shares outstanding on that day) decreases as the size of the firm increases. This variable has been used in various cross-sectional studies to reflect the degree of informed trading in a firm's stock (Stoll,1976; Glosten and Harris,1988) Similarly, Seyhun (1986) demonstrated that the probability of trading with an insider decreases as firm size increases. In addition, Chiang and Venkatesh (1988), Hasbrouck (1991) also observe an inverse relationship between firm size and the degree of information asymmetry in firms. Therefore, it is hypothesized that the relative information asymmetry will be felt more sharply by the market makers of firms in the low differential information environment (and, hence, by the uninformed investors in these firms) than by market makers of firms in the high differential information environment. Further, it can be conjectured that a precise earnings signal plays a pivotal role in alleviating the information asymmetries existing in the environment of firms in the low differential information environment. This issue regarding differential information and the significance of second quarter earnings and dividend signals in reducing the perceptions of information asymmetries in the environment is looked at next.

H2: There will be no significant difference between the change in the bid-ask spread of firms in the high differential information environment and the change in the spread of firms in the low differential information environment, around second quarter earnings and dividend announcement dates.

As previously discussed, reported earnings figures may be noisy to the extent that some adjustments are required to be made to the figure before they can be used to predict the future earnings potential of the firm. Earnings figures may become noisy due to income smoothing accounting policy changes, for e.g. (Elliot and Philbrick,1990; Hand,1990), or the effect of extraordinary items and discontinued operations on future income streams (O'Glove,1987; Hector,1989). In general, the lower this noise element associated with earnings, the greater the predictive ability of reported earnings and the higher will be the quality of earnings. Low quality of earnings disclosures aggravate the information asymmetries in the environment and result in ex-ante return differentials among investors. Elliot and Philbrick (1990) demonstrate that there is a reduction in earnings predictability after the issuance of earnings figures with accounting changes. Hence, the association between the increase in the bid-ask spreads and the quality of the firm's earnings disclosures will throw some light on the effect of the latter on the information asymmetry in the firms's information environment.

H3: There will be no significant difference between the change in the bid-ask spread of firms characterized by low quality of earnings disclosures and the change in the bid-ask spread of firms characterized by high

quality of earnings disclosures, around second quarter earnings and dividend announcements.

The adverse selection cost component of the spread is associated with the dealer's perception of the relative information asymmetry in the environment, specifically the arrival rates of the informed traders and the quality of information in their hands. A direct way to test the effect of information asymmetries on the behavior of the spread is to look at only the adverse selection cost component of the spread and not at the total spread. Hence, by controlling for the dealer's holding and order processing cost and after accounting for the market maker's inventory policy[1], one can look at the behavior of the adverse selection cost component around earnings and dividend announcements and reexamine the previous hypotheses.

H4: There will be no significant change in the adverse selection cost component of the spread around second quarter earnings and dividend announcements.

The role of differential information and its impact on the information asymmetries among investors at the time of such announcements is looked at next.

H5: There will be no significant difference between the change in the adverse selection cost component of the spread for firms in the high differential information environment and the change in the adverse selection cost component of firms in the low differential

information environment, around second quarter earnings and dividend announcements.

Similarly, the quality of earnings signal and its relevance to the information asymmetries in the environment will be examined next by directly looking at the adverse selection cost component.

H6: There is no significant difference between the change in the adverse selection cost component of firms characterized by low quality of earnings disclosures and the change in the adverse selection cost component of firms characterized by high quality of earnings disclosures, around second quarter earnings and dividend announcements.

It is expected that the adverse selection cost component, in the case of earnings announcements, will increase prior to the event date and that the increase in the adverse selection cost component will stabilize subsequent to the event dates. This stabilization in the post-event period will be function of the quality of the firm's earnings signal and its noisiness. However, once the new information gets impounded into the prices, the adverse selection cost component will decrease to its normal level. In the case of subsequent dividend announcements, while the adverse selection cost component will increase prior to such announcements, its behavior subsequent to the event may be slightly different. The adverse selection cost component may subsequently decrease at a faster rate for the dividend announcements than for the earnings announcements but this decrease will be conditional on the quality of the earnings disclosures made by the firm.

This study will also examine the behavior of the bid-ask spread across a sequence of a preceding earnings signal and a succeeding dividend signal. Brown, Choi and Kim (1989) have provided evidence that for small firms an antecedent dividend signal mitigates the impact of a subsequent earnings signal. Hence, the effect of signal sequencing on the behavior of the adverse selection cost component, given the differential information environment of a firm, will be examined. In addition, consistent with the Miller and Rock (1985) framework, the quality of the earnings signal may systematically affect the behavior of the adverse selection cost component around dividend announcements. While this relationship may depend on whether the dividend signal is antecedent or subsequent to the earnings signal, this study examines the behavior of the bid-ask spread and the adverse selection cost component around earnings followed by dividends signal sequences only.

H7: There is no systematic relationship between the behavior of the adverse selection cost component around subsequent dividend announcements and the

quality of the firm's information environment as well as the quality of its earnings disclosures.

In the next section, the variables and the methodology of the study shall be defined.

3.2 Sample Selection

The sample has been extracted from the CRSP-NASDAQ 1989 data tapes from the University of Chicago. The initial sample has been restricted to those OTC firms which are on the COMPUSTAT tape (to be used for financial data) and, also, on the IBES tapes (to be used for consensus earnings forecast information). While the sample time period is 1985-1989, the sample has been restricted to only those firms with full data for the years 1980 to 1989 in an effort to obtain companies which have been active for at least 10 years. The firms should have total assets of at least $ 1 million[2] and should have greater than 500 shareholders as of the beginning of 1980. This is to ensure that the sample firms have been required to file 10-k reports with the Securities Exchange Commission (SEC) on a regular basis. The dates of the filings of such 10-k reports and the information contained in such reports are used in this study for the evaluation of the quality of the earnings disclosures made by the firm. All sample firms should have had a December 31 fiscal year-end and a second quarter earnings announcement published in the Wall Street Journal (WSJ) during the analysis period. Further, the selected firms should have declared dividends continuously to eliminate the impact of dividend initiations, omissions and resumptions. Also, firms selected must have second quarter and annual earnings forecast data available on the IBES data tape.

The data on second quarter earnings announcements and dividend announcements for the sample period of 1985 to 1989 have been obtained from the Wall Street Journal Index (WSJI) as well as the COMPUSTAT and the CRSP data tapes, respectively. The announcement dates have been classified (Venkatesh and Chiang,1986) into (i) joint announcements, (ii) first and initial announcements, and (iii) second and subsequent announcements. By reference to the WSJI, firm-events have been classified as follows:

(i) joint announcements sample: these are announcements of dividends and earnings made on the same day. In addition, these firms have no other preceding announcements made 35 days prior to the announcement[3].

(ii) first announcements sample: these are first announcements of earnings in the quarter, not preceded by any other earnings or dividends announcements in the 35 days prior to the selected announcements, and, secondly, are followed by another dividends announcement at least 25 days after this first announcement.

(iii) second announcements sample: these are announcements of dividends made at least 25 days after a first earnings announcement but not more than 35 days after the first announcement (see Figure 1).

In addition, earnings announcements not preceded by any other such announcement in the 35 days prior to or 35 days after such announcements, have also been examined. Such events have been categorized as sole earnings announcements.

For all the announcements, the estimation period starts 147 days and ends 21 days before the first (or, joint) announcement. Additional sample selection criteria that have been imposed at this stage are (i) there should be no other confounding events taking place both in the estimation window and the analysis window, and (ii) the security should have been traded for at least 60 days in the estimation window. For all announcements, the analysis period begins 15 days before and ends 10 days after the event - the announcement date in the WSJI (see Figure 1). Each firm-event is centered around either a first earnings announcement, or, a joint earnings and dividend announcement, or, a sole earnings announcement.

3.3 The Variables

3.3.1 The Dependent Variable

The dependent variable in this study is the daily spread in the analysis period ($S_{i,d}$) for each firm-event i (i = 1.....N) and for each day d (d = -15...0...+10) in the analysis period. This study focusses on the total (or absolute) spread and not the proportional (or relative) spread, consistent with recent theoretical work (Copeland and Galai,1983; Glosten and Milgrom ,1985; Easley and O'Hara,1987; Stoll,1989), and the empirical work of Conrad and Niden (1990).

3.3.2 Proxies for Differential Information Environment

Annual firm size in the sample period (FS_q), an endogenous proxy for the amount of predisclosure information in the environment, has been used to classify the sample firms into three portfolios, namely high differential information environment firms, low differential information environment firms and medium differential information environment firms. Firm size has been measured at the beginning of the calendar years in the sample period. The sample firms have then been assigned to the three portfolios, sorted on the basis of their firm size. The largest firms, meeting all other sample selection criteria, have been assigned to the high differential information portfolio. Similarly, the set of small firms have been classified in the low differential information environment and the middle firms have been classified as medium differential information environment firms.

The entire analysis has been repeated using an exogenous proxy for the differential information environment of the firm, namely the number of analysts following (AF_q) a firm at the beginning of each estimation period. Dempsey (1989) has demonstrated that financial analysts' following, as a proxy for the quality of firms' information environment, has some incremental explanatory power over and above firm size. Dempsey concludes that firm size and analysts' following are not equivalent proxies for firms' predisclosure environment. Hence, in a manner similar to firm size, three differential information portfolios have been formed in order to carry out the rest of the analysis.

3.3.3 Proxies for Earnings Quality

Bernard and Stober (1989,p. 627-28) operationalize the quality of earnings variable in terms of the market's reaction to unexpected cash flows. They hypothesize that unexpected accruals will have smaller impact on prices than unexpected cash flows of the same magnitude "since accruals are either subject to manipulation, or represent only indirect links to future cash flows". On a similar note, Lev (1989,p. 177) points out "that adjustments to reported data are an essential element of financial statement analysis". To the extent that reported earnings figures contain some noise (e.g., accounting policy changes, extra-ordinary items, discontinued operations, etc.), sophisticated investors will always make adjustments to the reported earnings figures and use such adjusted figures to make predictions about future earnings. Hence, for investors, the quality of such reported earnings figures improves if they contain less noise, i.e., they have better predictive content with respect to the future cash flow potential of the firm and its dividend paying ability. The predictive ability of earnings then is one way to operationalize the quality of earnings issue. Another way to measure the earnings quality is by directly examining the noisiness of the earnings data by looking at the volatility of the reported earnings stream and other financial variables. The earnings predictability measure is described next.

3.3.3.1 Earnings Predictability Measure

According to Lev (1989) the better the predictive ability of earnings, the higher is the quality of a firm's earnings reports. Hence, the lower the quality of the earnings reports, the greater will be the absolute forecast errors made by analysts. In fact, Eliott and Philbrick (1990,p. 173) find that the analysts' forecast errors for firms with accounting policy changes is larger than those of firms with no accounting changes. In general, the mean absolute forecast errors of analysts following low quality of earnings firms will be larger than the mean absolute forecast error of high quality of earnings firms. Evidence of this relationship was demonstrated in a recent paper by Imhoff (1992). In his study, Imhoff finds a strong positive relationship between earnings quality and the predictability of the earnings stream. In addition, he documents that financial analysts of high quality of earnings firms make (i) a smaller number of forecast revisions after the announcement of first quarter results, and (ii) have smaller absolute annual forecast errors as compared to low quality of earnings firms.

Similarly, the lower the quality of a firm's earnings reports and the more noisy the earnings reports, the larger will be the dispersion in the forecasts made by analysts. Elliot and Philbrick (1990,p. 173) find that the dispersion of analysts' forecasts were significantly larger in the year of an accounting change. In general, the mean dispersion of analysts' forecasts will be greater for low quality of earnings firms as compared to the mean dispersion of analysts' forecasts of high quality of earnings firms.

Every firm has to file within 90 days of the close of its financial year, its annual report with other details on Form 10-k with the SEC. This report includes a summary of the firm's operation over the last two years. For each firm q in the sample, the date the SEC 10-k report was filed in year y (i.e., for the previous year's earnings data) was obtained for the years 1984 to 1989. The consensus financial analysts forecast for the current year y ($CYF_{q,y}$, y=1984 to 1989) made subsequent to the filing date has been used in this study[4]. This forecast is assumed to incorporate the information contained in the 10-k reports (Swaminathan,1991; Stice,1991). The actual annual earnings per share for each firm q for the years y=1984 to 1989 ($AEPS_{q,y}$) was obtained from COMPUSTAT and the standardized absolute forecast error ($SAFE_{q,y}$) was calculated as follows:

$$(CYF_{q,y} - AEPS_{q,y}) / (AEPS_{q,y}) = SAFE_{q,y} \quad ...(1)$$

Note that the $AEPS_{q,y}$ number is primary earnings per share before extra-ordinary items, etc. and is consistent with the definition of earnings in forecast data (see Elliot and Philbrick, 1990;p. 164, footnote 8). To be included in the sample forecast data for each firm must be available for at least four out the six years from 1984 to 1989. For each firm the mean standardized absolute forecast error is calculated as follows:

$$SAFE_q = 1/K \sum SAFE_{q,y} \quad ...(2)$$

where, K may take the value 4 to 6, depending on data availability.

In addition to the standardized absolute forecast error, for each firm q and each year y the relative dispersion of analysts' forecasts is obtained for the consensus forecast issued just after the date of filing the 10-k report (Elliot and Philbrick, 1990). Note that firms with only one analyst following them will have a dispersion of zero.

$$(\text{Dispersion of Analysts' Forecast}_{q,y}) / (CYF_{q,y}) = DAF_{q,y} \quad ..(3)$$

As was done for the mean standardized absolute forecast error, for each firm q and for each year y (at least four years out of six) the mean relative dispersion of analysts' forecasts surrounding the 10-k report was estimated:

$$DAF_q = 1/K \sum DAF_{q,y} \qquad \ldots(4)$$

Once again, K may vary from 4 to 6 depending on data availability.

For the overall sample, the medians for $SAFE_q$ and DAF_q i.e. SAFE AND DAF were estimated. These were used for the quality of earnings scores.

The scores are calculated as follows:

Scores:	$SAFE_q$	DAF_q
4	> SAFE	> DAF
3	> SAFE	< DAF
2	< SAFE	> DAF
1	< SAFE	< DAF

A score of '1' represents a firm with high annual earnings predictability and is classified as a high quality of earnings disclosure firm. An implicit assumption in the scoring system with respect to the assessment of the earnings quality score is that lower forecast errors (bias) are a more desirable property in forecasts than lower dispersion in analysts beliefs. Hence, a score of '4' represents a firm with the lowest quality of earnings disclosures. In effect, all firms retained in the sample have been allotted scores which range from '1' to '4', i.e., from high quality to low quality of earnings disclosures.

The earnings predictability score evaluates the quality of a firm's earnings disclosure in terms of the ex-post forecasting performance of the financial analysts following the firm. An alternative measure of the quality of the earnings reports used in this study involves more traditional financial statement analysis variables/ ratios and has been based on Bernstein (1978) and O'Glove (1987).

3.3.3.2 Earnings Noise Measure

The alternate measure of the quality of earnings reports has been based on more traditional financial statement analysis variables and ratios (for e.g., see Bernstein,1978; O'Glove,1987; Hector,1989). Specifically, the study looks at (i) earnings per share, (ii) the per share effect of extra-ordinary items, discontinued operations, and accounting policy changes, and (iii) the allowance for uncollectible accounts or loan losses, as the case may be. The actual assessment of the earnings quality score is based on the volatility of these variables/ratios over the 10 year period from 1980 to 1989.

In general, the greater the stability of the earnings stream, the better is the quality of earnings disclosures. Further, the greater the difference between the reported earnings and the adjusted earnings, the greater will be the standard deviation of all these financial items over 1980 to 1989, given that these items are often used to manage earnings. In addition, another factor which increases the noisiness of a earnings signal, namely accounting policy changes (Elliot and Philbrick, 1990) has also been incorporated in this measure of the quality of earnings reports of a firm. Hence, for each firm the number of accounting policy changes made over the last 10 years has been calculated using the COMPUSTAT database. The greater the number of accounting policy changes made in the ten years, the more noisy the reported earnings figures.

The following has been calculated for each firm for the 10 years based on the SEC 10-k reports:

(i) the standard deviation of the primary earnings per share stream ($SPES_q$);

(ii) the standard deviation of the difference between the earnings per share after extra-ordinary items, discontinued operations and the cumulative effect of accounting changes and, the primary earnings per share ($SSES_q$);

(iii) the standard deviation of the allowance for uncollectible accounts (or, loan losses in the case of banks and financial companies) standardized as a percentage of net income ($SALL_q$);

(v) the number of accounting policy changes made over the last 10 years ($NAPC_q$).

For each of these 5 variables, the median values across the sample of firms has been estimated (i.e. SDE, SPES, SSES, SALL, and NAPC). For each variable, each firm has been given a score of ' 2 ' if the value of the variable is above the median of that variable. Otherwise, the firm has got a score of ' 1 ' on that variable. The maximum possible score a firm can get is '8', which represents a firm with low quality of earnings disclosures. The minimum score a firm can get is ‘ 4 ’, which represents a firm with high quality of earnings disclosures.

3.3.4 The Cross-sectional Control Variables

This su\section deals with the other cross-sectional control variables used in the study and the motivation for incorporating them.

3.3.4.1 Unexpected Earnings (UE_i)

Senteney (1990) found an association between the unexpected earnings component and the increase in the bid-ask spread around quarterly earnings announcements. In general, the greater the unexpected earnings component, the greater will be the value of any unique information regards the future earnings potential of a firm and the higher will be the incentive for an informed trader to trade on this unique information. Hence, in the cross-sectional tests, the magnitude of the unexpected earnings in the earnings announcement is controlled for.

Unexpected earnings for each firm-event i is measured as:

$$UE_i = [EPS_i - E (EPS_i)] / [P_i] \qquad ...(5)$$

where,

EPS_i = the reported primary earnings per share for firm-event i;

$E(EPS_i)$ = the last IBES consensus analyst forecast of the firm's primary earnings per share for the second quarter, issued prior to the earnings announcement date; and,

$P_i = (B_i + A_i) / 2$ and, B_i and A_i are the mean bid price and the mean ask price of the firm-event i in the related estimation period, starting from t =-147 and ending t = -21 days before the first or joint announcement.

3.3.4.2 Reporting Lag (LAG_i)

In general, the greater the reporting lag, the greater will be the adverse selection costs of the market maker. A larger reporting lag increases the level of uncertainty associated with the expected announcement and provides informed traders a larger window to trade on their unique information. Further, a larger reporting lag for earnings may also reflect on the quality of the earnings disclosure, itself. On this note, Trueman (1990) has hypothesized that managers of firms with unfavorable news attempt to shift the recognition of income across periods with a view to increase the current periods reported income. However, this action takes time and hence causes a delay in the earnings announcement and is a probable explanation for the negative abnormal returns for delayed earnings announcements.

For the purposes of this study, the expected date of earnings announcements is calculated using the "naive" model of Chambers and Penman (1984). The expected date of the earnings announcement is based on the date of the earnings announcement in the previous year. The actual lag in the previous fiscal year is used as the expected lag between the quarter end and the earnings announcement date in the analysis period. The dummy variable, LAG_i, takes the value of '1', if the firm reports later than the expected lag period in that quarter and is '0' otherwise.

3.3.4.3 Volatility of Returns (VT_i)

The bid-ask spread is positively related to the variability of returns. The inventory holding costs increase in proportion to the volatility of returns as the risk of holding a non-diversified portfolio increases. Further, the increase in the variability of returns makes it difficult for the dealer to perceive the true price of the stock and increases his adverse selection costs (Copeland and Galai,1983). Hence, the variance of returns positively increases both the adverse selection cost component of the spread and the inventory holding cost component of the spread. To control for the effect of risk on the inventory holding cost component, the estimation model includes a risk variable, namely, the absolute change in price (Branch and Freed,1977). This variable is used as a proxy of the "bid-ask bounce" in transaction returns.

French and Roll (1986) and Glosten (1988) point out that the inventory holding and order processing cost component of the spread cause an upward bias in the variance of returns. The variance in returns due to the adverse selection costs (i.e. arrival of new information) reflects the true underlying variance of a stock's returns. Glosten and Milgrom (1985), Glosten (1988) and Stoll (1989) demonstrate that the serial correlation in returns is caused by the non-adverse selection costs. This study, in addition, controls for the confounding influence of the variability of returns on the spread in the analysis period by making use of this latter result.

Based on Schwert (1990) and Fama (1976,p. 114-119) the following regression was run for the entire estimation window:

$$R_{i,t} = b_{i,o} + \sum_{j=1}^{8} b_{i,j} R_{i,t-j} + U_t \qquad \ldots(6)$$

The regression was restricted to 8 lags as Schwert (1990) found only the first 8 lags to be significant. The R^2 of this regression is the proportion of the variability of returns explained by the lagged values of returns (i.e. the trading noise element of the variance, French and Roll, 1986), and is taken to be the proxy for the serial correlation in returns. The sample firms are sorted on the basis of their respective R-squares, and for firms with R-squares greater than the sample median, the variable VT_i will take the value of ' 1 '. It is conjectured that the increase in the variance of returns will positively affect the inventory holding costs of such firms, and the variable VT_i

controls6Xforthis confounding effect[5] in the event period. This variable takes a value of zero for firms with R-squares lower than the median R^2.

Other control variables incorporated in the cross-sectional model are examined next.

3.3.5 Other Control Variables

1. The number of market makers (MM_i): For each firm-event i, the average number of market makers dealing in the firm's security over the estimation period for that quarter's earnings and dividend announcements is estimated and used in the cross-sectional study. This data has been extracted from the CRSP-NASDAQ data tapes. In general, the greater the competition between dealers and the larger the capital backing for the market making activities, the smaller will be the bid-ask spread of a firm (Stoll,1978).

2. The number of institutional shareholders ($INST_i$) and the number of insider shareholders ($INSID_i$): For each firm, this data has been obtained from the Standard and Poor's OTC Handbook for each year in the sample period. In general, the larger the share holding of institutions, the greater will be the relevance of the quality of earnings issue. With a large set of institutional and insider shareholders, the adverse selection costs faced by the market maker will increase (Seyhun,1986; Glosten and Harris,1988), given lower quality of earnings disclosures (Hand,1990). Chiang and Venkatesh (1988) find that insider

holdings are a significant proxy for a dealer's adverse information costs and that there is a positive relationship between insider holdings and the dealer's perception of information asymmetry, and therefore the size of the spread. On the other hand, Chiang and Venkatesh do not find any significant relationship between institutional holding and the adverse information cost component of the spread. Hence, they conclude that dealer's do not regard institutions as information traders. On a different note, Bhushan (1989) demonstrates an negative association with the differential information environment of a firm and the number of institutional shareholders, which provides an alternative rationale to expect a negative relationship between the spread and these two variables.

3. The day of the week the firm makes its announcement (DAY_i): This variable takes on the value ' 1 ' , if the earnings or dividend announcement is made on a Friday and a value ' 0 ' otherwise. In general, the adverse selection costs will increase by a larger amount if the announcement is made on a Friday. This is because of the increased level of uncertainty associated with the consequent non-trading period due to the increased possibility of the release and the selective access to some unique information by informed traders (Brock and Kleidon,1989; Ma et al.,1989).

3.4 The Tests: Background

All tests carried out on the bid-ask spread in the analysis period are based on the standard methodology developed by Brown and Warner (1985) assuming cross-sectional dependence in the dependent variable across the sample of firms. The tests for the hypotheses involve the calculation of the daily unexpected values of the dependent variable ($U_{i,d}$) in the analysis period and the standardized unexpected value of the spread ($SU_{i,d}$) in the same period.

$$U_{i,d} = S_{i,d} - E(S_{i,d}) \quad \ldots(7)$$

$$SU_{i,d} = U_{i,d} / \hat{S}(U_d) \quad \ldots(8)$$

$$\hat{S}(U_d) = \left\{ \sum_{t=-147}^{-21} (U_{i,t} - \overline{U}_i)^2 / 125 \right\}^{0.5} \quad \ldots(9)$$

$$\overline{U}_i = \sum_{t=-147}^{-21} (U_{i,t}) / 126 \quad \ldots(10)$$

where,

(a) d = -15...0...+10 days i.e. the analysis period and t = -147 to -21 days in the estimation period;

(b) the E ($S_{i,d}$) is the estimation period mean bid-ask spread (i.e. U_i) for the initial sets of hypotheses H1 to H3. For all subsequent hypotheses i.e. for H4 to H7, however, a simultaneous equation system is used to estimate the expected value of the spread on a day d in the analysis period.

(c) $s(U_d)$ is the time-series standard deviation of $U_{i,t}$ over the estimation period and is the proxy for the event period standard deviation of the unexpected spread. This is used to standardize the unexpected spread component for the cross-sectional regressions.

The following test statistic developed by Brown and Warner (1985) is calculated for the entire sample of firm-events i for each day d in the analysis period for the univariate tests on the standardized unexpected value of the spread:

$$\bar{U}_d / \hat{s}(\bar{U}_d) \qquad \ldots(11)$$

This statistic has a t-distribution with 125 degrees of freedom. Further,

$$\bar{U}_d = \frac{1}{M}\sum_{i=1}^{M} U_{i,d} \qquad \ldots(12)$$

where, M = N the number of firm-events in the sample. Also,

$$\hat{s}(\bar{U}_d) = \{\sum_{t=-147}^{-21} (\bar{U}_t - \bar{U})^2/125\}^{0.5} \quad \ldots(13)$$

$$\bar{U}_t = \frac{1}{M}\sum_{i=1}^{M} U_{i,t} \quad \ldots(14)$$

and

$$\bar{U} = \{\sum_{t=-147}^{-21} \bar{U}_t\}/126 \quad \ldots(15)$$

The initial tests carried out on the bid-ask spread are described next.

3.5 The Initial Tests

3.5.1 Univariate Test of the Behavior of the Bid-Ask Spread Around Second Quarter Earnings and Dividend Announcement Dates

For the initial hypotheses H1, the expected value of the dependent variable in the analysis period for each firm-event is the average bid-ask spread over the estimation period. This is calculated as follows:

$$E(S_{i,d}) = \sum_{t=-147}^{-21} (A_{i,t} - B_{i,t})/126 \ldots(16)$$

where, t = estimation period days.

The time-series standard deviation of the deviation of the actual spread from the expected spread ($s(U_d)$ estimated as in (9)) over the estimation period, is also calculated.

This hypothesis (H1) examines the behavior of the spread around second quarter earnings and subsequent dividend announcement dates. The test involves examining whether there has been a significant increase in $U_{i,d}$ over the 26 day event period[6]. The Brown and Warner test statistic is calculated to examine the hypothesized increase in $U_{i,d}$. The test statistic is also calculated, to examine the behavior of the bid-ask spread[7], for each differential information portfolio. In these cases, M will be equal to the number of firm-events in each portfolio. Though Brown and Warner (1985) found this test statistic[8] to be robust to deviations from normality, following Ajinkya and Jain (1989) the tests are carried out once again after log transforming the spread variable. Ajinkya and Jain found that the test statistic is better specified after such a log transformation, given that their dependent variable (trading volume) had a non-normal distribution.

3.5.2 Univariate Test of the Behavior of the Adverse Selection Cost Component Proxy Around Second Quarter Earnings and Dividend Announcement Dates

This test of hypothesis H4 is carried out on the adverse selection cost component of the spread. Specifically, the prediction error in the analysis period, i.e., the difference between the actual spread and the expected spread in the analysis period proxies for the adverse selection cost component of the spread. For this set of univariate tests, the expected spread in the analysis period [$E(S_i)$] is estimated using a system of two structural equations. The system of equations will simultaneously adjust for inventory holding costs and order processing costs, as well as, adjust for the effect of the dealer's inventory policy on the bid-ask spread. Hence, in the estimation period, the following system is estimated by using Three Stage Least Squares, assuming cross-correlation between the structural error terms:

$$S_{i,t} = a_0 + a_1(TV_{i,t}) + a_2(P_{i,t}) + a_3(R_{i,t}) + a_4(S_{i,t-1}) + \eta_{i,t} \quad ..(17a)$$
$$TV_{i,t} = b_0 + b_1(S_{i,t}) + b_2(MF_{i,t}) + b_3(TV_{i,t-1}) + \mu_{i,t} \quad ..(17b)$$

where, (8a) and (8b) are the structural equations; and,

i = 1.....N sample firms-events;

t = -147..to......-21 days before the first or joint announcement;

$S_{i,t}$ = the daily spread;

$TV_{i,t}$ = the daily trading volume;

$P_{i,t}$ = the daily price;

$R_{i,t}$ = the absolute change in price i.e. from day t-1 to day t, as a measure of the security's risk (used by Branch and Freed (1977);

$MF_{i,t}$ = the proxy for the market volume (Bamber 1986).

The variables $P_{i,t}$, $R_{i,t}$, $MF_{i,t}$, $S_{i,t}$, and, $TV_{i,t}$ are all pre-determined, while $S_{i,t}$ and $TV_{i,t}$ are the endogenous variables[9]. The pre-determined variables in equation (17a) control for the holding and order processing cost components of the spread, and equation (17b) accounts for the simultaneous relationship between the dealer's spread and the trading volume, given the inventory policy of the dealers in the market[10].

After the expected spread is determined, the adverse selection cost component proxy or the abnormal spread is estimated by subtracting the expected spread from the actual spread in the analysis period as was done before to get $U_{i,d}$. Calculations listed in equations (7) to (10) are also carried out on the abnormal spread.

The estimation of the E $(S_{i,d})$ basically involves the calculation of the reduced form coefficients from the structural coefficients, and combining the reduced form coefficients with the values of the exogenous variables to get the forecasted values of the dependent, endogenous variables (Kmenta,1986; Fomby, Hill and Johnson,1984). The hypothesis is tested using the test statistic developed by Brown and Warner (1985) as was done before with the mean-adjusted spread[11] (refer to equations (11) to (15)). These tests were repeated with log transformed endogenous and exogenous variables, i.e., by running the estimation models as loglinear models, in order to check the robustness of the results to the presence of non-normalities in the data.

3.6 The Subsequent Tests

3.6.1 Cross-sectional Tests on the Cumulative Standardized Unexpected Spread

The cumulative prediction error for the unexpected spread in the analysis period is calculated as follows for each firm-event i:

$$CSU1_i = \sum_{t=-15}^{+10} SU_{i,d} \quad \ldots(18)$$

In the above formulation, the expected spread is the mean estimation period bid-ask spread.

To test the hypotheses H2 and H3, specifically, the following cross-sectional tests is carried out on the variables $CSU1_i$:

$$\begin{aligned} CSU1_i = {} & a_0 + a_1(INFO1_i) + a_2(INFO2_i) + a_3(QS_i) + a_4(INFO1*QS_i) \\ & + a_5(INFO2*QS_i) + a_6(D1_i) + a_7(D2_i) \\ & + a_8(D3_i) + \eta_i . \end{aligned}$$

where,

i i = the firm-events ranging from i = 1 to N ;

$INFO1_i$ = ' 1 ', for low differential information environment, and, ' 0 ' otherwise;

$INFO2_i$ = ' 1 ', for median differential information environment, and, ' 0 ' otherwise;

QS_i = the quality score of the firm. This score takes the value of ' 1 ' (for high quality of earnings disclosures) to ' 4 ' (for low quality of earnings disclosures) if the earnings predictability approach is used, or, takes the value of ' 4 ' (high quality of earnings) to ' 8 ' (low quality of earnings) in the case of the earnings noise approach.

$D1_i$ = ' 1 ', if it is a joint announcement and ' 0 ' otherwise;

$D2_i$ = ' 1 ', if it is a sole earnings announcement and '0 ' otherwise;

$D3_i$ = ' 1 ', if it is a dividend announcement subsequent to a earnings announcement and ' 0 ' otherwise.

As per the hypotheses, it is expected that both a_1 and a_2 will be significantly positive, i.e., the cumulative change in the bid-ask spread is larger for firms in the low differential and, possibly also, in the median differential information environment than change for the high differential information firms. It is expected that a_3 will also take on a significant positive value, indicating that as the firms quality of earnings disclosures decreases, the cumulative change in the bid-ask spread will be larger. Further, it is expected that the cumulative change in the spread of the low and high quality of earnings firms will depend on the degree of differential information in the environment, and both a_4 and a_5 will take positive values.

3.6.2 Cross-sectional Tests on the Cumulative Standardized Abnormal Spread

The cumulative abnormal spread, the proxy for the cumulative unexpected adverse selection cost component, is estimated as follows:

$$CSU2_i = \sum_{t=-15}^{+10} SU_{i,d} \qquad ...(20)$$

Note that the estimated spread used to calculate the above formulation is estimated by the system of two equations mentioned before. As the adverse selection cost is essentially a time series cost, the cumulative prediction error, i.e. the cumulative abnormal spread, is taken as the proxy for the market maker's perception of the cumulative adverse selection cost with the arrival of informed traders with superior information[12].

The following cross-sectional test is carried out on the cumulative abnormal spread, $CSU2_i$, to specifically test the hypotheses H5 to H7 and the cumulative implication on the adverse selection costs:

$$CSU2_i = c_0 + c_1(INFO1_i) + c_2(INFO2_i) + c_3(QS_1) + c_4(INFO1*QS_1) + c_5(INFO2*QS_i) + c_6(UE_i) + c_7(LAG_i) + c_8(MM_i) + c_9(INSID_i) + c_{10}(INST_i) + c_{11}(QS_i*INST_i) + c_{12}(DAY_i) + c_{13}(D1_i) + c_{14}(D2_i) + c_{15}(D3_i) + c_{16}(VT_i) + \gamma_i \qquad \ldots(21)$$

where,

i = 1.....N firm-events;

$INFO1_i$ = '1', for low differential information environment and '0' otherwise;

$INFO2_i$ = '1', for medium differential information environment and '0' otherwise;

QS_i = the quality score of the firm;

UE_i = the unexpected earnings of the firm in that quarter;

LAG_i = ' 1 ', if the earnings or dividend announcement is delayed and, '0 ', otherwise i.e. if it is timely or early;

MM_i = the average number of market makers dealing in the security in the estimation period;

$INSID_i$ = the fraction of insider share holding;

$INST_i$ = the fraction of institutional share holding;

DAY_i = ' 1 ', if the announcement is made on Friday and ' 0' otherwise;

$D1_i$ = ' 1 ', if it is a joint announcement and ' 0 ' otherwise;

$D2_i$ = ' 1 ', if it is a sole earnings announcement and '0 ' otherwise;

$D3_i$ = ' 1 ', if it is a dividend announcement subsequent to a earnings announcement and ' 0 ' otherwise.

VT_i = ' 1 ' if the variability of returns explained by lagged returns is greater than the median R^2, and is ' 0 ' otherwise.

It is expected that both c_1 and c_2 will be significantly positive, as cumulative change in the abnormal spread and, therefore, the cumulative effect on the adverse selection costs is expected to be greater for firms in the low differential information environment than for those in the high differential information environment. This will indicate that the role of earnings and dividend announcements and their influence on dealer's perception of the level of information asymmetry increases inversely to the level of predisclosure information of the firm.

As per the hypothesis, it is expected that c_3 will be significantly positive as the change in the cumulative abnormal spread and the adverse selection costs is expected to be greater for firms with low quality of earnings (i.e. high quality of earnings scores). This will indicate that the dealer's perception of the level of the information asymmetry in the firm's environment decreases as the quality of the firm's earnings reports improves. Similarly, the dealer's perception of the level of information asymmetry, given a high level of institutional holdings, will also depend on the quality of the earnings reports. The better the quality of earnings signals and the lower the potential rewards for sophisticated analysis by institutional investors, the smaller will be the adverse information cost component of the spread. Hence, it is expected that c_{11} will be significant and positive.

Both c_6 and c_7 are expected to be significantly positive. The larger the unexpected earnings component, the greater the will be the value of the unique information in the hands of the informed traders and, hence, the higher will be the dealer's losses in the hands of such traders. Given this, the cumulative change in the abnormal spread may be directly proportional to the magnitude of the unexpected earnings. The greater the delay in the earnings or dividend announcement, the larger the window available to the informed trader to operate with his unique information. This suggests that the dealer may face heightened adverse information costs given delayed reports, and hence the cumulative change in the abnormal spread may be larger for lagged earnings or dividend reports.

Given the result that the spread reduces with an increase in the competition between dealers (Copeland and Galai,1983), it is expected that c_8 will be significantly negative. The larger the set of dealers, the more liquid will be the market for the security. Given this, the dealers will be able to recoup their adverse selection costs with a smaller change in the abnormal spread. Further, it is expected that c_9 will be significantly positive. As the number of insiders with unique information increases, the dealers adverse information costs will also increase in proportion. However, the sign and magnitude of c_9 and c_{10} may be confounded by the empirical observation made by Bhushan (1989) of a negative relationship between the number of institutional and insider shareholders, and the level of predisclosure information available for a firm.

The coefficient on the DAY_i variable, i.e. c_{12}, it is expected will be significantly positive because of the higher level of uncertainty regards the selective access by the informed traders to superior information, given the ensuing non-trading period.

It is expected that the coefficients c_{13} to c_{15} will be positive and significant. To test whether joint announcements contain more information and are less noisy than sole earnings signals involves checking whether c_{13} is equal to c_{14}. It is expected that c_{14}, the sole earnings announcement coefficient, will be significantly larger than c_{13}, the joint earnings announcement coefficient, because the level of noise in the latter will be reduced to the extent of the information contained in the joint dividend signal. Similarly, to check whether sequence matters for dividend announcements the significance of c_{15} is tested. It is expected that this coefficient will be positive; the information contained in a subsequent dividend announcement is conditioned by the information contained in the preceding earnings announcement. Note that tests on $CSU2_i$ have been redone after log-transforming the endogenous and the exogenous variables to check the robustness of the cross-sectional results, given possible deviations from normality.

Notes

1. According to Copeland and Galai (1983), the dealer offsets the losses he suffers in the hands of the informed traders with the gains he earns from the liquidity traders by increasing the bid-ask spread. While the dealer may widen the spread prior to earnings and dividend announcements, this has to be balanced with the expected increase in the trading volume (i.e., an increase in liquidity traders) around such public announcements. For e.g., Beaver (1968), Bamber (1986), Morse and Ushman (1986) have documented a significant increase in volume around earnings announcement dates. This trade-off between spread and volume is captured by the use of a simultaneous equation model in the estimation period.

2. This requirement was raised to $3 million in 1982 and $% million in 1985. The sample firms have been checked to ensure that they meet this requirement.

3. The lag of 35 days is necessary as the event period for both the first and the second announcement starts 15 days before and ends 10 days after the specific announcement. In addition, there is a gap of 10 days between the end of the estimation period and the start of the event period. Morse and Ushman (1983) used [-10,+10] as their event window. The use of a lag of 10 days between the first and the second announcement, as was done by Venkatesh and Chiang (1986), would have resulted in overlapping event periods between the first and the second announcement. In their study, Venkatesh and Chiang examined the behavior of the spread for only 7 days prior to the sample announcements.

4. For firms where the SEC date stamp was not clear or was not found on the 10-k report, the May consensus forecast was used to derive the earnings predictability score. This is consistent with Swaminathan (1991).

5. The regression residual with an appropriate transformation can be taken as the proxy for the daily standard deviation of returns on day t (Schwert,1990). The variable $|u_t|(\pi/2)^{0.5}$, however, will be correlated with the variability in returns caused by the arrival of new information (and, therefore, the adverse selection cost component) and, hence, is not used as a proxy for risk in the spread estimation model.

6. Similar tests are carried out for trading volume surrounding the second quarter earnings and subsequent dividend announcements. As in the case of the bid-ask

spread, the behavior of the trading volume variable has been re-examined after log-transforming the variable (Ajinkya and Jain,1989).

7. An alternate explanation for the increase in the spread surrounding the announcement dates is the "liquidity/inventory hypothesis", i.e., due to the dealers inventory and pricing policy and the need to maintain the inventories within a certain optimum range. In the period prior to the earnings and dividend announcement, the uninformed investors may sell their holdings of a firm's securities to minimize their risk exposure due to the uncertainty associated with the contents of the announcement. Amihud and Mendelson (1980) show that the dealer's bid and ask prices decrease as the dealers inventory increases beyond an optimal point, and that the dealer will lower the bid price more than the ask price to discourage sellers. Hence, the entire analysis (with the test statistics) has been repeated for ask prices and bid prices. If there is a systematic decrease in the bid and ask prices with the decrease in the bid prices being greater than the decrease in the ask prices, and an associated increase in the trading volume in the days prior to the announcements, there is reason to believe that the liquidity\inventory hypothesis is a valid description of events. A more direct test of this has been made by examining the behavior of the adverse selection cost component itself.

8. To test the behavior of unexpected bid-ask spread in the presence of non-normalities, Corrado's Rank Test statistic has also been estimated over the event periods. This statistic involves the ranking of each $U_{i,t}$, where t = 1 to 152 days in the estimation and event period. Further:
(i) $K_{i,t}$ = rank ($U_{i,t}$)
(ii) $J_{i,t}$ = ($K_{i,t}$ - 76.5), where 76.5 is the average rank over the 152 days.
For each t=127 to 152 days, the z-statistic is computed as follows:

$$\bar{J}_t / \hat{s}\,(\bar{J}_t)$$

where,

$$\bar{J}_t = \frac{1}{N}\sum_{i=1}^{N} J_{i,t}$$

and,

$$\hat{s}(\bar{J}_t) = \sqrt{\frac{1}{152}\sum_{t=1}^{152} (\bar{J}_t)^2}$$

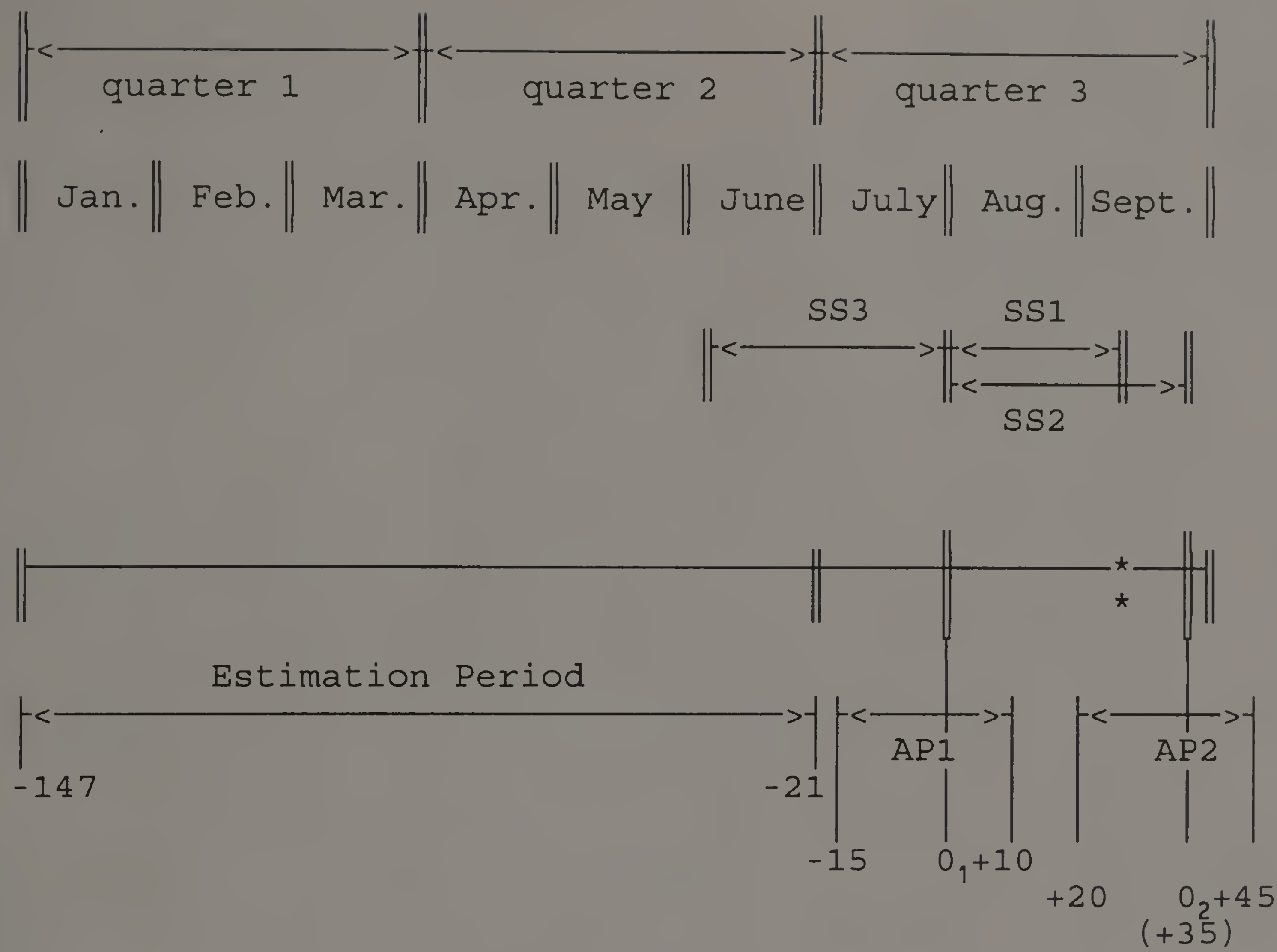
9. The Hausman specification test is used to examine the exogeneity of the relevant endogenous variables on the right-hand side of each of the structural equations. The null hypothesis of this test is that there is no simultaneity in the structural equations, i.e., the variables $S_{i,t}$ and $TV_{i,t}$ are in fact exogenous in nature. If the study fails to reject the null hypothesis, the first structural equation of the model can be estimated by using Ordinary Least Squares to get consistent and efficient estimates. The results are discussed in Chapter 4.

10. The first structural equation controls for the inventory and order processing costs of the spread assuming that the adverse selection costs are uncorrelated and orthogonal to these components. In the first structural equation of the estimation model, price proxies for the minimum holding cost and the capital locked up for a security's market making. Price is positively related to the quoted spread. The trading volume variable proxies for the holding period of the dealer and is negatively related to the total spread. The risk variable is positively related to the spread. As the absolute change in price increases, the dealer's risk of holding a non-diversified portfolio increases and, hence the spread. The choice of the proxies for the holding and the order processing costs (i.e. price, trading volume and risk) and the rationale behind them is based on Morse and Ushman (1983), Stoll (1978), Branch and Freed (1977), and, Glosten and Harris (1988). The second structural equation accounts for the dealer's inventory policy, which involves adjusting the spread to keep the inventory levels within the optimal range (Amihud and Mendelson, 1980), after adjusting for market-wide movements. Note that the market volume variable is the aggregate market volume of firms in the sample. The lagged variables account for possible first-order autocorrelation in volume (Ajinkya and Jain,1989) and spread (Conrad and Niden,1990; Seyhun,1986). Similar structural equations were used by Hegde and Miller (1989), Conrad and Niden (1990), Glosten and Harris (1988) for cross-sectional studies.

11. In addition, the Rank Test of Corrado (1989) has been carried out on the adverse selection cost component proxy or the abnormal spread as was done with unexpected spread.

12. Hasbrouck (1991) uses a vector autoregressive approach to look at the cumulative quote revision to measure the information content of stock trades (or, trade innovations) over time. Such a measure will look at the persistent impact on the price of information arrivals as opposed to immediate impacts on price due to transient liquidity considerations. Hasbrouck suggests that the full information effect of a trade on security price is felt with

12. Hasbrouck (1991) uses a vector autoregressive approach to look at the cumulative quote revision to measure the information content of stock trades (or, trade innovations) over time. Such a measure will look at the persistent impact on the price of information arrivals as opposed to immediate impacts on price due to transient liquidity considerations. Hasbrouck suggests that the full information effect of a trade on security price is felt with a protracted lag and is not instantaneous. Unlike transient inventory related effects on price, the information impact of a trade persists over a period of time and, according to Hasbrouck, is the ultimate impact of the stock price or quote resulting from the unexpected component of the trade.



KEY

AP1 = Analysis period for first or joint announcements [-15,+10] made on 0_1

AP2 = Analysis period [+20,+45] for second (dividend) announcement (0_2), for e.g., on +35

* = Earliest possible second announcement date i.e. +25

SS1 = Sample selection criteria 1: Second announcement should be at least 25 days after the first announcement. Firms with second announcements in the [0_1,+25] window have been omitted

SS2 = Sample selection criteria 2: Second announcement no later than 35 days after the first one

SS3 = No other confounding events in the [-35,0_1] window

NOTE: 21 trading days per calendar month assumed

Analysis of Quarter Two Results: Research Design

Figure 1

CHAPTER 4

DATA DESCRIPTION, RESULTS AND DISCUSSION

In this chapter, a brief description of the sample data, and the results of the Hausman specification test will be provided along with a discussion of the normality of the spread variable. Further, the results of the univariate tests and the cross-sectional tests will be discussed for each hypothesis.

The initial three hypotheses relate to the behavior of the unexpected spread and log spread in the event \riods. The rest of the hypotheses relate to the abnormal spread which is taken to be the proxy for the adverse selection cost component of the spread. The hypotheses have been grouped together as follows:

HYPOTHESIS NO.	REMARKS
1. H1 AND H4	Full sample hypotheses
2. H2 and H5	Differential information hypothesis
3. H3 and H6	Quality of earnings hypothesis
4. H7	Signal sequencing hypothesis

The discussion of the hypotheses results is in the sequence mentioned above. In all cases, initially, the detailed results for unexpected spread and log spread have been presented. Detailed results for the daily volume and log volume variables have been reported as endnotes. These results are followed by the detailed results for abnormal spread and log spread for the same set of portfolios.

Finally, based on these detailed results, the implications of these results for each set of hypotheses has been fleshed out in a separate section. Explanations for the results based on the adverse selection cost theory of Copeland and Galai (1983) and Glosten and Milgrom (1985) have been examined. Alternate explanations for those results not consistent with this theory have also been forwarded. Further, for the purposes of this analysis, the event period has been divided into three sub-periods (i) the pre-announcement period from day -15 to day -2, (ii) the announcement period from day -1 to day 0, and, (iii) the post-announcement period from day +1 to +10.

4.1 Data Description

The final sample consists of 54 firms and 153 firm events i.e. earnings announcements (Table 1). Out of the 153 earnings announcements, 73 firm events have subsequent dividend announcements. The rest (Table 2) are either joint earnings and dividend announcements (36 firm-events) or sole earnings announcements (44 firm-events). The sample (Table 3) is well spread out over the five sample years from 1985 to 1989 with no year-wise clustering of firm-events . While a majority of the firms in the sample (Table 4) are from various manufacturing industries, there is a cluster of firms from the banking sector and may cause some cross-sectional dependence in the behavior of the bid-ask spread in the event period. Hence, the Brown and Warner test statistic which accounts for such cross-sectional dependence has been used in this study for the univariate tests. An overall description of the estimation period sample means for spread, volume, price and firm has been provided in Table 5. In addition, Tables 6 and 7 describe the quality of earnings variables and the median scores for each portfolio, while Tables 8 and 9 list the yearwise sample means of the differential information portfolios.

Table 11 describes the effect of the log transformation on the bid-ask spread. The proportion of firm-events with a coefficient of skewness and kurtosis that is significantly different from the expected value of zero for a normal distribution reduces significantly after log-transformation of the spread variable. This analysis is based on a Chi-square test of proportions at 95% confidence levels[1]. Hence, the univariate tests have also been carried out for log spread. However, there is some degree of non-normality still present in the log spread variable. Hence, to further verify the robustness of the parametric results, the Corrado Rank Test, a non-parametric test, has also been estimated at the univariate level.

4.2 The Simultaneous Equation Estimation Models

The Hausman specification test[2] (Table 13) was carried out to test the endogeneity of the volume variable in the spread equation and, at the same time, the spread variable in the volume equation. A Chi-square goodness of fit test was carried out at 95% confidence levels to test the significance of the proportion of firm-events for which the null hypothesis of exogeneity was rejected. Overall, the results demonstrate that these variables are endogenous in nature for a significant proportion of firm-events[3].

For both the spread and the log spread equation, all independent variables have a positive mean coefficient (Tables 14 and 15). Interestingly, the mean R-square does not change with the log transformation of the structural models. In both versions, lag spread and the risk variable are significant a larger proportion of times[4] compared to the other independent variables. Table 16 provides the mean reduced form coefficients (the impact multipliers) which quantify the change in spread (log spread) for a unit change in the independent variable.

The detailed results of the various sets of hypotheses have been presented below in the remaining sections.

4.3 Hypothesis 1 (H1): Univariate Results

This hypothesis relates to the behavior of the unexpected spread and log spread surrounding earnings and dividend announcements.

The results for the earnings signal are provided first followed by the results for the dividend announcements.

4.3.1 The Earnings Signal

There is no evidence of any significant increase or decrease in the bid-ask spread around second quarter earnings (Table 17).

The results for log spread are, essentially, the same as the results obtained for spread. However, in the pre-announcement period the decrease in spread is significant on days -11 and -4. These results are confirmed by the Rank test-statistic at lower significance levels.

4.3.2 The Dividend Signal

There are no significant changes in the daily spread around the dividend signal issued after a second quarter earnings announcement (Table 19), except for significant decreases in the spread on days -9, -2, and -1 as per the Rank test-statistic. With the log transformation, however, there is evidence of a significant spread decrease on day -10 in the pre-announcement period. While log spread increases on days 0 and +1, the increase is significant only on day +1, and is not corroborated by the Rank test-statistic. After the announcement, there are significant decreases in the daily spread and log spread on day +4 and +6.

4.3.3 Univariate Test Of H1: Observations on the Earnings and Dividend Signals

Based on the results of the univariate tests, there do not appear to be any significant changes in the daily spread and log spread around the earnings signal[5] except for significant decreases on certain days in the pre-announcement period. However, there is some evidence of significant changes in the daily log spread around the dividend announcement[6] in the pre and post-announcement period.

4.4 Hypothesis 4 (H4): Univariate Results

This hypothesis relates to the behavior of the abnormal spread and log spread surrounding earnings and dividend announcements. The abnormal spread and log spread proxy for the adverse selection cost component of the spread.

The behavior of the abnormal spread and log spread surrounding the earnings announcement is examined first, followed by an examination of the results for the dividend announcement.

4.4.1 The Earnings Signal

No significant change in the abnormal spread is observed during the event period (Table 53). However, there are significant decreases in the abnormal log spread on days -11, -6, and -4 in the pre-announcement period. These results are also documented by the Rank test-statistic. There is evidence of non-significant increases in abnormal spread and log spread on days -1 and 0. In the post-announcement period, significant decreases in the abnormal log spread are observed on day +1 and +6. Some evidence of this decrease is also provided by the Rank test-statistic for the days +1, + 6, +9, and +10.

4.4.2 The Dividends Signal

In the pre-announcement period, as per the parametric tests, abnormal spread and log spread decrease significantly on days -15 and -10 (Table 54). As per the Rank test, the days of significant decrease are -9 and -2. Interestingly, the non-parametric tests provide some evidence of an increase in abnormal spread on day -12.

While there is some evidence of an increase in abnormal spread on day 0 as per the Brown and Warner test-statistics, these results are not supported by the Rank test-statistic. Abnormal log spread increases significantly on day +1, the day after the announcement. Similarly, there is a significant decrease in abnormal spread on day +6 which is not corroborated by the Rank test-statistic. However, abnormal log spread does decrease significantly on days + 6 and +7. Significant decreases in abnormal log spread are also evident on days +2 and +4 (the latter day is confirmed by the Rank test-statistic).

4.4.3 Univariate Tests of H4: Observations on the Earnings and Dividend Signals

For the earnings signal, there are significant decreases in the dependent variable in the event period. The evidence is mixed for the dividends signal. There is evidence of significant decreases in the pre-announcement period. As per the Rank test only, there is weak evidence of an increase in abnormal spread on day -12. Abnormal log spread significantly increases on the day after the dividend announcement.

4.5 Overall Conclusions: Full Sample Hypothesis

4.5.1 The Full Sample Hypotheses (H1 and H4): Results for the Earnings Signal

The results for the pre-announcement period demonstrate that there are significant decreases in the daily bid-ask spread and log spread. This may be due to a decrease in either the order processing and the holding cost component or the adverse selection cost component, or, both. In the pre-announcement period there is no increase in the daily volume (see footnote 5). Given that there is evidence available in other studies that would indicate that return variances and, therefore, risk does not decrease in this period (Patell and Wolfson (1982), Chari, et. al (1988)), it is reasonable to assume that there is no decrease in the order processing and holding cost components of the spread. Hence, the significant decreases in the daily bid-ask spread may possibly be explained by the significant decreases in the adverse selection cost component proxies in the pre-announcement period. This suggests that there is a decrease in the market makers' perception of the relative information asymmetry in the environment prior to second quarter earnings announcements of OTC firms. Assuming that insiders and other informed traders possess finer information than the market-makers (Glosten and Milgrom, 1985), this may imply the following:

(i) that the ratio of the informed to the uninformed arrival rates does not increase given the SEC "abstain or disclose" requirements[7];

(ii) that the uniformed demand and supply is inelastic and the market-makers can easily recoup the losses suffered in the hands of informed traders;

(iii) that insiders do trade around such announcements despite SEC regulations but the market-makers perceive such trades and the subsequent earnings signals as joint signals that complement each other (see John and Mishra, 1990)[8].

The decrease in the abnormal spread in the post-announcement period (days +1 and +6), given the increase in volume on day -1 and 0, suggests that there is a decline in the adverse selection costs and the perceived level of information asymmetry in the environment once the earnings information is impounded in the prices (Glosten and Milgrom, 1985).

4.5.2 The Full Sample Hypotheses (H1 and H4): Results for the Dividends Signal

In the pre-announcement period -15 to -10 log volume decreases significantly (see footnote 6). The Rank test-statistic demonstrates a decrease in volume in this period especially a weakly significant decrease on day -13. Assuming that risk levels remain the same, in this time period, this suggests an increase in the order and holding cost components of the spread. Hence, the decrease in log spread on days -15 and -10 is driven by the significant decrease in abnormal log spread on the same days. Similarly, as per the Rank test-statistic abnormal spread decreases on day -9. However, there is weak evidence of an increase in abnormal spread on day -12, as per the non-parametric test results, which reflect increased perceptions of informed trading on that day.

In the rest of the pre-announcement period, log volume increases significantly on day -7 and -5, and declines on days -4 and -2. The decrease in volume on day -1 is significant as per the Rank test-statistic. As per the Rank test-statistic, abnormal spread declines on day -2 and -1 causing a significant decrease in the bid-ask spread on days -2 and -1. There is an increase in the bid-ask spread and abnormal spread on day -3 possibly due to informed trading on day-3.

These results in the pre-announcement event period suggest that the market-makers perceive a decrease in the relative information asymmetry prior to dividend signals given the "abstain or disclose" requirements of the SEC. An alternate explanation may relate to the insider trade data that is filed with the SEC for trades made by insiders around the earlier earnings announcement[9]. The market makers have access to such public information and may view such trades as signals that complement the information contained in the earnings announcements. Hence, the associated decrease in the perceived information asymmetry in the pre-announcement period. However, the increase in abnormal spread on day -3 is not consistent with the hypothesis that insider trades are viewed as informative joint signals by investors.

The increase in the log spread variable on day +1 may be driven by increased order processing and holding costs given increased risk levels and, also, by an increase in the adverse selection costs (abnormal log spread increases on day +1). This suggests that the dividends signal contains information that is perceived to be noisy in nature. Note that while this particular result is not corroborated by the Rank test-statistic, there is evidence of an increase in adverse selection costs on day +9 based on the non-parametric results. The significant decreases in the abnormal spread on days +2, +6 and +7 in the post-announcement period reflects the reduced level of information asymmetry once information gets impounded in the stock price.

4.6 Hypothesis 2 (H2): Univariate and Cross-sectional Results

This hypothesis relates to the behavior of unexpected spread and log spread surrounding earnings and dividend announcements across differential information portfolios.

The univariate results for the earnings signal and the dividend signal have been documented initially. Due to inadequate sample size, only the results for the analysts' following based differential information portfolios have been discussed for the dividend announcement. Following this discussion of the univariate results, the cross-sectional results for both earnings and dividend announcements have been provided.

4.6.1 The Low Differential Information Portfolio: Univariate Results for the Earnings Signal

4.6.1.1 Firm Size Based Portfolio

There is no significant change in the daily spread and log spread in the event period surrounding the earnings signal except for a significant decrease on day +6 (Table 21). Note that as per the Rank test-statistic, this is a non-significant decrease.

4.6.1.2 Analysts' Following Based Portfolio

The evidence is very similar to the firm-size based portfolios (Table 22). There is no evidence of a change in the daily spread and log spread in the event period except for a significant decrease in the spread and log spread on day +6. In addition, as per the Rank test-statistic, abnormal spread decreases significantly on day -9.

4.6.2 The Medium Differential Information Portfolio: Univariate Results for the Earnings Signal

4.6.2.1 Firm Size Based Portfolio

Both spread and log spread demonstrate a significant decreases in the daily spread and log spread on days -11 and -3 in the pre-announcement period (Table 25). This is followed by a significant increase in the spread and log spread on the announcement day in the Wall Street Journal

(WSJ), i.e. day 0. In addition, spread and log spread demonstrates a significant decrease on day +10.

4.6.2.2 Analysts' Following Based Portfolio

Both spread and log spread (Table 26) demonstrate a significant increase on day 0, the day of announcement of earnings in the WSJ, as per the parametric tests. However, these results are not confirmed by the Rank test-statistic.

4.6.3 The High Differential Information Portfolio: Univariate Results for the Earnings Signal

4.6.3.1 Firm Size and Analysts' Following Based Portfolios

Both spread and log spread decreases significantly on day -4 for both types of differential information portfolios (Tables 29 and 30).

4.6.4 Univariate Tests on H2: Observations on the earnings Signal

For the low differential information portfolios, with and without log transformation of spread, there are no significant changes in the dependent variable except for some weak evidence of a significant decrease on day +6[10].

All the medium differential information portfolios show a significant increase in daily spread and log spread on day 0 with a significant decrease on day +10. In addition, for the firm size based portfolios there are significant decreases on days -11 and -3 in the pre-announcement period[11].

Essentially, the high differential information portfolios show no significant change in daily spread and log spread in the event period[12] except for a significant decrease on day -4.

Hence, other than the significant increase in the dependent variables on the day of the announcement for the medium differential information portfolios there appear to be no significant differences in the behavior of the daily spread and log spread between portfolios across all univariate tests.

4.6.5 The Low Differential Information Portfolio: Univariate Results for the Dividend Signal

Both unexpected spread and log spread demonstrate significant decreases (Table 33), as per the Brown and Warner test-statistics, in the initial eight days of the pre-announcement period. This evidence is weakly supported by the Rank test-statistic. There is some evidence of increases in spread on days -6 and -3. Unexpected log spread decreases on day -1 and, in addition, both unexpected spread and log spread decrease significantly on day +1 in the post-announcement period. In the rest of the post-announcement period there are days of significant decreases in unexpected log spread[13].

4.6.6 The Medium Differential Information Portfolio: Univariate Results for the Dividend Signal

There is a significant decrease in unexpected log spread on day -15 and day -2 (Table 35). The latter decrease is confirmed by the Rank test. Unexpected log spread decreases significantly on day +2 and day +7 as per the parametric tests[14].

4.6.7 The High Differential Information Portfolio: Univariate Results for the Dividend Signal

There is no significant increase in unexpected log spread (Table 37) but there is evidence of a significant increase on day -14 and -1 as per the non-parametric test. While the Rank test-statistic demonstrates no significant change in this variable over the post-announcement period, unexpected log volume decreases significantly on day +7[15].

4.6.8 Univariate Tests of H2: Observations on the Dividend Signal

The low differential information portfolio demonstrates weak evidence of decreases in spread followed by increases in spread in the pre-announcement period. Unexpected log spread decreases significantly on day -1. Unexpected spread and log spread increase significantly on the day after the announcement and, then, demonstrate evidence of significant decreases in the post-announcement period.

The medium differential information portfolio demonstrates significant decreases in spread on days -15 and -2. There is a significant decrease in unexpected spread on day -1 as per the Rank test-statistic. In the post-announcement period, significant decreases are evident for the unexpected log spread variable.

The high differential information portfolio demonstrates no significant change in unexpected spread and log spread except for a significant increase on day -14 as per the Rank test-statistic. Similarly, as per the Rank test-statistic, there is evidence of a significant increase in spread. In the post-announcement period, there is no significant change in the dependent variables except for a significant decrease on day +7.

4.6.9 Cross-sectional Tests on Cumulative Standardized Unexpected Spread and Log Spread: Results for Earnings and Dividend Signals

The results of the analysts' following based portfolios are discussed first (Tables 88 to 93). For cumulative standardized unexpected spread, none of the coefficients (i.e. of $INFO1_i$ and $INFO2_i$) were significant. In addition, the overall regression F-statistics were not significant in all cases. This suggests that there is no significant difference in the cumulative standardized unexpected spread across differential information portfolios. Identical results were obtained for cumulative standardized unexpected log spread suggesting no significant differences in cumulative standardized unexpected log spread between the low and medium differential (low and medium analysts' following) and the high differential (high analysts' following) groups. The results for the firm-size based portfolios are discussed next (Tables 47 to 52).

Both, the coefficient of $INFO2_i$ as well as the overall regression are significant with the firm size and earnings noise combination with cumulative standardized unexpected log spread as the dependent variable (Table 49). This coefficient was significant and negative at reduced probability levels in the case of cumulative standardized unexpected spread. The significant negative coefficient suggests that the cumulative decrease (increase) in the cumulative standardized unexpected log spread was significantly larger (smaller) for medium differential information firms than firms in the high differential information portfolio based on firm size, after controlling for the effect of other covariates. A study of the means demonstrates that, without adjusting for the influence of other covariates, there is a cumulative decrease in the standardized unexpected log spread for the medium differential information firms and a cumulative increase in the standardized unexpected log spread for the high differential information firms (Table 47). Further, for both standardized unexpected spread and log spread the cumulative decrease for the low differential portfolio is lower than the decrease for the medium differential information portfolio.

None of the other firm-size based cross-sectional regressions were significant (Tables 51 and 52).

4.7 Hypothesis 5 (H5): Univariate and Cross-sectional Results

This hypothesis relates to the behavior of abnormal spread and log spread surrounding earnings and dividend announcements across differential information portfolios.

The univariate results for the earnings signal are discussed first. The results surrounding the dividend announcement are examined next. For the dividend signal only the analysts' following based differential information portfolios have been examined for sample size reasons. Finally, the cross-sectional results relating to both types of announcements have been discussed.

4.7.1 The Low Differential Information Portfolio: Univariate Results for the Earnings Signal

4.7.1.1 Firm Size Based Portfolio

While the daily abnormal spread and log spread (Table 55) demonstrate non-significant decreases in the pre-announcement period, the decrease in the log abnormal spread is significant on day -11. Both abnormal spread and log spread decrease significantly on days +2 and +6. However, as per the Rank test only the decrease on day +6 is significant.

4.7.1.2 Analysts' Following Based Portfolio

While there is a significant decrease, as per the Brown and Warner tests, in the abnormal spread on day -11, both abnormal spread and log spread show non-significant decreases in the rest of the pre-announcement period. The decrease in abnormal spread on day -9 is significant as per the Rank test-statistic (Table 56). Both variables display non-significant increases on day -1 and 0. There is a significant decrease in the abnormal spread and log spread on days +2 and +6. In addition, as per the Rank test there is weak evidence of a decrease on day +8.

4.7.2 The Medium Differential Information Portfolio: Univariate Results for the Earnings Signal

4.7.2.1 Firm Size Based Portfolio

Both, abnormal spread and log spread demonstrate significant decreases on days -11,-7,-4,and -3 in the pre-announcement period (Table 57). Daily abnormal spread and log spread increases significantly on day 0, though this increase is not significant according to the Rank test-statistic. In the post-announcement period the variables decrease significantly on days +1,+3,+7,+8, and +10.

4.7.2.2 Analysts' Following Based Portfolio

On days -11 and -4 in the pre-announcement period there are significant decreases in abnormal spread and log spread (Table 58). In addition, daily abnormal log spread decreases significantly on day -6. Both abnormal spread and log spread demonstrate a significant decrease on day +1, the day following the announcement.

4.7.3 The High Differential Information Portfolio: Univariate Results for the Earnings Signal

4.7.3.1 Firm Size and Analysts' Following Based Portfolios

There is no significant change in the daily abnormal spread and log spread for both firm size based and analysts' following based portfolios (Tables 59 and 60) except for a significant decrease on day -4. In addition, the analysts' following based portfolios demonstrates a significant decrease on day -10 as per the Rank test-statistic.

4.7.4 Univariate Tests of H5: Observations on the Earnings Signal

The low differential information firms demonstrate evidence of some non-significant decreases and some significant decreases (day -9 and -11 for abnormal spread for the analysts' following based portfolio and, also, for log abnormal spread for the firm size based portfolio) in the pre-announcement period. For none of the low differential information portfolios is the increase in the abnormal spread and log spread on day -1 and 0 significant. However, both variables decrease significantly on day +2 and +6 in the post-announcement period.

The medium differential information firms have days of significant decrease in abnormal spread and log spread in the pre-announcement period. While the firm size based portfolios show significant decreases on several days in the post-announcement period, the analysts' following based portfolios show significant a decrease only on day +1 followed by non-significant decreases after this day.

While there is a significant decrease in abnormal spread and log spread on day -4 (and on day -9 for the analysts' following based portfolio), the high differential information firms essentially demonstrate no significant change in the event period.

4.7.5 The Low Differential Information Portfolio: Univariate Results for the Dividend Signal

The Brown and Warner test-statistic based results are discussed initially followed by the results of the non-parametric test (Table 61).

Both abnormal spread and log spread decrease significantly from day -15 to day -8. While abnormal spread increases significantly on days -6 to -3, abnormal log spread increases significantly only on day -3 in the pre-announcement period. There is a significant increase in abnormal spread on days 0 and +1 followed by significant decrease on day +2, +4, and +6. While daily abnormal log spread increases on days 0 and +1 the change is significant only on the latter day. In the post-announcement period, abnormal log spread decreases significantly on day +2 and +4. Interestingly, abnormal spread demonstrates a significant increase on day +7.

It is evident that there are significant non-normalities existing in this portfolio. The results based on the Rank test statistic are much weaker. According to these results, there is a significant decrease on day -9. The increase on day -6 is significant only at reduced levels of significance as is the case with the decrease on day +2. In sum, there is weak evidence of a decrease followed by an increase in the pre-announcement period.

4.7.6 The Medium Differential Information: Univariate Results for the Dividend Signal

The results of the parametric tests are discussed first. There is a significant increase in daily abnormal spread on day -8 followed by a significant decrease on day -1 (Table 62). The increase on day 0 is not significant but is succeeded by significant decreases on day +1 and +7 in the post-announcement period.

The evidence is very similar with abnormal log spread. This variable shows a significant decrease in the spread on day -5, a mild decrease on day -1 in the pre-announcement period and no significant increase on day 0. The daily abnormal log spread decreases significantly on day +1, +3, and +7 in the post-announcement period.

The Rank test-statistic confirms only the decrease in abnormal spread on day +1. On the other hand, there is weak evidence of an increase on day -12 followed by a decrease on day -11.

4.7.7 The High Differential Information: Univariate Results for the Dividend Signal

For the high differential information portfolio (Table 63), there is no significant change in the daily abnormal spread in the event period except for a significant increase on day -14. However, daily abnormal log spread shows significant increases on day -14 and day -11 as well as a significant decrease on day -10. Interestingly, in the post-announcement period, there is a significant increase on day +1 and +10 for the abnormal log spread. These last results are not confirmed by the Rank test-statistic.

4.7.8 Univariate Tests on H5: Observations on the Dividend Signal

The low differential information portfolio shows weak evidence of a significant decrease followed by a significant increase in the pre-announcement period. The increase in the abnormal log spread on day +1 is significant but not corroborated by the non-parametric results. There is some evidence of significant decreases in abnormal spread and log spread in the post-announcement period based on the parametric tests.

Unlike the low differential information portfolio, the medium differential information portfolio displays a significant decrease only on days -5 and -1, for abnormal log spread, and day -11 for abnormal spread as per the Rank test-statistic. The increase on the announcement day is not significant. In the post-announcement period abnormal log spread decreases significantly on days +1,+3, and +7.

The high differential information firms demonstrate a significant increase in the abnormal spread and log spread on day -14. In addition, abnormal log spread shows a significant increase on day -11 followed by a significant decrease on day -10. These results are not evident on examining the Rank test-statistic for these days. Abnormal log spread increases significantly on days +1 and +10 in the post-announcement period.

4.7.9 Cross-sectional Tests on Cumulative Standardized Abnormal Spread and Log Spread: Results for Earnings and Dividend Signals

4.7.9.1 Analysts' Following Based Portfolio

For the analysts' based portfolios, none of the coefficients (i.e. $INFO1_i$, $INFO2_i$, $INFO1_i*QE_i$, $INFO2_i*QE_i$) are significant (Table 106 and 107). This suggests that there is no significant difference in the cumulative change in the standardized abnormal spread and log spread across the differential information portfolios. Further, for both the low and medium differential information portfolios, there is no significant change in the cumulative standardized abnormal spread and log spread with a change in the quality of the earnings signal.

4.7.9.2 Firm Size Based Portfolio

The evidence is mixed for the firm size based portfolios depending on whether the quality of earnings variable is defined by the earnings noise measure or the earnings predictability measure. However, in all cases the overall regression F-statistic is significant.

With the earnings noise measure as the basis, the coefficient of $INFO1_i$ (i.e. the low differential information group) is significant and positive (Tables 73 and 74). On the other hand, the coefficient of $INFO2_i$ (i.e. the high differential information) is not significant. The direction of the $INFO1_i$ coefficient is as hypothesized. It suggests that the cumulative increase (decrease) in the cumulative standardized abnormal spread and log spread will be greater (smaller) for the low differential information firms as compared to the high differential information firms. However, the portfolio means (Table 72) demonstrate a cumulative decrease in the dependent variables for the low differential information portfolio while there is an cumulative increase for the high differential information firms[16].

With earnings predictability measures as a basis of classifying firms into quality of earnings portfolios (Table 76), the coefficient for the low differential information portfolio is not significant ($INFO1_i$) but the coefficient of the medium differential information portfolio ($INFO2_i$) is significant and negative for cumulative standardized abnormal spread only. This suggests that the cumulative decrease (increase) in the standardized abnormal spread is greater (smaller) for the medium differential information firms than that of the high differential information firms. Note that it was hypothesized that the sign of this coefficient would be positive and that the medium differential information firms would have a larger increase, or, a smaller decrease than the large firms. In fact, a study of the portfolio means suggests a cumulative decrease in the dependent variable for the medium differential information firms and a cumulative increase for the high differential information firms (Table 75). Further, the cumulative decrease in the standardized unexpected spread and log spread (Table 76) is greater (smaller) for the firm size (analysts' following) based portfolio.

4.7.10 Overall Conclusions: The Differential Information Hypotheses (H2 and H5)

The implications of the results of the differential information portfolios are discussed in the next few sections.

4.7.10.1 Differential Information Portfolios: Earnings Signal

For the low differential information portfolios the pre-announcement period is characterized by a decrease in volume (see endnote 10) with some evidence of decreases in spread, log spread, abnormal spread and log spread in the same period especially on day -9. With the decrease in the volume (assuming that risk levels remain constant for the market makers) these results imply an increase in the order processing and holding cost components in the pre-announcement period which have been compensated by a decrease in the adverse selection costs. Following a significant increase in volume on the announcement day , it is not surprising to observe significant decreases in the adverse selection cost proxies in the post-announcement period. The latter result reflects the fact that the information from the public disclosure has been impounded in the security price.

In the case of the medium differential information portfolios and especially for the firm-size based portfolios, there is weak evidence of significant decreases in the volume variable (see endnote 11) in the pre-announcement period. The decrease in spread in the pre-announcement period, hence, seems to be driven by the reduced levels of information asymmetry as evidenced by significant decrease in abnormal spread and log spread. The increase in bid-ask spread on day 0 may be driven by an increase in the order and holding cost component due to an increase in the perceived levels of risk and no change in the trading volume. The adverse selection costs do not change significantly in this period. For this portfolio, there is evidence that the adverse selection costs decrease after the earnings announcement starting with day +1.

In the case of the high differential information portfolios there are significant increases in the volume variable (see endnote 12) on days -1 and 0. However, there are no significant changes in the adverse selection cost component proxies over the entire event period.

4.7.10.2 Differential Information Portfolios: Dividends Signal

The low differential information portfolios demonstrate some evidence of a significant decrease (day -9) in the adverse selection cost component proxies followed by significant increase (day -3 for abnormal log spread and day -6 for abnormal spread) in the same, in the pre-announcement period. The significant increase in the pre-announcement period and on the announcement day are consistent with the theory of Copeland and Galai (1983) and Glosten and Milgrom (1985), that predicts such an increase in the adverse selection costs with an increase in rate of informed trading. On the other hand, the initial significant decreases in these costs are not consistent with this theory. These decreases suggest that the market makers perceive a reduction in the relative level of information asymmetry in the environment and, hence, reduced adverse selection costs. This sequence of decreases in the adverse selection costs followed by a sequence of increases in the same is puzzling. There is some evidence on significant decreases in the post-announcement phase. This reduction in the adverse selection costs in the post-announcement period implies that the information contained in the dividends signal has been impounded in the security prices.

The medium differential information portfolios demonstrate significant decreases in the adverse selection costs in the pre-announcement period. There is weak evidence of an increase in these costs as per the Rank test. However, there is strong evidence of a decrease in these costs on day +1 in the post-announcement period. A decrease in the adverse selection costs implies that the market makers perceive a reduction in the relative level of information asymmetry.

In contrast, in the case of the high differential information portfolio there is evidence of significant increases in abnormal log spread on days -14 and -11 followed by a significant decrease in the abnormal log spread on day -10. This is consistent with the adverse selection theory which predicts an increase in the adverse selection costs with the arrival of informed traders and a subsequent decrease in these costs as information is impounded by the market. As per the Rank test-statistic abnormal spread increases on day -14 and -1. There are significant increases in abnormal log spread on days +1 and +10 during the post-announcement period. The Rank test-statistic demonstrates non-significant increases on these days. The results suggest that the market makers of firms in the high differential information perceive an increase in the relative information asymmetry prior to dividends announcements and that this perception may be heightened after the dividend announcement. A possible explanation is that informed traders dealing with the high differential information firms, i.e. firms with relatively high market capitalization, are better able to disguise their trades[17].

4.7.10.3 Differential Information Portfolios: Cross-sectional Results

As indicated before the results for the firm size based cross-sectional regressions provide mixed evidence depending on whether the quality of earnings variable is measured by the earnings noise score or the earnings predictability score.

With firm size and earnings predictability as the defining variables, there is evidence to suggest that, after controlling for the effects of other covariates, the cumulative increase (decrease) in standardized abnormal log spread is smaller (greater) for small firms versus large firms. Similarly, the evidence suggests that the cumulative increase (decrease) in standardized abnormal log spread is smaller (greater) for medium size firms versus large firms. The cell means of the various portfolios (not adjusted for effect of covariates; Tables 75 and 76) reflect these underlying patterns as they demonstrate a cumulative decrease in the standardized abnormal spread and log spread for medium and low differential firms, and a cumulative increase for high differential information firms. These results suggest that earnings and dividend announcements are more efficient in reducing the relative information asymmetry of small and medium size firms than for the large firm environments.

An explanation for these results may be related to the fact that informed traders are better able to disguise their trades for the large market capitalization firms (see endnote 17). Hence, the results maybe compatible with the adverse selection cost theory that market makers increase the adverse selection costs in the presence of informed trades[18].

When earnings noise score is used to define quality of earnings the results are as hypothesized in Chapter 3. These results demonstrate that, after controlling for the influence of the other covariates, the increase (decrease) in cumulative standardized abnormal spread and log spread is greater (smaller) for small firms as compared to large firms. Given the results of Seyhun (1985), Chiang and Venkatesh (1988) and Hasbrouck (1991) that the probability of facing an insider increases inversely to the size of a firm, these results are not unexpected. The results suggest that the market makers perceive a larger degree of informed trade activity for small firms as compared to large firms and hence, the larger increase in the adverse selection costs for the former set of firms[19]. Note that the cell means, which represent the cumulative change in the standardized abnormal spread and log spread without adjusting for the effect of other covariates, do not mirror these results. Also, these results for the earnings noise score based portfolios are inconsistent with the results obtained for the earnings predictability score based portfolios.

4.8 Hypothesis 3 (H3): Univariate and Cross-sectional Results

This hypothesis relates to the behavior of the unexpected spread and log spread surrounding earnings announcement and dividend announcement across quality of earnings portfolios. The univariate results for the earnings predictability score based portfolios are examined first, followed by the cross-sectional results for both the earnings and the dividend announcements. Next, the univariate results for the earnings noise score based portfolios have been examined. In the case of this quality of earnings varaiable, the dividend announcement results could not be examined as the sample size was not adequate for reliable results. Further, the two low quality of eanings portfolios (earnings noise score equal to '7' and '8' could not be examined for the same reasons. Finally, the cross-sectional results for the earnings and dividend signals for the earnings noise score based portfolios are listed.

4.8.1 Earnings Predictability Score Based Portfolios: Univariate Results for the Earnings Signal

For the earnings predictability score only the extreme portfolios (i.e. earnings predictability score equal to '1' and '4') have been examined for sample size reasons. For the high quality of earnings portfolio with a score of '1', there are no significant changes in the daily spread and log spread in the event period (Table 39). For low quality of earnings portfolio with earnings predictability score equal to '4', there is a significant decrease in spread and log spread on day -11 followed by non-significant decreases in the spread in the pre-announcement period (Table 41). As per the parametric tests, there is some evidence of an increase in spread and log spread on day -1 with a non-significant increase on the announcement day. In the post-announcement period, the decrease in daily spread and log spread is significant on day +3[20].

4.8.2 Univariate Tests of H3: Observations on the Earnings Signal

Essentially the significant decreases in spread on days -11 and +3 distinguishes the low quality of earnings portfolio from the high quality of earnings portfolio. The latter portfolio demonstrates no significant changes in the event period.

4.8.3 Earnings Predictability Score Based Portfolios: Univariate Results for the Dividends Signal

For the high quality of earnings portfolio (Table 43), there is weak evidence of a significant increase in unexpected log spread on days -7 and -3. The increase on day -7 is also weakly supported by the Rank test. Unexpected log spread increases significantly on day +1 and decreases significantly on day +4. Both, unexpected spread and log spread decrease significantly on day +5. There is some evidence of a significant decrease in unexpected log spread on days +9 and +10 in the post-announcement period[21].

For the low quality of earnings portfolio (Table 45), there is a significant increase in unexpected log spread on day -14 with significant decreases on days -8 and -4.

Unexpected log spread decreases significantly on day -1. In the post-announcement period, unexpected log spread decreases significantly from days +3 to +9. The decreases in spread on day +4 and +5 are significant as per the Rank test[22].

4.8.4 Univariate Tests of H3: Observations on the Dividend Signal

The pre-announcement period of the low quality of earnings portfolio is characterized by a significant increase in spread followed by significant decreases in spread. The high quality of earnings portfolio demonstrates only some weak evidence of an increase in this period. In the announcement period, the low quality of earnings portfolio demonstrates weak evidence of a significant decrease while the high quality of earnings portfolio demonstrates no significant change. The high quality of earnings portfolio demonstrates a significant increase in unexpected log spread on day +1 followed by significant decreases in the post-announcement period. On the other hand, the post-announcement period of the low quality of earnings portfolio is characterized by significant decreases in the dependent variables.

4.8.5 Cross-sectional Tests on Cumulative Standardized Unexpected Spread and Log Spread: Results for Earnings and Dividend Signals

These set of cross-sectional regressions (Tables 92, 93, 51 and 52) have quality of earnings defined by the earnings predictability score based measure. In all these regressions, neither the coefficient for QE_i nor the coefficients for $INFO1_i*QE_i$ and $INFO1_i*QE_i$ the interaction terms) are significant. This suggests that there is no significant difference in the cumulative change in the standardized unexpected spread and log spread across earnings predictability based quality of earnings portfolios. For low and medium differential portfolio firms, a change in the quality of earnings does not significantly impact the cumulative change in the standardized unexpected spread and log spread.

Interestingly, the earnings predictability portfolio with a score of '1', i.e. high quality of earnings, is characterized by a cumulative increase while the low quality of earnings portfolio with a earnings predictability score of '4' is characterized by a cumulative decrease (Tables 50 and 91). This is true for both the dependent variables, i.e. standardized unexpected spread and log spread. Further, the quality of earnings portfolio with earnings predictability score equal to '2' demonstrates a cumulative decrease for both these dependent variables.

4.8.6 Earnings Noise Score Based Portfolios: Earnings Signal

For the earnings noise based quality of earnings variable, only portfolios with scores equal to '4' (high quality) to '6' (medium quality) could be examined as the remaining portfolios did not have sufficient sample size. Further, only the behavior of unexpected spread and log spread surrounding the earnings announcement has been examined.

The high quality of earnings portfolio (earnings noise score equal to '4') demonstrates a significant increase in spread and log spread on day 0 (Table 82). For the same portfolio, spread and log spread significantly decreases on day +7[23].

The high quality of earnings portfolio with earnings noise score equal to '5' was examined next (Table 84). There is a significant increase in daily spread and log spread on day -1 and 0[24]. However, the Rank test-statistic provides only weak evidence of an increase on day -14 and on day -1.

The quality of earnings portfolio with earnings noise score equal to '6' demonstrated no significant change in spread during the event period based on the parametric tests (Table 86). However, for the same portfolio there is a significant decrease in the log spread on days -11,-4, and -3 in the pre-announcement period[25]. The non-parametric tests confirm these results.

4.8.7 Univariate Tests of H3: Observations on Earnings Noise Portfolios

The high quality of earnings portfolios demonstrate a significant increase in spread and log spread on day 0, the announcement day. In addition, the earnings noise score equal to '5' portfolio has a significant increase in daily log spread and spread on day -1. On the other hand, the earnings noise score equal to '6' portfolio (medium quality of earnings) demonstrates significant decreases in daily spread and log spread on certain pre-announcement days. Due to inadequate sample size the low quality of earnings portfolios based on the earnings noise score could not be examined.

4.8.8 Cross-sectional Tests on Cumulative Standardized Unexpected Spread and Log Spread: Results for Earnings and Dividend Signals

Given the univariate results, it is not surprising to observe that the coefficient for QE_i is not significant when firm size (Tables 48 and 49) is used to classify firms into differential information portfolios. While the coefficient is significant and negative when analysts' following is used to form the differential information portfolios (Tables 89 and 90), the F-statistic for the overall regression itself is not significant. In all cases, the interaction terms between differential information and the quality of earnings is not significant.

To conclude, the results suggest that there is no significant difference in the cumulative change in standardized unexpected spread and log spread across earnings noise portfolios. However, there is weak evidence that suggests that as the quality of earnings reports decreases the cumulative change in the standardized unexpected spread and log spread increases, given analysts' following based differential information portfolios (Table

88). Interestingly, the earnings noise equal to '4' portfolio (high quality of earnings) demonstrates a cumulative increase in the standardized unexpected spread and log spread while the earnings noise equal to '6' portfolio (medium quality of earnings) demonstrates a cumulative decrease in the same variables. This parallels the results obtained for the earnings predictability score based portfolios which demonstrate similar results.

4.9 Hypothesis 6 (H6): Univariate and Cross-sectional Results

The results of the earnings predictability score based portfolios are discussed initially. For these portfolios, the results for the earnings signal are discussed first followed by the results surrounding the subsequent dividend signal. Finally, a discussion of the cross-sectional results for the earnings and the dividend signal is provided. The subsequent sections relate to the earnings noise based portfolios. As the sample size was not adequate for reliable interpretation, the performance of the abnormal spread and log spread around the dividend signal could not be examined for the latter portfolio. The cross-sectional results, however, relate to both types of announcements.

4.9.1 Earnings Predictability Score Based Portfolios: Univariate Results for the Earnings Signal

The high quality of earnings portfolio with earnings predictability score equal to '1' demonstrates no significant change in the abnormal spread and log spread during the event period (Table 64).

For the low quality of earnings portfolio with earnings predictability score equal to '4', daily abnormal log spread demonstrates a significant decrease on day -11 (Table 65). While abnormal log spread increases on days -1 and 0, the increase is significant only on day -1. The increase in the daily abnormal spread on day -1 and 0 is not significant as per the non-parametric tests. According to the non-parametric test-statistics, abnormal spread decreases significantly on day -4 as per the Rank test-statistic.

In the post-announcement period there is a significant decrease in abnormal log spread on day +3. The Rank test-statistic confirms the decrease in abnormal spread on day +3 and, in addition, demonstrates a significant decrease on days +9 and +10.

4.9.2 Univariate Tests on H6: Observations on Earnings Signal

There is no significant change in the daily abnormal spread and log spread for the high quality of earnings portfolios. The low quality of earnings portfolios demonstrate a significant increase on day -1 as per the parametric tests. However, the non-parametric tests do not corroborate these results. Further, abnormal spread and log spread decrease significantly on day -11 and on day +3. In addition, the Rank test-statistic points to a significant decrease on days +9 and +10.

4.9.3 Earnings Predictability Score Based Portfolios: Univariate Results for the Dividends Signal

The daily abnormal spread and log spread decrease significantly on days -10, -6 and -2 in the pre-announcement event period of the high quality of earnings portfolio as per the Brown and Warner test-statistic (Table 64). However, as per the non-parametric tests, only the decrease on day -6 is significant. In addition, abnormal spread decreases significantly on day -15 while abnormal log spread decreases significantly on day -14. As per the Brown and Warner test-statistic, abnormal spread increases significantly on the announcement day and decreases significantly on days +2, +4, +8 in the post-announcement period. There is a significant increase in daily abnormal spread on day +9. None of these changes are significant as per the Rank test. On the other hand, abnormal log spread decreases significantly on day +2, +4 and increases significantly on day +5. The increase in the daily abnormal log spread on day 0, however, is not significant.

In the case of the low quality of earnings portfolio, abnormal spread and log spread (Table 67) demonstrate a significant increase on day -14, -12, and -6 with a significant decrease on day -8 and -4. In addition, abnormal spread decreases significantly on day -3. While there is no significant change in the daily abnormal spread and log spread on days -1 and 0, there is a significant increase on day +1 as per the Brown and Warner test-statistics. In addition, abnormal log spread decreases significantly on day +7.

4.9.4 Univariate Tests of H6: Observations on the Dividend Signal

For the high quality of earnings portfolios there are significant decreases in the daily abnormal spread and log spread in the pre-announcement period though the results are weaker for the Rank test. On the other hand, the low quality of earnings portfolio demonstrates significant increases and decreases on some days in the pre-announcement period. Neither abnormal spread nor log spread demonstrate any significant change on days -1 and 0 for any of the quality of earnings portfolios. There are significant decreases in abnormal spread and log spread in the post-announcement period of the high quality of earnings portfolio as per the parametric test. However, the low quality of earnings portfolio demonstrates a significant increase on day +1 for abnormal spread and log spread as per the Brown and Warner test-statistic.

4.9.5 Results of the Cross-sectional Tests on the Cumulative Standardized Abnormal Spread and Log Spread: Earnings and Dividends Signal

The coefficient of QE_i is not significant in all the cross-sectional regressions (Tables 76,77,109 and 110). This suggests that there is no significant difference in the cumulative increase (decrease) in the standardized abnormal spread and log spread across the quality of earnings portfolios. Similarly, none of the interaction terms (i.e.

$INFO1_i*QE_i$ and $INFO2_i*QE_i$) are significant indicating that cumulative change in the standardized abnormal spread and log spread is not dependent on the level of differential information available in the environment.

An examination of the portfolio mean cumulative standardized abnormal spread and log spread (Table 75) reveals further information about the cumulative changes in the adverse selection costs without adjustments for the other covariates. The extreme earnings predictability score portfolios (i.e. earnings predictability score equal to '1' and '4') demonstrate a small cumulative decrease in the dependent variables. The middle two portfolios with earnings predictability score equal to '2' and '3', on the other hand, demonstrate a large decrease in the dependent variables with the former portfolio having the greater decrease.

4.9.6 Earnings Noise Score Based Portfolios: Univariate Results for the Earnings Signal

For the high quality of earnings portfolio with an earnings noise score of '4' both abnormal spread and log spread decrease significantly on day -6 and increase significantly on day -5 (Table 94). In the post-announcement period, the dependent variables decrease significantly on day +1 and +7.

In the case of the high quality of earnings portfolio with an earnings noise score of '5', daily abnormal log spread decreases significantly on day -5 (Table 95). Both abnormal spread and log spread increase significantly on day -1, the day before the announcement, and then decrease significantly on day +2. The Rank test confirms the significant decrease on day +2. The increase on day -1 is not significant as per this latter test.

There is evidence of significant changes in the abnormal spread and log spread prior to the earnings announcement for the quality of earnings portfolio with earnings noise score equal to '6' (Table 96). The abnormal log spread decreases significantly on days -11, -4, and -3.

4.9.7 Univariate Tests of H6: Observations on the Earnings Signal

The high quality of earnings portfolio (earnings noise score equal to '4') has some mixed evidence in the pre-announcement period. The dependent variables decrease on day -6 and increase on day -5. However, there are days with significant decreases in the post-announcement period. The high quality of earnings portfolio (earnings noise score equal to '5') shows a significant increase on day -1 (not significant as per the Rank test) followed by a significant decrease on day +2 (significant as per the Rank test). The quality of earnings portfolio (earnings noise score equal to '6') demonstrates significant decreases in the abnormal spread on certain days in the pre-announcement period.

4.9.8 Results of the Cross-sectional Tests on the Cumulative Standardized Abnormal Spread and Log Spread: Earnings and Dividends Signals

When analysts' following is used as the differential information variable the coefficients for quality of earnings and the interaction terms are not significant (Tables 106 and 107). With firm size (Table 73) as the independent variable defining differential information, however, the coefficient for quality of earnings (QE_i) is significant and positive for cumulative standardized abnormal spread. This is as expected and implies that as the quality of earnings decreases (i.e. as the earnings noise score increases), the cumulative change (increase or decrease) in the standardized abnormal spread will increase. The interaction term with the low differential information portfolio (i.e. $INFO1_i*QE_i$) is significant and negative suggesting that as the quality of earnings decreases the cumulative increase (decrease) in the dependent variable decreases (increases). In fact, for low differential information firms there is a cumulative increase in the standardized abnormal spread when the earnings noise score is equal to '4', i.e. high quality of earnings. At the same time for low differential information firms, there is cumulative decrease in the standardized abnormal spread when the earnings noise score is equal to '7', i.e. low quality of earnings.

For cumulative standardized abnormal log spread, the quality of earnings coefficient is not significantly different from zero but the interaction term $INFO1_i*QE_i$ is significant and negative as before. A study of the portfolio means (Table 72) reveals that the cumulative decrease in the abnormal spread and the abnormal log spread does increase as the earnings noise score increases except for the portfolio with a score of '5'. This portfolio demonstrates a small cumulative increase in the abnormal spread and a small cumulative decrease for the abnormal log spread.

4.10 The Overall Conclusions: Quality of Earnings Hypotheses (H3 and H6)

The results for these portfolios vary depending on the variable used to define the quality of earnings namely the earnings predictability score, or, the earnings noise score. Hence the results for the portfolios are discussed separately. Hence, the results for each set of portfolios are discussed separately. The earnings predictability score based portfolios are examined first.

4.10.1 Earnings Predictability Portfolios: Earnings Signals

There is no evidence of any significant change in the spread and log spread variables, and, the abnormal spread and log spread variables during the event period of the high quality of earnings portfolio. On the other hand, volume and log volume increase significantly on some days in the pre-announcement period (see endnote 20). These results imply that there are no significant changes in the adverse selection costs of the high quality of earnings portfolio around earnings announcements.

In the case of the low quality of earnings portfolio there is weak evidence of a significant decrease in spread and log spread, and, abnormal spread and log spread on day -11. Further, there is weak evidence of a significant increase in the spread, log spread, abnormal spread and log spread on the day before the announcement day (day -1). On the days -1 and 0 both the volume variables demonstrate a significant increase. These results suggest a slight decrease in the adverse selection costs in the pre-announcement period with a slight increase a day prior to the earnings announcement. The significant increase in trading volume facilitates the impounding of the new information by the market and, hence, there is some evidence of a decrease in the adverse selection cost component proxies in the post-announcement period.

4.10.2 Earnings Predictability Portfolios: Dividend Signals

There is evidence of increases in the adverse selection cost proxies in the pre-announcement period of the low quality of earnings portfolio. On the other hand, the pre-announcement period of the high quality of earnings portfolio displays weak evidence of a decrease in the adverse selection cost proxies on certain days. Further, the high quality of earnings portfolios demonstrates significant decreases in the abnormal log spread on some days in the post-announcement period with some weak evidence of increases especially after day +5. In contrast, the low quality of earnings portfolios show evidence of significant increases in the abnormal log spread immediately after the dividends announcement on days +1 and +2 followed by significant decreases after this day.

These results suggest that the market makers of low quality of earnings portfolios perceive an increase in the relative information asymmetry around dividend announcements made subsequent to a second quarter earnings announcement. This increase in the information asymmetry persists for some time after the dividend announcement but reduces once the information gets impounded in the price. This is consistent with the adverse selection cost theory. For the high quality of earnings portfolio such an increase in adverse selection costs is apparent only in the latter half of the post-announcement period. The rest of the event period is characterized by significant decreases in the adverse selection cost. Hence, it is apparent that there is a perception of a relative reduction in the levels of information asymmetry surrounding the dividend announcement of a firm in the high quality of earnings portfolio prior to and for some time after the dividend announcement. However, there is some evidence to suggest that the adverse selection costs increase in the post-announcement period of this portfolio in a manner not predicted by the adverse selection cost theory.

4.10.3 Earnings Predictability Portfolios: Cross-sectional Results

The results of the cross-sectional regressions, however, suggest that there is no significant difference in the cumulative standardized abnormal spread and log spread across the quality of earnings portfolios. Also for a given quality of earnings portfolio, there is no significant difference in the cumulative standardized abnormal spread and log spread across different levels of differential information, i.e. there is no interaction between quality of earnings and the predisclosure information environment of a firm[26].

A study of the means (Table 75) demonstrates that the extreme quality of earnings portfolios have a relatively low cumulative decrease in the standardized abnormal spread and log spread. On the other hand, the middle two portfolios demonstrate a higher decrease in the cumulative standardized abnormal spread and log spread. This suggests that the market makers perceive the earnings and dividend announcements of the firms in the two middle portfolios as being more efficient in reducing the relative information asymmetry in the environment. Note that these cell means represent gross movements in standardized abnormal spread and log spread without any adjustments for the various covariates and, hence, should be interpreted with some caution.

4.10.4 Earnings Nosie Portfolios: Earnings Signals

For the high quality of earnings portfolio with an earnings noise score of '4' there is no evidence of any change in spread and log spread in the pre-announcement period. However, the adverse selection cost proxies show a significant decrease on day -6 followed by a significant increase on day -5. This behavior of the adverse selection costs is puzzling as it suggests a decrease in the perceived level of information asymmetry that is followed by a increase in the same. Spread and log spread increase on day 0 as per the parametric tests. With no increase in the adverse selection cost proxies this increase in spread and log spread is probably due to an increase in the order processing and holding costs. The adverse selection costs decrease in the post-announcement period with the impounding of information through increased trades.

In the case of the quality of earnings portfolio with earnings noise score equal to '5' spread, log spread and volume increase significantly on days -1 and 0 (see endnote 12). The increase in spread on day -1 is driven by an increase in abnormal spread and log spread, the adverse selection cost proxies. This may be due to the occurrence of informed trades that are concurrent with the earnings announcement in keeping with the spirit of the SEC regulations of "abstain or disclose". Note that these results for the spread variable are weaker when the Rank test-statistic is examined. In fact, this statistic demonstrates a non-significant increase in abnormal spread on these days. Hence, the results should be interpreted with some caution. However, once information gets impounded in the prices the adverse selection cost proxies decrease significantly in the post-announcement period suggesting lowered levels of information asymmetry.

For the medium quality of earnings portfolio with a earnings noise score of '6' there is an increase in the daily volume on day -1 and 0 (see endnote 13). There is evidence of significant decreases in the adverse selection costs in the pre-announcement period but there is only weak evidence, as per the Rank test-statistic, of a decrease in the adverse selection costs and the level of information asymmetry in the post-announcement period.

4.10.5 Earnings Noise Portfolios: Cross-sectional Results

Significant and interpretable results are obtained when firm size is used as the cross-sectional variable defining the differential environment of a firm. After controlling for the effects of other variables, the coefficient of QE_i is positive and significant as was hypothesized previously. This suggests that as the quality of earnings decreases, the cumulative decrease (increase) in standardized abnormal spread is smaller (greater). This suggests that the market maker perceives an increase in the level of informed trading through the event period of low quality of earnings firms as compared to the event period of high quality of earnings firms[27].

The interaction term, $INFO1_i*QE_i$, is negative and significant. After controlling for the other covariates, the sign of this coefficient is not in the hypothesized direction. This suggests that for small firms, as the quality of earnings decreases, the cumulative decrease (increase) in the standardized abnormal spread and log spread is greater (smaller). This suggests that for small firms, earnings and dividend announcements are more efficient in reducing the perceived levels of information asymmetry for the low quality of earnings firms as compared to the high quality of earnings firms (Table 72).

4.11 Hypothesis 7 (H7): Univariate and Cross-sectional Results

This hypothesis relates to the behavior of abnormal spread and log spread for different signal sequences. Results for unexpected spread, log spread, volume and unexpected log volume have been reported in the Appendix.

4.11.1 Joint Announcements

There is no significant change in daily abnormal spread during the event period except for a significant decrease on day -5 as per the Rank test-statistic (Table 68). Abnormal log spread significantly decreases on days -5 and -3 in the pre-announcement period. Further, abnormal spread and log spread decreases significantly on days +2 and +10 in the post-announcement period.

4.11.2 Earnings Followed by Dividends Signal Sequence

There is a significant decrease on days -11 and -4 in abnormal spread and log spread in the pre-announcement event period of the earnings signal (Table 69). For the same event, abnormal log spread decreases significantly on day +6.

For the dividend announcement, abnormal log spread decreases significantly on day -10 and increases significantly on day +4 (Table 70). No significant change in the abnormal log spread is observed as per the Rank test-statistic.

4.11.3 Sole Earnings Announcements

Both abnormal spread and log spread increase significantly on the announcement day as per the parametric tests (Table 71). In addition, abnormal log spread decreases significantly on day -10 and day +3.

4.11.4 Univariate Tests: Observations on Signal Sequences

Using abnormal log spread as the basis of comparison, it is evident that all types of announcements are characterized by some day(s) of significant decreases in the pre-announcement event period. As per the Brown and Warner test-statistic, there is a significant increase in the abnormal log spread on the announcement day of a sole earnings signal. On the other hand, joint announcements demonstrate non-significant decreases on the announcement day. In the post-announcement period there are some significant decreases in the abnormal spread for joint announcements, sole earnings announcements, earnings and dividend announcement in the earnings-dividend sequence.

4.11.5 Cross-sectional Results: Signal Sequencing Issue

The coefficient of the dummy variables $D1_i$, $D2_i$, and $D3_i$ are never significant in any of the regressions. This suggests that there is no significant difference in the cumulative change in the standardized abnormal spread and log spread across joint announcements, sole earnings announcements and the earnings announcement in a earnings-dividend sequence. Further, the results suggest no significant difference in the behavior of the mean cumulative standardized abnormal spread and log spread around the earnings announcement and the subsequent dividend announcement. This result is surprising given the univariate results around the dividend announcement across analysts' following based differential information portfolios and the earnings predictability based quality of earnings portfolios.

4.11.6 Overall Conclusions: Signal Sequencing Hypothesis

All types of signal sequences (joint announcements, sole earnings announcements, and, earnings-dividend sequences) demonstrate significant decreases in the adverse selection cost proxies in the pre-announcement period suggesting a reduced level of information asymmetry at this time. Further, only in the case of joint earnings-dividend announcements is there evidence of a decrease (non-significant) in the adverse selection cost proxies on the day of the announcements. For, both, the earnings announcement of the earnings-dividend sequence and the sole earnings announcement, there is weak evidence of an increase in abnormal spread on the announcement days. Also for all the earnings announcements (irrespective of the signal sequence), there is evidence of significant decreases in the adverse selection cost component in the post-announcement period suggesting reduced levels of information asymmetry with the impounding of new information. However, this decrease is strongly evident for the joint announcement portfolio. In the case of a dividend announcement subsequent to a second quarter earnings announcement there is evidence of an increase in the adverse selection costs after the announcement suggesting heightened levels of information asymmetry at this time, and only weak evidence of a decrease in adverse selection costs after the announcement. This would imply that joint announcements of earnings and dividends are more efficient in reducing the levels of information asymmetry than the earnings-dividend signal sequence, given the increase (non-significant) in the post-announcement period of the dividend signal. Similarly, joint announcements are more efficient than sole earnings announcements given the significant increase in the adverse selection costs on the announcement day of the latter portfolio.

The cross-sectional results, however, demonstrates no significant difference in the cumulative standardized abnormal spread and log spread across these different types of signal sequences. This suggests that the market makers perceive joint announcements, sole earnings announcements and earnings-dividend signal sequences as being equally efficient in reducing the relative information asymmetry in the environment.

4.12 Other Control Variables

The variables LAG_i, DAY_i, and UE_i are significant in some of the cross-sectional regressions and these results are discussed next.

4.12.1 LAG_i and DAY_i: Firm Size x Earnings Noise Score Cross-sectional Regressions

For both cumulative standardized spread and log spread the coefficient for the LAG_i variable is positive and significant at 95% confidence levels. This implies that the cumulative change in the standardized abnormal spread and log spread is greater if the earnings announcement is delayed. Similarly, the coefficient on the variable DAY_i is positive and significant at 90% confidence levels. This suggests that there a weak positive relationship between the day of the earnings announcement (Friday versus other weekdays) and the cumulative change in the dependent variable.

4.12.2 UE_i: Firm Size x Earnings Predictability Score Cross-sectional Regressions

In addition to the coefficients of the variables LAG_i and DAY_i mentioned above, the coefficient of the variable UE_i is also significant and positive at 95% confidence levels. This suggests that there is a positive association between the size of the unexpected component in the earnings announcement and the cumulative change in the standardized abnormal spread and log spread.

4.12.3 Cross-sectional Tests: Implications for Other Control Variables

Timely earnings reports play a significant role in reducing the relative information asymmetry in the environment. For delayed earnings reports, the results suggest that the cumulative decrease (increase) in the standardized abnormal spread and log spread around earnings and dividends announcements will be smaller (larger). This suggests the efficiency of an earnings and dividend announcement in reducing the relative information asymmetry in the environment increases if these signals are timely. These results are consistent with the negative abnormal returns observed by Trueman (1990) for delayed earnings announcements.

There is weak evidence to suggest that the cumulative change in the standardized abnormal spread and log spread will increase if an earnings announcement is made on a Friday, i.e. prior to a non-trading period. This implies that earnings announcements made on a Friday result in smaller (larger) cumulative decreases (increases) in the dependent variable and is less efficient in reducing the relative levels of information asymmetry as perceived by the market makers. The non-trading period increases the possibility that informed traders may access unique information and, hence, increases the uncertainty associated with the earnings announcement on a Friday.

There is strong evidence that suggests that the relative efficiency of earnings and dividend announcements in reducing the information asymmetry in the environment is positively associated with the magnitude of the unexpected earnings component. The results suggest that as the magnitude of the unexpected earnings component increases, the cumulative decrease (increase) in the standardized unexpected abnormal spread and log spread will be smaller (larger). The unexpected earnings component may be considered to be a proxy for the monetary benefit of the unique information in the hands of informed traders. The higher the benefits receivable from acquiring such information given the costs (legal costs, acquisition costs), the higher the chances of informed traders acting on their information.

Notes

1. The same analysis was done for volume (see Table 12). It is apparent, based on a comparison of the Chi-square statistic, that the log transformation has been more effective in reducing the non-normalities of the volume variable as compared to the spread variable. Hence, the study incorporates non-parametric univariate tests on the spread variable to test the robustness of the parametric results.

2. The Hausman specification test has been carried using the expanded regression technique. (See Maddalla (1988), p. 440)

3. It is interesting to note that the Chi-square statistic is larger for the log version of the estimation equation. Further, the test rejects the null a larger number of times for the volume equation suggesting a recursive structure of equations.

4. For the volume equation the mean R-square does increase with the log transformation. While lag volume and market volume are significant for a larger proportion of the firm-events in the volume equation, log spread and log market volume is significant for a larger proportion of the firm-events in the log volume equation.

5. Log volume decreases significantly on day -15 (Table 18) though this is not evident as per the Rank test-statistic. In addition, both volume and log volume increase significantly on days -1 and 0 around the earnings signal. This is confirmed by the Rank test. Ask and bid prices (with and without log transformation) show non-significant increases in the event period (Table 78 and 79). Around day -1 and 0, the increase (non-significant) in ask price is greater than the increase in the bid price resulting in a non-significant increase in the spread on day 1. Similarly, on day -11 the (non-significant) increase in the bid price is greater than the (non-significant) increase in the ask price resulting in a significant decrease in the log spread on day -11. These significant decreases/increases in the spread/log spread reflect the dealers' inventory policy and are consistent with the liquidity/inventory hypothesis.

6. There are no significant changes in volume during the dividend signal event period. These results are confirmed by the Rank test except for a significant decrease on day +8 (Table 20). However, daily log volume decreases significantly on days -15, -13 and -2. Also, there is a

significant increase in log volume on day -7. While there is no significant change in log volume around days -1 and 0, there is a significant decrease in log volume on day +8. Both ask and bid prices (with and without log transform; Table 19 and 20) show no significant changes in the event period. However, there is a pattern of diminishing increases in log ask and bid prices prior to the announcement. The relative increase in the log ask price is greater than the relative increase in log bid price which peaks on day +1 when log spread increases significantly. After day +1, the log ask and bid prices decline with the relative decline in the ask price being greater than the relative decline in the bid price. This peaks on day -6 when there is a significant decrease in log spread.

7. According to SEC's rule 10b-5 read in conjunction with the Chiarella ruling, insiders have to disclose material information or else abstain from trading on that information.

8. John and Mishra (1990) contend that insiders trade prior to capital expenditure announcements, and that their trades and the subsequent announcement are joint signals that complement the information contained in the other. This theory is contrary to the adverse selection cost theory of Copeland and Galai (1983) and Glosten and Milgrom (1985). It implies that insider trades prior to such announcements in fact reduce the relative information asymmetry in the environment. Hence, the John and Mishra approach would predict a reduction in adverse selection costs prior to the earnings and dividend announcement surrounding insider trades.

9. Insiders have to file with the SEC, within 10 days after the last day of the month of trade, data relating to all trades they make in that month (section 16-a of The Securities Exchange Act, 1934).

10. Volume and log volume decreases significantly on day -15 and -8 for the firm size based portfolio (Table 23). Further, log volume increases significantly on day -1. In addition, daily log volume and volume for the firm size based low differential information portfolio show a significant increase on day 0. This significant increase on day 0 and -1 is also evident for the analysts' following based portfolio (Table 24). In addition to a significant decrease on day -15, there is a significant increase in log volume on day +4 for the analysts' following based portfolio.

11. In the case of daily volume and log volume, the evidence points to no significant changes other than a significant decrease in log volume on day -10 for the firm size based portfolio and days -9 and +5 as per the Rank test-statistic for the same portfolio (Tables 27 and 28).

12. There are significant increases, comparable to the low differential information portfolios, in daily volume and log volume on days -1 and 0. In addition, volume and log volume increases significantly on day -14 for the firm-size based portfolio (Table 31 and 32).

13. Unexpected log volume decreases significantly from day -15 to day -13 (Table 34). The decrease on day -15 is weakly supported by the Rank test-statistic. There is evidence of a significant increase in unexpected log volume on day -7 with a significant decrease on day -2. As per the Rank test-statistic there is no significant change in unexpected volume in this period. Further, in the post-announcement period there is no significant change in unexpected volume and log volume.

14. There is no significant increase in unexpected log volume (Table 36) though there is a significant decrease in unexpected volume on day -11 as per the Rank test-statistic. Volume decreases significantly on days -2 and -1 as per the same test-statistic. There is some evidence of a significant decrease in unexpected log volume on days +3 and +7.

15. There is a significant decrease in unexpected log volume on day -12 and -9 (Table 38). According to the Rank test, however, there is no significant change in volume except for a slight increase on day -14. Unexpected log volume increases on day -5 and on day -2. Both, unexpected volume and log volume increase significantly on day -1. Significant increase in unexpected log volume is evident on days +7, +6 and +10.

16. However, the cumulative change is larger for the low differential information firms as compared to the high differential information firms.

17. As per the Dirk case ruling, selective access by non-insiders especially security analysts to inside information is permissible to maintain a healthy capital market. This is provided the insider does not derive any personal advantage from such disclosure. This encourages security analysts to seek out such unique information from insiders and use it for the benefit of their clients provided no monetary reward is provided to the insider. The probability of selective access by security analysts to insider

information, then, will increase as the number of financial analysts following a firm increases i.e. as competition for unique information increases.

18. The ANCOVA results demonstrate a significant firm size main effect when quality of earnings is defined by the earnings predictability score and the dependent variable is cumulative standardized abnormal spread.

19. The ANCOVA results demonstrate a significant firm size main effect for the earnings noise based quality of earnings variable when the dependent variable is the cumulative standardized abnormal spread and log spread.

20. The high quality of earnings portfolio (i.e. score equal to '1') portfolio (Table 46) demonstrates a significant increase on days -14 and -10 for log volume. As per the Rank test, there are significant increases in volume on day -14, -11,-10 -1 and on day 0. For the low quality of earnings portfolio (Table 42), both volume and log volume increase significantly on day -1 and 0. In addition, log volume increases significantly on day -8. As per the Rank test-statistic, volume decreases significantly on day +10.

21. There is a significant increase in unexpected log volume on day -7 (Table 44) with significant decreases on days -3 and -2. The decrease on day -2 is also evident as per the Rank test-statistic. There is no significant change otherwise.

22. There is a significant decrease in unexpected volume on day -15 as per the Rank test-statistic (Table 46). Unexpected log volume decreases significantly on day -9, -8, and -4 as per the Brown and Warner test-statistic. There is no significant change in the variables for rest of the event period except for a significant decrease on day +8 in the post-announcement period.

23. There is no significant change in volume and log volume for this portfolio (Table 83).

24. There is evidence of a significant increase in volume and log volume on day +14. Both daily volume and log volume decrease significantly on day -7 though the evidence is weaker for the Rank test-statistic (Table 85). In addition, log volume increases significantly on day -1 and 0.

25. Daily volume and log volume (Table 87) decreases significantly on day -8. Further, there is evidence of a significant decrease in volume on day -4. Both daily volume and log volume demonstrate a significant increase on day -1 and 0.

26. In the ANCOVA results, only when the dependent variable is cumulative standardized abnormal spread and the differential information variable is defined by firm size, is there a significant main effect for earnings predictability based quality of earnings variable.

27. In the ANCOVA results, the earnings noise main effect (i.e. the quality of earnings effect) is significant with cumulative standardized abnormal spread as the dependent variable for both differential information variables.

CHAPTER 5

CONCLUSIONS

This study examines the behavior of the bid-ask spread and the adverse selection cost component surrounding second quarter earnings and subsequent dividend announcements of OTC firms. Specifically, it examines the relationship between the spread, the adverse selection cost component of the spread and (i) the quality of earnings, (ii) the pre-disclosure environment of the firm, and, (iii) the sequence of the earnings and dividend announcements made in the second quarter. The broad objective of the dissertation is to study whether earnings and dividend announcements provide information that is useful to investors and, especially, the uninformed traders. The study examines the efficiency of earnings and dividend announcements in reducing the relative information asymmetry in a firm's information environment around such signals, given that the adverse selection cost component of the spread is positively associated with the market makers perception of the relative level of information asymmetry.

Specifically, the dissertation focusses on the relevance of earnings quality in reducing information asymmetries between informed and uninformed traders by examining the behavior of the spread and the adverse selection cost component. Further, it examines whether the market makers' perception of the relative levels of information asymmetry is associated with the pre-disclosure information that is available for a firm. In addition, a comparison has been made between the relative efficiencies of a joint announcement of dividends and earnings, a sole earnings announcement and a earnings-dividend signal sequence.

The specific hypotheses examined in this study and the methodology adopted were described in Chapter 3. The detailed results and specific implications have been discussed in Chapter 4. This Chapter will provide a summary of the results and their research implications, given the objectives of the study.

The final sections of this chapter will briefly outline the limitations of this study and will, also, indicate further research extensions of this work.

5.1 Overview of the Results and their Implications:

5.1.1 The Broad Results for the Full Sample

There is evidence to suggest that there is a decrease in the market makers' perception of the relative information asymmetry in the environment prior to the second quarter earnings announcements of OTC firms. These results may be driven by a perceived reduction in the arrival rate of informed traders given the SEC's "abstain or disclose" requirement[1] assuming that the adverse selection theory is a correct interpretation of events. An alternate explanation is provided by the theoretical work of John and Mishra (1990) that suggests that insider trades, given the legal environment, are essentially signals that complement the information of the earnings announcement. Hence, contrary to the adverse selection cost theory, their work suggests that insider trades are associated with a decrease in the relative information asymmetry in the environment. A documentation of the insider trade activity prior to second quarter earnings and subsequent dividend announcements may help to discriminate between the alternate explanations for the results in this study.

In the post-announcement period of the earnings announcements, there is evidence of decrease in the adverse selection costs and, therefore, the perception of the relative information asymmetry in the environment. This reduction in the relative information asymmetry once the information has been impounded in the security price has been predicted by the adverse selection cost theory.

Unlike the earnings announcements, the results are mixed for the dividend announcement. In the pre-announcement period, there is some evidence of increased adverse selection costs on certain days followed by significant decreases in these costs. This suggests the presence of informed trading at this time. The results, however, are sensitive to the choice of the test-statistic. In the post-announcement period, an increase in the adverse selection costs was observed for the dividend announcement on the day after the announcement. After this day, adverse selection costs decrease with the impounding of the new information and the information contained in the informed trades. In addition, the Rank test points to increased adverse selection costs at the end of the post-announcement period.

These results suggest that the dividend announcement subsequent to an earnings signal is perceived to be noisy, given the increase in the informed trade activity just after the day of announcement. This is contrary to the expectations based on Miller and Rock (1985) that dividend signals subsequent to earnings signals convey information to the uninformed investors. Note that this would not violate the SEC's "abstain or disclose" rule.

5.1.2 The Differential Information Hypotheses

As was expected for the high differential information portfolio, there was no significant change in the adverse selection costs during the entire event period of the earnings signal. This would suggest that for such firms, given the high level of pre-disclosure information, the market makers perceive a lower level of informed trading during the same period. In the case of the dividend signal, however, the univariate results provide evidence of increases in adverse selection costs both in the pre-announcement and post-announcement period possibly associated with increased levels of informed trading. It is possible that informed traders are better able to disguise their trades for firms with high market capitalization. Further, for firms with high analyst following there is a possibility of selective access by some analysts to unique information not available to the market makers.

For the low and medium differential information environment there is evidence of significant decreases in the pre-announcement and post-announcement period for the earnings signal. These results point to reduced levels of informed trading prior to such announcements given the SEC's "abstain or disclose" rule and is consistent with the adverse selection cost theory. An alternate explanation, however, assumes high levels of insider trading during the pre-announcement period which provide complementary information signals to the market makers (and the uninformed investors). This results in a reduction in the market makers perception of the relative information asymmetry in the environment (John and Mishra, 1990). The decreases in the post-announcement phase reflects the impounding of the information content of the earnings signals as per the predictions of the adverse selection cost theory.

For these latter two portfolios, there is weak evidence of increased adverse selection costs in the pre-announcement period of the dividend signal. This may be due to increased levels of informed trading perceived by the market-maker at this time and is consistent with the adverse selection cost theory. In the post-announcement period, adverse selection costs decrease as information is absorbed by the market.

While significant results are obtained for the firm size based cross-sectional regressions, the results, however, are sensitive to the choice of the quality of earnings variable. The cross-sectional results indicate that the earnings and dividend announcements are more efficient in reducing the information asymmetries of the small (market capitalization) firms than the large firms when earnings predictability scores are used to measure quality of earnings. After controlling for the effect of other covariates, the evidence suggests that the cumulative increase (decrease) in adverse selection costs is smaller (greater) for small and medium size firms as compared to large firms. This indicates a higher perception of the level of informed trading by the market makers of the latter set. It is possible that insiders find it easier to disguise trades for large market capitalization firms and, hence, this perception on the part of the market makers. In contrast, an alternate explanation based on John and Mishra (1990) assumes increased insider trading for small firms around earnings and dividend announcements that, in fact, may convey information to the uninformed traders and the market makers in a manner that reduces the perceived levels of information asymmetry in the environment.

When earnings noise scores are used to measure quality of earnings, the results demonstrate that the market makers perceive a higher level of informed trading in the event period of small firms as compared large firms. The results demonstrate that the cumulative increase (decrease) in the adverse selection costs is greater (smaller) for small firms as compared to large firms. These results are consistent with previous results that have indicated that the probability of facing an insider increases inversely with firm size.

5.1.3 The Quality of Earnings Hypotheses

The results for the quality of earnings issues are mixed. With earnings predictability score based portfolios, there is no evidence of any significant change in the adverse selection costs surrounding the earnings announcement for the high quality of earnings portfolio. However, when the earnings noise measure is used there is significant evidence of increases in the adverse selection costs followed by decreases in the same, in the pre-announcement period of the earnings signal. This pattern is consistent with the prediction of the adverse selection cost theory of an increase in the perception of the relative information asymmetry assuming the arrival of informed traders, and a decrease in the same once the information in such trades has been impounded.

In the case of the dividend signal for the high quality of earnings portfolio, there is no significant change in the pre-announcement period. However, there is weak evidence of a significant increase in the adverse selection costs in the post-announcement period suggesting that the market makers perceive an increase in the arrival of informed traders after the dividend announcement.

For the low quality of earnings portfolio based on the earnings predictability score there is some decrease in the adverse selection costs in the pre-announcement period of the earnings signal. This decrease is also evident in the medium quality of earnings noise score based portfolio. This implies that market makers perceive reduced levels of information asymmetry prior to the earnings announcement which may be because of the SEC's "abstain or disclose" rule. Further, the earnings predictability score based portfolio displays weak evidence of an increase in the adverse selection costs on the day before the announcement in the WSJ and the day of the announcement in WSJ. The increase in the adverse selection costs on the announcement day suggests a perceived increase in informed trades timed with the earnings disclosure.

In the post-announcement period of the low quality of earnings portfolio based on the earnings predictability86Xscore, there is evidence of a decrease in the adverse selection costs. This is contrary to the expectation that low quality of earnings firms provide opportunities for sophisticated and informed investors to trade even after the earnings announcement. The evidence points to the fact that informed traders have an opportunity to trade in the pre-announcement period of the low quality of earnings firms. There is only weak evidence, however, of continued informed trading after the earnings announcement.

In contrast, for the dividend signal the low quality of earnings portfolio demonstrates increased adverse selection costs possibly associated with an increase in the level of information asymmetry perceived by the market makers in the pre-announcement period. Further, in the post-announcement period of the dividend signal of the low quality of earnings portfolio, the evidence points to increased adverse selection costs due to a increase in the perceived levels of informed trading. Contrary to the expectations based on Miller and Rock (1985) subsequent dividend signals of firms with noisy earnings announcements do not reduce the level of information asymmetry perceived in the environment. However, adverse selection costs decrease in the latter half of the post-announcement period. In contrast, for the high quality of earnings portfolios there is evidence consistent with a reduction in the perceived levels of information asymmetry by the market makers for all signals. This is as predicted by the adverse selection cost theory and implies that the new information has been impounded by the market.

Significant and interpretable cross-sectional results are obtained with the earnings noise score and the firm size combination. The evidence suggests that as the quality of earnings decreases, the cumulative decrease (increase) in the adverse selection costs is smaller (greater). The results demonstrate that market makers perceive a higher degree of informed trading in the event period of low quality of earnings firms as compared to the event period of high quality of earnings firms. Further, for small firms, earnings and dividend announcements are more efficient in reducing the perceived levels of information asymmetry for the low quality of earnings firms as compared to the high quality of earnings firms.

5.1.4 The Signal Sequencing Hypothesis

There is no substantive evidence to suggest any significant difference between joint earnings and dividend announcements, sole earnings announcements, and earnings-dividend signal sequences in terms of their efficiency in reducing the market makers' perception of the relative information asymmetry surrounding such signals. There is some evidence, however, of increased adverse selection costs on the announcement day of sole earnings announcments and the earnings announcement of the earnings-dividend sequence. Further, for both these types of announcements there is only weak evidence of subsequent decreases in adverse selection costs. To the extent these costs demonstrate significant decreases in the post-announcement period of the joint announcements, there is reason to believe that joint announcements may have a relative advantage over earnings-dividend sequence in terms of their efficiency in reducing the perceived levels of information asymmetry. This issue needs further investigation.

5.1.5 Other Cross-sectional Variables

There is strong evidence to suggest that timely earnings announcements increase the relative efficiency with which earnings and dividend signals reduce the adverse selection costs and the levels of information asymmetry around such events. Further, there is evidence of a strong negative association between the unexpected component of the earnings announcement and the relative efficiency with which earnings and dividend signals reduce the perceived levels of information asymmetry during the event period. The size of the unexpected earnings component may be positively associated with monetary value of the unique information in the hands of the informed traders and may explain the positive association with the cumulative change in the adverse selection costs. In addition, there is evidence to suggest that earnings announcements prior to non-trading periods are associated with increased levels of uncertainty and, as a result, adverse selection costs.

5.2 Limitations

This study has some limitations that relate to the availability of relevant data. Firstly, this study exclusively uses bid-ask spread data that is available for OTC firms on the CRSP data tapes. The results, therefore, are valid only for the competitive dealer system that operates in the OTC market as opposed to the monopoly specialist system that functions in the New York Stock Exchange (NYSE).

Further, OTC firms tend to have smaller market capitalization, on an average, than NYSE firms and this may bias the results to some extent. In addition, many firms had to be dropped from the analysis due to a lack of analysts' following data and this may have resulted in a selection bias in the sample.

The second limitation of this study relates to the fact that the sample firms are all OTC firms and is concerned with the reliability of the earnings predictability measure used for the quality of earnings portfolio. For some firms analysts' following information is provided infrequently and, hence, this measure was constructed to include analyst data for at least four out of the six years from 1984 to 1989. Consequently, this measure may be a noisy predictor of the quality of earnings of a firm. This may partially explain the mixed results for the earnings predictability score based quality of earnings portfolios.

There are some limitations that are intrinsic to the simultaneous equation methodology adopted. The prediction error of the reduced form equations derived from the simultaneous equation model is taken to be the proxy for the adverse selection costs. This assumes that the average adverse selection costs in the estimation period is zero and that this cost is a time series cost that is positive only in the event period. Further, the Brown and Warner (1985) test statistic ignores the variance of the prediction error. While this may bias the test statistics to some extent, it has been partially compensated for by using a large event period.

Finally, the spread data that has been used in this study reflects the market spread. i.e. the lowest ask and the highest bid price. Data for each market maker's quote is not available and, hence, these results are conservative to this extent.

5.3 Suggestions for Future Research

The primary suggestion relates to the institutional and legal framework within which this study has been undertaken. An important extension of this research would be to examine insider trade data for the sample firm-events. A study of this data will help to determine whether the reduced perception of information asymmetry observed in the pre-announcement period of the earnings and dividend signals is the effect of:

(i) the SEC's "abstain or disclose" requirement which result in reduced informed trade (see endnote 1) and, hence, the reduced adverse selection costs, or,

(ii) increased insider trade that provide complementary signals to the uninformed investors and the market makers and, hence, the reduced adverse selection costs.

A methodological extension that would further verify the robustness of the results obtained is the use of vector auto-regressions to estimate the adverse selection cost proxy. This procedure may provide more flexibility than the simultaneous methodology with respect to any auto- regression in the spread variable. Further, the estimation of the variance of the prediction error can be more conveniently carried out with this methodology. However, vector auto-regression approach is not necessarily as intuitive at a theoretical level as the approach adopted in this study.

Notes

1. The Wall Street Journal on September 23, 1992 quotes a study carried out by H. Nejat Seyhun from the University of Michigan. According to this study the predictive value of insider trades would have decreased from 1975 to 1989 given the increase in the SEC's enforcement activity. The study observes a dramatic drop in the average number of insider trades prior to takeover announcements from 3495 trades a month to 30 trades a month from the late 1970s to the late 1980s. There has been a similar drop though of a lower magnitude for insider trades prior to earnings announcements.

APPENDIX:

DATA-TABLES

Table 1

Sample selection

	Firms	
1. Firms on all data tapes (i.e. OTC_CRSP, COMPUSTAT, IBES)	819	
Less Firms rejected from sample:		
2. Firms that do not have Dec. 31 year-ends and/or are not fully updated on the COMPUSTAT tape	548	
3. Below SEC 10-k filing threshold	58	
4. Dividend and earnings announcements are less than 25 days apart, and, confounding events in the window starting 35 days prior to first announcement and ending 10 days second announcement	101	
5. Firms with more than 60 tradings days of "zero" spread data in the estimation period	0	
6. Firms with sole dividends or dividends followed by earnings signal sequences	7	
TOTAL: FIRMS (FIRM-EVENTS)	105	287
Less Firms with no IBES and/or COMPUSTAT data for calculation of quality of earnings scores, and, firms with no IBES data to calculate unexpected earnings	51	(134)
TOTAL: FIRMS (FIRM-EVENTS)	54	(153)

Table 2

Type of signal sequences

	Number of firm-events
1. JOINT ANNOUNCEMENTS:	36
2. EARNINGS FOLLoWED BY Dividends signal SEQUENCE:	73
3. SOLE EARNINGS ANNOUNCEMENTS:	44
TOTAL:	153

Table 3

Yearwise analysis

YEAR	Number of firm-events
1985	33
1986	30
1987	32
1988	26
1989	32
TOTAL:	153

Table 4

Industry codewise classification of firms

Description (Code)	Firms
1. Food and kindred products (20)	1
2. Textile mill products (22)	1
3. Lumber and wood products except furniture (24)	1
4. Paper and allied products (26)	1
5. Printing, publishing and allied (27)	2
6. Chemicals and allied products (28)	2
7. Petroleum refining and related industries (29)	1
8. Rubber and miscellaneous plastic products (30)	1
9. Stone, clay , glass, concrete products (32)	1
10. Primar metal industry (33)	1
11. Fabricated metal except machinery, etc. (34)	1
12. Machinery except electrical (35)	5
13. Electrical, electrical machinery, etc. (36)	2
14. Transportation equipment (37)	2
15. Measurement instrument, photo goods, etc. (38)	1
16. Motor freight, Transport, etc. (42)	2
17. Communication (48)	2
18. Electric, gas, sanitary services (49)	1
19. Durable goods-wholesale (50)	3
20. Banking (60)	20
21. Insurance (63)	1
22. Real estate (65)	1
23. Other (87)	1
	54

Table 5
Estimation period means
(figures in brackets are standard deviations)

Mean Spread Range	No.	Mean Abslt. Spread	Mean Vol-ume	Mean Bid Price	Mean Ask Price	Mean Firm Size
>0.0 - 0.1	0	-	-	-	-	-
>0.1 - 0.2	1	0.17 (0)	14590 (0)	5.81 (0)	5.99 (0)	35006 (0)
>0.2 - 0.3	18	0.24 (0.03)	15287 (10427)	12.87 (8.52)	13.11 (8.54)	94782 (119240)
>0.3 - 0.4	30	0.35 (0.03)	35394 (25421)	21.27 (9.74)	21.62 (9.75)	334873 (348979)
>0.4 - 0.5	18	0.46 (0.03)	30011 (34329)	28.86 (10.23)	29.32 (10.23)	341822 (430084)
>0.5 - 0.6	33	0.55 (0.03)	30927 (34437)	29.71 (10.51)	30.26 (10.52)	370869 (359340)
>0.6 - 0.7	23	0.65 (0.03)	39042 (46246)	33.79 (13.31)	34.43 (13.31)	413557 (310100)
>0.7 - 0.8	12	0.74 (0.02)	62177 (86135)	39.86 (12.92)	40.60 (12.92)	588335 (452152)
>0.8 - 0.9	5	0.85 (0.02)	14821 (17292)	45.29 (22.06)	46.15 (22.07)	548004 (485467)
>0.9 - 1.0	5	0.96 (0.03)	336202 (699063)	46.34 (22.06)	47.29 (22.07)	1889286 (485467)
>1.0 - 1.1	2	1.07 (0.03)	504246 (479532)	39.60 (17.19)	40.67 (17.21)	2369425 (146806)
>1.1 - 1.2	1	1.18 (0.00)	24899 (00000)	54.57 (00.00)	55.75 (00.00)	764454 (000000)
>1.2 - 1.3	4	1.27 (0.03)	500298 (815999)	55.33 (20.45)	56.60 (20.48)	2535519 (1676118)
>1.3 - 1.4	0	-	-	-	-	-
>1.4 - 1.5	0	-	-	-	-	-
>1.5 - 1.6	1	3.28 (0.00)	67954 (00000)	35.80 (00.00)	39.08 (00.00)	785015 (000000)

Table 6

Analysis of earnings noise scores

A. Median standard deviation for classifying 54 sample firms:

Variable	
Primary earnings per share (PEPS)	1.11
Extra-ordinary items, Discontinued Operations, and Cumulative effect of Accounting policy change per share (DCONT)	0.07
No. of accounting policy changes (CHNGS)	0.00
Alowance for uncollectibles or for loan losses as a percentage of net income (ACCRL)	0.19

B. Frequency of earnings noise scores in sample of 153 firm-events:

Score:	No.	PEPS	Median of DCONT	CHNGS	ACCRL	
4	21	0.87	0.09	0.00	0.19	High Quality
5	97	0.92	0.07	0.32	0.12	
6	28	1.21	0.35	0.42	0.29	
7	7	1.77	1.01	0.42	0.72	Low Quality
8	0	-	-	-	-	
	153					

Table 7

Analysis of earnings predictability scores

A. Median of $DAF_{q,y}$ and $SAFE_{q,y}$ for classifying the 153 sample firm-events:

Standardized Absolute Forecast Error ($SAFE_{q,y}$):	0.464
Relative Dispersion of Analysts' Forecast ($DAF_{q,y}$):	0.045

B. Frequency of earnings predictability scores in sample of 153 firm-events:

Score:	No.	Median of SAFE	Median of DAF	
1	48	0.227	0.022	High Quality
2	21	0.290	0.052	
3	17	0.570	0.029	
4	67	1.202	0.117	Low Quality
	153			

Table 8

Analysis of differential information variables: Firmsize

Mean Firmsize and Standard Deviation (in brackets)

FIRMSIZE PORTFOLIO NO.

YEAR	1 (Low)	2 (Medium)	3 (High)	
1985	63511 (24518)	201617 (58204)	641795 (188219)	
1986	61244 (29211)	206551 (50587)	917280 (547312)	
1987	50293 (21830)	000000 (00000)	564511 (538386)	
1988	64117 (25683)	211412 (86094)	1468971 (1276375)	
1989	81398 (41990)	238141 (66886)	1491918 (1747742)	
Frequency:	46	37	70	/ 153

Table 9

Analysis of differential information variables: Analysts' following

Mean Analyst Following and Standard Deviation (in brackets)

ANALYSTS' FOLLowING PORTFOLIO NO.

YEAR	1 (Low)	2 (Medium)	3 (High)	
1985	1.82 (1.08)	4.56 (0.53)	10.15 (3.95)	
1986	2.00 (0.89)	5.00 (1.00)	15.60 (8.02)	
1987	1.62 (0.96)	5.64 (1.29)	13.00 (8.34)	
1988	1.67 (1.51)	6.30 (1.06)	15.70 (8.34)	
1989	2.25 (1.42)	6.80 (1.32)	16.00 (9.24)	
Frequency:	53	49	51	/153

Table 10

Description and frequencies of other cross-sectional variables

A. Description of other cross-sectional variables:

	MEAN	STND. DEV.
1. No. of market makers	6.72	(5.29)
2. No. of insiders (%age)	14.34	(19.10)
3. No. of institutional shareholders (%age)	38.16	(19.68)

B. Frequencies[1] of other cross-sectional variables:

1. Joint, Sole or First (in sequence) Earnings announcments on a Friday	33
2. Second (in sequence) Dividend announcements on a Friday	18
3. Delayed earnings announcements	62
4. Greater than median R-square in the returns-lagged returns regression:	
Non-log version	75
Log version	74

NOTES:
1. The total frequency is 153 frim-events

Table 11

Analysis of skewness and kurtosis of spread

A. Mean (Standard Deviation) of spread skewness and kurtosis

	SPREAD	LOG SPREAD
Skewness	1.499 (0.985)	0.638 (0.703)
Kurtosis	5.070 (5.712)	1.475 (2.159)

B. Analysis of effect of log-transformation on spread skewness:

	Significant @ p < 0.05 (2 tailed)	Not Significant	Total
Spread	134	19	153
Log Spread	101	52	153
Total Spread	235	71	306

Chi-square statistic: 18.78 Significant @ $p < 0.05$

C. Analysis of effect of log-transformation on spread kurtosis:

	Significant @ p < 0.05 (2 tailed)	Not Significant	Total
Spread	122	31	153
Log Spread	87	66	153
Total Spread	209	97	306

Chi-square statistic: 17.45 Significant @ $p < 0.05$

contd.-next page

Table 11 (Contd.)

NOTES:

1. Coefficient of Skewness (g_1) = $m3/(m2)(m2)^{0.5}$ where, m2 and m3 are thw second and third moments of the distribution. The expected value of the coefficient of skewness is zero when the distribution is normal with a variance equal to 6/N, where N = 126 days in the estimation period. Hence, $g_1/(6/N)^{0.5}$ is a t-distribution with 125 degrees of freedom.

2. Coefficient of Kurtosis (g_2) = $[m4/(m2)^2]-3$ where m4 and m2 are the fourth and the second moments of the distribution. The expected value of the coefficient of kurtosis is zero when the distribution is normal with a variance equal to 24/N, where N = 126 days in the estimation period. Hence, $g_2/(24/N)^{0.5}$ is a t-distribution with 125 degrees of freedom.

Table 12

Analysis of skewness and kurtosis of volume

A. Mean (Standard Deviation) of volume skewness and kurtosis

	VOLUME	LOG VOLUME
Skewness	3.391 (1.755)	-.805 (0.820)
Kurtosis	17.941 (19.204)	2.416 (3.716)

B. Analysis of effect of log-transformation on Volume skewness:

	Significant @ p < 0.05 (2 tailed)	Not Significant	Total
Volume	153	0	153
Log Volume	0	153	153
Total Volume	153	153	306

Chi-square statistic: 302.01 Significant @ $p < 0.05$

C. Analysis of effect of log-transformation on Volume kurtosis:

	Significant @ p < 0.05 (2 tailed)	Not Significant	Total
Volume	151	2	153
Log Volume	66	87	153
Total Volume	217	89	306

Chi-square statistic: 111.79 Significant @ $p < 0.05$

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Table 12 (Contd.)

NOTES:
1. Coefficient of Skewness (g_1) = $m3/(m2)(m2)^{0.5}$ where, m2 and m3 are thw second and third moments of the distribution. The expected value of the coefficient of skewness is zero when the distribution is normal with a variance equal to 6/N, where N = 126 days in the estimation period. Hence, $g_1/(6/N)^{0.5}$ is a t-distribution with 125 degrees of freedom.

2. Coefficient of Kurtosis (g_2) = $[m4/(m2)^2] - 3$ where m4 and m2 are the fourth and the second moments of the distribution. The expected value of the coefficient of kurtosis is zero when the distribution is normal with a variance equal to 24/N, where N = 126 days in the estimation period. Hence, $g_2/(24/N)^{0.5}$ is a t-distribution with 125 degrees of freedom.

Table 13

Results of Hausman specification test

A.

	SPREAD EQUATION	VOLUME EQUATION
Fail to reject null of exogeneity:	142	131
Reject null i.e. existence of endogeneity:	11	22
Total:	153	153

Chi-square statistic of Goodness of Fit test at $p < 0.05$ levels: 27.04 (Significant)

B.

	LOG SPREAD EQUATION	LOG VOLUME EQUATION
Fail to reject null of exogeneity:	144	112
Reject null i.e. existence of endogeneity:	9	41
Total:	153	153

Chi-square statistic on Goodness of Fit test at $p < 0.05$ levels: 143.77 (Significant)

Table 14

Simultaneous equation model: Structural coefficients and percentage significant

The following simultaneous equation model has been estimated for each of the 153 sample firm-events:

$$S_{i,t} = a_0 + a_1(TV_{i,t}) + a_2(P_{i,t}) + a_3(R_{i,t}) + a_4(S_{i,t-1}) + \eta_{i,t} \quad (1a)$$
$$TV_{i,t} = b_0 + b_1(S_{i,t}) + b_2(MF_{i,t}) + b_3(TV_{i,t-1}) + \mu_{i,t} \quad (1b)$$

SPREAD EQUATION:

COEFFICIENT:	MEAN:	STND. DEV. :	PERCENTAGE SIGNIFICANT:	MEAN R-SQUARE (stnd. dev)
CONSTANT	-0.012	(2.13)	9.2	9.2 % (0.115)
VOLUME	0.000	(0.00)	7.8	
PRICE	0.019	(0.07)	9.2	
RISK	0.042	(0.13)	11.8	
LAG SPREAD	0.141	(0.16)	17.6	

VOLUME EQUATION:

COEFFICIENT:	MEAN:	STND. DEV. :	PERCENTAGE SIGNIFICANT:	MEAN R-SQUARE (stnd. dev.)
CONSTANT	10211.52	(34557.92)	9.2	6.6 % (0.090)
SPREAD	-13780.44	(101166.13)	7.8	
MARKET VOLUME	0.001	(0.002)	9.2	
LAG VOLUME	0.15	(0.113)	18.3	

Table 15

Simultaneous equation model (log version): Structural coefficients and percentage significant

The following simultaneous equation model has been estimated for each of the 153 sample firm-events:

$$S_{i,t} = a_0 + a_1(TV_{i,t}) + a_2(P_{i,t}) + a_3(R_{i,t}) + a_4(S_{i,t-1}) + \eta_{i,t} \quad (1a)$$
$$TV_{i,t} = b_0 + b_1(S_{i,t}) + b_2(MF_{i,t}) + b_3(TV_{i,t-1}) + \mu_{i,t} \quad (1b)$$

<u>LOG SPREAD EQUATION</u>:

COEFFICIENT:	MEAN:	STND. DEV. :	PERCENTAGE SIGNIFICANT:	MEAN R-SQUARE (stnd.dev.)
CONSTANT	-0.049	(1.96)	9.2	9.2 % (0.109)
VOLUME	0.001	(0.11)	7.8	
PRICE	0.124	(0.54)	5.2	
RISK	0.044	(0.10)	9.2	
LAG SPREAD	0.159	(0.12)	16.3	

<u>LOG VOLUME EQUATION</u>:

COEFFICIENT:	MEAN:	STND. DEV. :	PERCENTAGE SIGNIFICANT:	MEAN R-SQUARE (stnd. dev.)
CONSTANT	0.227	(9.47)	7.8	8.0 % (0.119)
SPREAD	1.264	(3.82)	19.6	
MARKET VOLUME	0.516	(0.58)	11.8	
LAG VOLUME	0.003	(0.025)	3.9	

Table 16

Mean reduced form coefficients (Impact multipliers) and standard deviations for the spread and log spread equations:

COEFFICIENT:	SPREAD	LOG SPREAD
CONSTANT	0.024 (1.909)	-1.060 (2.623)
PRICE	0.015 (0.066)	0.137 (0.678)
RISK	0.105 (0.183)	0.096 (0.115)
LAG SPREAD	0.175 (0.178)	0.183 (0.129)
MARKET VOLUME	0.000 (0.000)	0.058 (0.084)
LAG VOLUME	0.000 (0.000)	0.000 (0.003)

Explanations for Tables 17 to 46

1. The mean-adjusted spread (U_d): Daily cross-sectional mean of the mean-adjusted spread for each day d in the event period. Further,

$$\bar{U}_d = \frac{1}{M}\sum_{i=1}^{M} U_{i,d}$$

where, M = the number of firm-events in the sample.

In the case of mean-adjusted log spread, the cross-sectional daily mean of the mean-adjusted log spread for each day d in the analysis period has been calculated.

2. The Brown and Warner test-statistic:

$$(\bar{U}_d / \hat{S}(\bar{U}_d))$$

This statistic has a t-distribution with 125 degrees of freedom. Here,

$$\hat{S}(\bar{U}_d) = \{\sum_{t=-147}^{-21} (\bar{U}_t - \bar{U})^2/125\}^{0.5}$$

and,

$$\bar{U}_t = \frac{1}{M}\sum_{i=1}^{M} U_{i,t}$$

$$\bar{U} = \{\sum_{t=-147}^{-21} \bar{U}_t\}/126$$

The same procedure has been adopted for calculation of the test-statistics for mean-adjusted log spread.

3. The Corrado Rank test-statistic:

To test the behavior of unexpected bid-ask spread in the presence of non-normalities, Corrado's Rank Test statistic has also been estimated over the event periods. This statistic involves the ranking of each $U_{i,t}$, where t = 1 to 152 days in the estimation and event period. Further:

(i) $K_{i,t}$ = rank ($U_{i,t}$)

(ii) $J_{i,t}$ = ($K_{i,t}$ - 76.5), where 76.5 is the average rank over the 152 days.

For each t=127 to 152 days, the z-statistic is computed as follows:

$$\bar{J}_t / \hat{s}\,(\bar{J}_t)$$

where,

$$\bar{J}_t = \frac{1}{N}\sum_{i=1}^{N} J_{i,t}$$

and,

$$\hat{s}(\bar{J}_t) = \sqrt{\frac{1}{152}\sum_{t=1}^{152} (\bar{J}_t)^2}$$

4. The cross-sectional mean of the mean-adjusted volume, bid and ask price for each day d in the analysis period have been calculated in a manner similar to (1).

5. The Brown and Warner and the Corrado Rank test-statistics for volume, bid and ask price have been calculated as in (2) and (3) above.

6. The event period has been broken up into three sub-periods. These are as follows:

Sub-period	Days
1. Pre-announcement period	-15 to -2
2. Announcement period	-1 to 0
3. Post-announcement period	+1 to +10

Table 17

Behavior of daily mean-adjusted spread: Earnings signal, Full sample

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0225	-0.2767	0.1062	-0.1425
-14	-0.0152	-0.1864	0.1214	0.7775
-13	-0.0421	-0.5175	-0.5929	-0.2811
-12	-0.0021	-0.0258	0.0544	-0.2436
-11	-0.0814	-0.9991	-2.3122*	-1.9227@
-10	-0.0503	-0.6178	-1.0221	-1.0158
-9	-0.0446	-0.5476	-1.0481	-0.7836
-8	-0.0078	-0.0960	0.0605	-0.1808
-7	-0.0054	-0.0659	0.0597	-0.1249
-6	-0.0716	-0.8787	-1.5771	-0.9958
-5	-0.0650	-0.7984	-1.5120	-1.0403
-4	-0.0912	-1.1195	-2.1863*	-1.9434@
-3	-0.0589	-0.7232	-1.4921	-1.2693
-2	-0.0242	-0.2967	-0.3447	-0.7683
-1	0.0481	0.5913	1.6943@	1.3375
0	0.0567	0.6967	1.6375@	1.2915
1	-0.0434	-0.5325	-0.7723	-0.6473
2	-0.0609	-0.7483	-1.3930	-1.0816
3	-0.0503	-0.6178	-0.9749	-0.6419
4	-0.0086	-0.1061	0.0636	0.3914
5	0.0036	0.0444	0.7744	1.6784@
6	-0.0503	-0.6178	-1.3694	-1.1965
7	-0.0470	-0.5777	-0.9286	-0.6764
8	-0.0229	-0.2817	-0.4627	-0.2980
9	-0.0438	-0.5375	-0.9873	-0.9185
10	-0.0332	-0.4071	-0.8104	-0.7346

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 153 firm-events

Table 18

Behavior of daily mean-adjusted volume: Earnings signal, Full sample

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	6956.4976	0.6592	-2.0463*	-0.6742
-14	9685.3800	0.9178	1.3948	1.4825
-13	-1797.5351	-0.1703	0.2728	0.4075
-12	-1436.1168	-0.1361	-0.1344	-0.2298
-11	1513.2100	0.1434	-0.5164	-0.2810
-10	-14353.7050	-1.3602	-0.2260	-0.5077
-9	-12335.4436	-1.1690	0.1052	0.0106
-8	-5819.2998	-0.5515	-1.3874	-0.2976
-7	1279.5630	0.1213	-0.9164	-0.8309
-6	-10119.7573	-0.9590	-0.2055	-0.6878
-5	-8516.7050	-0.8071	-0.2167	-0.1085
-4	-7492.5743	-0.7100	-1.2844	-1.5073
-3	-17626.5155	-1.6704@	-0.5220	-0.6215
-2	5247.6545	0.4973	-0.4806	-0.0166
-1	34708.0728	3.2891*	3.0641*	3.2715*
0	21871.8440	2.0727*	3.1354*	3.1442*
1	6387.4388	0.6053	0.1549	-0.1589
2	5010.9225	0.4749	1.2771	0.9687
3	-13207.1756	-1.2516	-0.2503	-0.2200
4	-8559.0514	-0.8111	0.5780	0.1032
5	-6984.1560	-0.6619	-0.6070	-0.9130
6	-10997.6789	-1.0422	-0.3275	-0.8640
7	-5029.0841	-0.4766	-0.5864	-1.0433
8	-10419.6658	-0.9874	0.1432	-0.5424
9	-2945.4370	-0.2791	-0.8201	-0.4218
10	-5376.2998	-0.5095	-0.4498	-0.8143

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 153 firm-events

Table 19

Behavior of daily mean-adjusted spread: Dividends signal, Full sample

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0628	-0.7715	-1.8677@	1.2431
-14	-0.0046	-0.0564	-0.1133	-0.9530
-13	-0.0251	-0.3088	-0.7336	-1.3474
-12	-0.0114	-0.1405	-1.1430	1.3152
-11	-0.0046	-0.0564	-0.2328	-1.3474
-10	-0.0680	-0.8345	-2.0064*	-1.1036
-9	-0.0303	-0.3719	-1.1721	-2.0704*
-8	0.0228	0.2801	-0.2303	-0.8820
-7	0.0451	0.5535	1.4062	-0.0782
-6	0.0416	0.5114	0.3437	1.1619
-5	0.0040	0.0487	-0.6475	-1.4559
-4	0.0160	0.1960	-0.9884	-1.2186
-3	0.0776	0.9531	1.6396@	1.2704
-2	-0.0286	-0.3508	-1.1497	-2.1187*
-1	-0.0303	-0.3719	-0.9952	-2.0002*
0	0.0708	0.8689	1.4115	0.4891
1	0.1050	1.2895	2.8569*	0.5206
2	-0.0269	-0.3298	-0.9443	-0.1395
3	-0.0286	-0.3508	-0.6865	1.0829
4	-0.0388	-0.4770	-1.7878@	-2.1191*
5	0.0468	0.5745	1.0794	0.5811
6	-0.0697	-0.8556	-2.0087*	-1.0001
7	-0.0337	-0.4139	-1.6185	0.6156
8	-0.0388	-0.4770	-1.2229	-0.4481
9	0.0297	0.3642	0.6937	1.8825@
10	0.0742	0.9110	1.7868@	-0.2323

NOTES:

1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 20

Behavior of daily mean-adjusted volume: Dividends signal, Full sample

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	14445.3929	1.3689	-3.0618*	-1.4054
-14	7632.6943	0.7233	-1.6940@	-0.1465
-13	1677.7491	0.1590	-2.1951*	-1.6589@
-12	8726.9683	0.8270	-0.4881	-0.0482
-11	16378.2559	1.5521	-0.1998	-0.5548
-10	-1637.6071	-0.1552	-0.7222	-1.0254
-9	-4143.8263	-0.3927	-1.4451	-0.5122
-8	1950.3244	0.1848	0.5137	0.7681
-7	-448.5797	-0.0425	2.0669*	0.8688
-6	-2572.7852	-0.2438	0.3800	-0.7195
-5	13143.7765	1.2456	1.6943@	-0.3744
-4	-1086.4427	-0.1030	-1.8178@	-0.6377
-3	2295.4203	0.2175	-0.9536	0.5968
-2	-3210.7578	-0.3043	-2.9741*	0.3164
-1	6484.0505	0.6145	0.3084	-1.7151@
0	658.6395	0.0624	-0.1186	0.5038
1	9255.6121	0.8771	0.8866	0.0643
2	-2293.0728	-0.2173	-1.0845	-1.6326
3	-4523.9222	-0.4287	-0.5823	-0.9404
4	11212.0641	1.0625	-0.0621	0.3748
5	5349.0094	0.5069	1.2214	-0.7817
6	4857.5984	0.4603	0.0093	-0.5992
7	-493.4701	-0.0468	-1.3853	-1.5826
8	-7077.3742	-0.6707	-2.1112*	-2.0567*
9	747.5573	0.0708	0.2475	-0.2654
10	7365.1463	0.6980	0.8857	-0.5366

NOTES:

1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 21

Behavior of daily mean-adjusted spread: Earnings signal
Low differential information portfolio based on firm size

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0322	0.6320	1.0150	0.6254
-14	-0.0602	-1.1789	-0.9804	-0.4336
-13	-0.0194	-0.3800	-0.3373	-0.2043
-12	0.0214	0.4189	0.1000	-0.4757
-11	-0.0900	-1.7648	-1.7604@	-1.3147
-10	-0.0303	-0.5931	-0.8143	-0.9732
-9	-0.0737	-1.4452	-1.7511@	-1.8637@
-8	0.0268	0.5254	0.4875	0.0359
-7	-0.0112	-0.2202	-0.2569	0.0094
-6	-0.0602	-1.1789	-1.1534	-0.3961
-5	-0.0683	-1.3387	-1.2748	-0.6550
-4	-0.0194	-0.3800	-0.4668	-0.3774
-3	-0.0072	-0.1403	-0.4241	-0.5911
-2	0.0051	0.0993	0.0990	-0.1497
-1	0.0227	0.4455	0.5909	0.9326
0	0.0513	1.0048	1.0304	1.1416
1	-0.0208	-0.4067	-0.1832	-0.2371
2	-0.0955	-1.8713@	-1.9461@	-0.9389
3	-0.0574	-1.1257	-1.0712	-0.9373
4	-0.0737	-1.4452	-1.2788	-0.8297
5	-0.0031	-0.0605	0.2344	1.4598
6	-0.1064	-2.0844*	-2.2274*	-1.4941
7	-0.0004	-0.0072	-0.0826	0.3384
8	-0.0316	-0.6197	-0.8020	-0.5459
9	-0.0438	-0.8594	-0.8319	-0.4944
10	-0.0466	-0.9126	-0.9400	-0.6425

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 46 firm-events

Table 22

Behavior of daily mean-adjusted spread: Earnings signal
Low differential information portfolio based on analysts' following

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0197	0.3869	0.9022	0.8852
-14	-0.0510	-1.0018	-0.6993	-0.1442
-13	-0.0322	-0.6315	-0.5244	-0.3271
-12	-0.0110	-0.2149	-0.3429	-0.6884
-11	-0.0888	-1.7424@	-1.6711@	-1.3659
-10	-0.0251	-0.4926	-0.5307	-0.1953
-9	-0.0794	-1.5573	-1.9131@	-1.9922*
-8	0.0527	1.0349	1.0915	0.4512
-7	0.0103	0.2017	0.1962	0.2062
-6	-0.0275	-0.5389	-0.6169	-0.0760
-5	-0.0298	-0.5852	-0.5947	-0.0713
-4	-0.0157	-0.3075	-0.3600	-0.3318
-3	-0.0381	-0.7472	-0.8879	-0.6046
-2	-0.0180	-0.3538	-0.4386	-0.4294
-1	0.0445	0.8729	1.1602	1.4930
0	0.0598	1.1738	1.0727	1.1798
1	-0.0263	-0.5158	-0.2690	-0.5752
2	-0.0841	-1.6499@	-1.8618@	-1.2961
3	-0.0605	-1.1870	-1.1722	-0.8418
4	-0.0086	-0.1686	-0.4991	-0.2264
5	0.0315	0.6183	0.7776	1.8527@
6	-0.1218	-2.3905*	-2.5486*	-1.9147@
7	-0.0275	-0.5389	-0.7784	-0.5039
8	-0.0640	-1.2564	-1.4702	-1.2310
9	-0.0605	-1.1870	-1.0757	-0.7442
10	-0.0463	-0.9092	-0.9159	-0.4806

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 53 firm-events

Table 23

Behavior of daily mean-adjusted volume: Earnings signal
Low differential information portfolio based on firm size

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-2126.0571	-0.6130	-3.0587*	-1.9479@
-14	-2470.2745	-0.7123	0.2161	-0.3855
-13	5313.2038	1.5320	0.9537	1.0421
-12	3894.3125	1.1229	-0.0645	0.6770
-11	551.1603	0.1589	-0.0662	0.1473
-10	769.1603	0.2218	0.1215	-0.4607
-9	-2037.9702	-0.5876	-0.3181	-0.8588
-8	-1713.5136	-0.4941	-2.1441*	-0.3965
-7	-287.0354	-0.0828	-1.1875	-1.2035
-6	-4042.1223	-1.1655	-0.4714	-0.6174
-5	3882.6603	1.1195	-0.5242	-0.4435
-4	-269.2310	-0.0776	-1.8111@	-1.7818@
-3	-2197.8180	-0.6337	-0.8014	-0.3542
-2	2828.5951	0.8156	-1.3858	-0.4028
-1	7961.6603	2.2956*	2.7178*	2.7597*
0	6293.8777	1.8147@	2.3101*	2.5654*
1	1057.3342	0.3049	0.9807	0.6065
2	-1256.0571	-0.3622	0.4831	0.0125
3	106.2038	0.0306	-0.2684	-0.0439
4	750.9212	0.2165	0.7538	0.4686
5	-167.7962	-0.0484	-0.3104	0.3714
6	-1565.5571	-0.4514	-0.1996	-0.1238
7	-2769.2528	-0.7985	0.0566	0.1301
8	-1620.8397	-0.4673	0.6513	0.0596
9	-127.4049	-0.0367	-0.8958	-0.8086
10	-1176.4049	-0.3392	-0.3978	-1.3446

NOTES:

1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 46 firm-events

Table 24

Behavior of daily mean-adjusted volume: Earnings signal Low differential information portfolio based on analysts' following

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	381.3422	0.0906	-2.5759*	-1.9537@
-14	456.1912	0.1084	1.0547	0.5798
-13	2038.7950	0.4845	0.9936	0.7957
-12	320.8139	0.0762	0.2098	0.1163
-11	-182.2050	-0.0433	0.6931	0.8138
-10	1749.5120	0.4157	-0.1675	-0.7473
-9	82.2478	0.0195	0.3649	0.1298
-8	-1909.9220	-0.4539	-1.2253	0.2295
-7	-241.5635	-0.0574	-1.0519	-0.6643
-6	582.2478	0.1384	0.3478	0.2386
-5	-2451.3748	-0.5825	-1.0490	-0.7111
-4	-2012.2427	-0.4782	-1.5362	-1.6668@
-3	1814.1912	0.4311	-0.2065	-0.1540
-2	23551.6818	5.5966*	-1.0898	-0.3925
-1	3862.6063	0.9179	1.9919*	2.2526*
0	2479.3422	0.5892	2.1448*	2.2315*
1	-3189.9031	-0.7580	0.5705	-0.0770
2	17275.3799	4.1051*	0.7476	-0.0347
3	1791.0026	0.4256	0.8508	0.8243
4	6046.8139	1.4369	2.0051*	1.6577@
5	-3734.3560	-0.8874	-0.0255	-0.1917
6	3969.0214	0.9432	0.2798	0.1978
7	-2350.8843	-0.5586	0.0449	-0.0679
8	6963.5875	1.6548@	1.2380	0.8576
9	467.5497	0.1111	-1.0022	-0.5601
10	-1970.2616	-0.4682	-0.1595	-1.2214

NOTES:

1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 53 firm-events

Table 25

Behavior of daily mean-adjusted spread: Earnings signal
Medium differential information portfolio based on firm size

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0229	-0.4545	-0.3334	-0.4346
-14	0.0278	0.5502	0.7229	1.5039
-13	-0.0466	-0.9233	-0.7204	-0.2891
-12	-0.0196	-0.3875	-0.4919	-0.2834
-11	-0.1614	-3.2005*	-3.4167*	-2.6753*
-10	-0.0364	-0.7224	-0.8796	-0.9919
-9	0.0075	0.1483	0.3381	0.8049
-8	-0.0196	-0.3875	-0.3873	-0.2853
-7	-0.0736	-1.4591	-1.4797	-1.8024@
-6	-0.0533	-1.0573	-1.2252	-1.4132
-5	-0.0398	-0.7894	-0.8418	-0.8143
-4	-0.0804	-1.5931	-1.8197@	-1.2659
-3	-0.1277	-2.5308*	-2.6147*	-2.3598*
-2	-0.0060	-0.1196	-0.2830	-0.2929
-1	0.0852	1.6888@	1.2549	0.1644
0	0.2372	4.7027*	3.4133*	1.9649*
1	-0.0500	-0.9903	-1.0245	-0.7482
2	0.0311	0.6172	0.5416	-0.2267
3	-0.0601	-1.1912	-1.2828	-1.1922
4	0.0007	0.0144	0.1128	0.4516
5	-0.0094	-0.1866	0.0266	0.6292
6	-0.0466	-0.9233	-1.0970	-0.8786
7	-0.0533	-1.0573	-1.3551	-1.6267@
8	-0.0837	-1.6601	-1.6193	-1.3887
9	-0.0060	-0.1196	-0.1988	-0.0907
10	-0.0804	-1.5931	-1.9875*	-1.7665@

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 37 firm-events

Table 26

Behavior of daily mean-adjusted spread: Earnings signal Medium differential information portfolio based on analysts' following

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0224	0.3971	0.3573	-0.0129
-14	0.0045	0.0801	0.1140	1.0929
-13	-0.0261	-0.4632	-0.2776	-0.3482
-12	0.0351	0.6235	0.2868	-0.1145
-11	-0.0975	-1.7309@	-1.8538@	-1.2735
-10	0.0173	0.3065	0.3171	0.2676
-9	-0.0236	-0.4179	-0.3933	-0.0161
-8	-0.0465	-0.8254	-0.7790	-0.5997
-7	0.0096	0.1707	0.1654	0.0403
-6	-0.1103	-1.9573@	-1.8288@	-1.3654
-5	-0.0644	-1.1423	-1.1810	-0.9253
-4	-0.0822	-1.4592	-1.5830	-1.3525
-3	-0.0082	-0.1462	-0.4357	-0.4191
-2	-0.0184	-0.3273	-0.1588	-0.4901
-1	0.0683	1.2120	0.9858	0.6351
0	0.1550	2.7514*	2.0402*	1.1026
1	-0.0746	-1.3234	-1.4893	-1.2122
2	-0.0312	-0.5537	-0.4612	-0.2902
3	0.0224	0.3971	0.4502	0.4320
4	0.0147	0.2612	0.5364	0.7431
5	-0.0133	-0.2368	0.0180	0.2450
6	0.0071	0.1254	-0.1558	-0.6609
7	-0.0261	-0.4632	-0.4819	-0.8753
8	-0.0414	-0.7348	-0.8937	-0.7496
9	0.0045	0.0801	-0.0342	-0.0613
10	-0.0159	-0.2821	-0.6764	-0.7093

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 49 firm-events

Table 27

Behavior of daily mean-adjusted volume: Earnings signal
Medium differential information portfolio based on firm size

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	15985.3786	1.5114	-0.1084	-0.5183
-14	-1716.7836	-0.1623	0.0603	0.6256
-13	-2977.2701	-0.2815	-1.0228	0.2037
-12	-240.8647	-0.0228	-0.2440	-0.8947
-11	-18180.7836	-1.7190@	-1.6125	-1.9967*
-10	-6033.7565	-0.5705	-2.0640*	-1.3602
-9	-2573.9457	-0.2434	1.3136	1.1584
-8	-8546.1620	-0.8080	-0.1359	-0.5819
-7	-17881.7295	-1.6907@	-0.8507	-1.7385@
-6	-12754.0538	-1.2059	-0.1919	-1.0947
-5	-13895.6484	-1.3138	-0.8565	-0.9874
-4	5027.1624	0.4753	-0.2285	-0.9038
-3	-9476.8376	-0.8960	-0.5679	-1.0056
-2	-13869.8106	-1.3114	-0.4542	-0.8929
-1	633.6218	0.0599	0.1227	0.6856
0	-11350.7836	-1.0732	0.7370	0.6183
1	-2514.4052	-0.2377	-0.0690	-0.0964
2	3425.7299	0.3239	0.6489	0.6146
3	-10480.6755	-0.9909	-0.4350	-0.6892
4	-1779.2701	-0.1682	-0.0411	-0.1800
5	-14529.8917	-1.3738	-0.9587	-1.9130@
6	-8889.2971	-0.8405	-0.0608	-0.6637
7	-13785.6484	-1.3034	-0.3556	-1.1056
8	-8723.2160	-0.8248	-0.5313	-0.9674
9	-10799.6484	-1.0211	-1.4035	-1.1129
10	-10144.9728	-0.9592	-0.4433	-0.8492

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 37 firm-events

Table 28

Behavior of daily mean-adjusted volume: Earnings signal Medium differential information portfolio based on analysts' following

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	7072.9067	1.2536	-1.4568	-0.6731
-14	3281.1720	0.5815	-0.0269	0.8798
-13	644.1108	0.1142	-1.3916	-0.0733
-12	-2030.1137	-0.3598	-0.0820	-0.6056
-11	-1400.4606	-0.2482	-1.6791@	-0.6262
-10	2152.8251	0.3816	-0.3609	0.1906
-9	-3906.9300	-0.6925	-0.6147	-0.5088
-8	1007.9271	0.1786	-0.7437	-0.2200
-7	-11270.0933	-1.9975*	-0.8149	-1.2435
-6	-7051.6239	-1.2498	-1.0068	-1.6981@
-5	3171.3761	0.5621	0.4450	0.2244
-4	9609.6822	1.7032@	-0.0927	-0.3446
-3	-7654.5831	-1.3567	-1.0260	-0.7743
-2	-5472.6239	-0.9699	-0.0118	-0.5587
-1	2183.6414	0.3870	1.4722	1.7289@
0	-1247.9096	-0.2212	1.3885	1.5295
1	-64.0525	-0.0114	-1.3464	-0.7684
2	-5208.0117	-0.9230	0.0985	0.1305
3	-6191.8280	-1.0974	-1.6929@	-0.6569
4	-10183.6443	-1.8049@	-1.5497	-1.3095
5	-11404.6035	-2.0213*	-1.5663	-1.4004
6	-9568.8484	-1.6959@	-0.6111	-1.1203
7	-3430.7055	-0.6080	-0.7445	-0.7024
8	-4647.3790	-0.8237	-1.4572	-1.4561
9	-254.0117	-0.0450	-0.3849	-0.4722
10	-1848.7055	-0.3277	-1.0632	-0.9576

NOTES:

1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 49 firm-events

Table 29

Behavior of daily mean-adjusted spread: Earnings signal
High differential information portfolio based on firm size

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0583	-0.3478	-0.3779	-0.4366
-14	-0.0083	-0.0495	0.4770	0.6078
-13	-0.0547	-0.3265	-0.2381	-0.1015
-12	-0.0083	-0.0495	0.2589	0.1675
-11	-0.0333	-0.1987	-0.3126	-0.3069
-10	-0.0708	-0.4224	-0.4349	-0.2165
-9	-0.0530	-0.3159	-0.4483	-0.3106
-8	-0.0244	-0.1454	-0.0523	-0.1321
-7	0.0346	0.2061	1.0154	0.9599
-6	-0.0887	-0.5289	-0.8092	-0.3644
-5	-0.0762	-0.4543	-0.8293	-0.6200
-4	-0.1440	-0.8591	-1.8386@	-1.9871*
-3	-0.0565	-0.3372	-0.4823	-0.0355
-2	-0.0530	-0.3159	-0.4106	-0.9196
-1	0.0453	0.2700	1.3464	1.2975
0	-0.0351	-0.2093	-0.1364	-0.1052
1	-0.0547	-0.3265	-0.4422	-0.3632
2	-0.0869	-0.5183	-0.9050	-0.8438
3	-0.0405	-0.2413	0.0139	0.4818
4	0.0292	0.1742	0.9116	0.9832
5	0.0149	0.0889	0.9188	1.1275
6	-0.0155	-0.0922	0.1572	-0.1700
7	-0.0744	-0.4437	-0.5635	-0.2923
8	0.0149	0.0889	0.7237	0.8511
9	-0.0637	-0.3798	-0.7207	-1.0199
10	0.0006	0.0037	0.5153	0.4745

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 70 firm-events

Table 30

Behavior of daily mean-adjusted spread: Earnings signal High differential information portfolio based on analysts' following

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.1096	-0.4924	-0.9027	-1.0397
-14	0.0032	0.0143	0.7063	0.5969
-13	-0.0679	-0.3051	-0.2978	0.0833
-12	-0.0287	-0.1289	0.1422	0.2735
-11	-0.0581	-0.2611	-0.8287	-1.1647
-10	-0.1414	-0.6356	-1.5087	-1.8962@
-9	-0.0287	-0.1289	0.2394	0.3776
-8	-0.0336	-0.1509	-0.1781	-0.2152
-7	-0.0360	-0.1619	-0.2098	-0.4456
-6	-0.0801	-0.3602	-0.5367	-0.5608
-5	-0.1022	-0.4593	-0.9969	-1.0245
-4	-0.1782	-0.8008	-1.9772*	-2.0600*
-3	-0.1292	-0.5805	-1.3433	-1.3979
-2	-0.0360	-0.1619	-0.0603	-0.5858
-1	0.0326	0.1465	0.9785	0.5400
0	-0.0409	-0.1839	0.0656	0.3346
1	-0.0311	-0.1399	0.2121	0.3859
2	-0.0654	-0.2941	-0.3196	-0.5497
3	-0.1096	-0.4924	-0.9914	-0.7815
4	-0.0311	-0.1399	0.0802	0.2721
5	-0.0091	-0.0407	0.6012	1.1716
6	-0.0311	-0.1399	0.0515	0.1152
7	-0.0875	-0.3932	-0.4632	-0.0208
8	0.0375	0.1686	1.2542	1.2077
9	-0.0728	-0.3272	-0.6844	-0.9453
10	-0.0360	-0.1619	0.0162	-0.2901

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 51 firm-events

Table 31

Behavior of daily mean-adjusted volume: Earnings signal
High differential information portfolio based on firm size

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	8152.6251	0.3652	0.1705	0.7222
-14	23700.2393	1.0617	2.4161*	2.1335*
-13	-5846.7321	-0.2619	0.1363	-0.2693
-12	-5570.7464	-0.2496	0.0317	-0.2795
-11	12555.0965	0.5624	0.4594	0.7199
-10	-28689.2749	-1.2852	1.1707	0.4199
-9	-24262.0035	-1.0869	-0.4968	-0.0856
-8	-7076.0464	-0.3170	0.2644	0.2031
-7	12437.1536	0.5572	0.5230	0.7085
-6	-12721.2178	-0.5699	0.3949	0.0947
-5	-13821.7035	-0.6192	1.0177	0.7781
-4	-18856.9178	-0.8447	0.0988	-0.4187
-3	-32073.0607	-1.4368	0.5385	-0.0525
-2	16942.2679	0.7590	1.3104	0.8283
-1	70295.0679	3.1490*	2.2908*	2.5157*
0	49669.3251	2.2251*	2.4513*	2.5066*
1	14595.3393	0.6538	-0.9569	-0.6218
2	9967.1108	0.4465	1.3151	1.0724
3	-23397.1178	-1.0481	0.2423	0.1312
4	-18260.6321	-0.8180	0.1622	-0.0719
5	-7475.0178	-0.3349	0.0453	-0.4529
6	-18310.3607	-0.8203	-0.3263	-0.8021
7	-1885.6464	-0.0845	-0.9296	-0.9812
8	-17098.4464	-0.7660	-0.1366	-0.2578
9	-645.7749	-0.0289	0.7972	0.6480
10	-5615.6464	-0.2516	0.0293	0.2784

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 70 firm-events

Table 32

Behavior of daily mean-adjusted volume: Earnings signal
High differential information portfolio based on analysts' following

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	13677.6583	0.4478	1.2744	1.1907
-14	25429.5602	0.8325	1.5196	1.3656
-13	-8130.2045	-0.2662	0.5704	0.0888
-12	-2691.2437	-0.0881	-0.5798	0.0430
-11	6074.5210	0.1989	-0.4422	-0.6731
-10	-46947.6359	-1.5369	0.1744	-0.4288
-9	-33338.0868	-1.0914	0.3423	0.3816
-8	-16441.4790	-0.5383	-0.3111	-0.5509
-7	14917.8543	0.4884	0.5869	0.2567
-6	-24189.2633	-0.7919	0.0964	0.1207
-5	-26049.6163	-0.8528	0.7615	0.2415
-4	-29619.4006	-0.9697	-0.2969	-0.9187
-3	-47410.4790	-1.5521	0.3193	-0.2706
-2	-3474.3025	-0.1137	0.7419	0.8590
-1	98012.1289	3.2086*	2.1060*	2.3204*
0	64237.9328	2.1030*	2.1106*	2.2940*
1	22538.8543	0.7379	0.9623	0.5052
2	2083.6975	0.0682	1.6203@	1.6931@
3	-35533.7535	-1.1633	-0.0676	-0.5412
4	-22176.8123	-0.7260	-0.2532	-0.0944
5	-6114.3025	-0.2002	0.4403	-0.1804
6	-27924.1064	-0.9142	-0.5371	-0.7133
7	-9348.0084	-0.3060	-0.5909	-1.1949
8	-34030.5378	-1.1141	-0.0762	-0.4094
9	-9078.1457	-0.2972	0.2270	0.1846
10	-12305.1653	-0.4028	0.4526	0.5287

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 51 firm-events

Table 33

Behavior of daily mean-adjusted spread: Dividends signal Low differential information portfolio based on analysts' following

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.1468	-2.8816*	-3.2336*	0.8208
-14	-0.1706	-3.3489*	-3.3186*	-1.1910
-13	-0.1825	-3.5826*	-3.7525*	-1.8642@
-12	-0.1409	-2.7648*	-3.1341*	0.4115
-11	-0.0992	-1.9471@	-1.8458@	-0.7881
-10	-0.1052	-2.0639*	-2.0818*	-1.4269
-9	-0.1885	-3.6994*	-3.8163*	-1.8803@
-8	-0.1706	-3.3489*	-3.4912*	-1.1359
-7	-0.0397	-0.7788	-0.5553	-0.8879
-6	0.1568	3.0764*	1.4806	1.6737@
-5	0.1091	2.1418*	0.5995	-0.7909
-4	0.1210	2.3754*	-0.6909	-0.7134
-3	0.2520	4.9455*	2.6141*	1.1663
-2	-0.0337	-0.6620	-1.3743	-0.8965
-1	-0.0992	-1.9471@	-2.0267*	-0.9895
0	0.0794	1.5577	0.7888	1.3482
1	0.2937	5.7633*	5.5333*	1.8459@
2	-0.0278	-0.5452	-1.5486	-1.4045
3	0.0079	0.1558	0.2919	1.1020
4	-0.1944	-3.8162*	-4.2334*	-1.2231
5	-0.0159	-0.3115	-0.4220	0.4907
6	-0.1171	-2.2975*	-2.2294*	-0.9097
7	0.0794	1.5577	-0.0927	0.6021
8	-0.0635	-1.2461	-1.5447	-0.9109
9	0.0437	0.8567	0.7178	1.4659
10	-0.0278	-0.5452	-0.8302	-0.6727

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 34

Behavior of daily mean-adjusted volume: Dividends signal Low differential information portfolio based on analysts' following

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	45853.2336	10.8960*	-3.1788*	-1.9448@
-14	-6028.6236	-1.4326	-2.3624*	-0.9150
-13	-7267.6236	-1.7270@	-2.5704*	-1.5046
-12	-1179.3855	-0.2803	-0.2794	0.4402
-11	4668.3288	1.1093	-0.6141	-0.3118
-10	-2001.8617	-0.4757	-1.0512	-0.6915
-9	-5696.0522	-1.3536	0.5130	-0.1279
-8	9791.9479	2.3269*	0.7637	1.2137
-7	6731.0907	1.5995@	2.5436*	0.0594
-6	-2823.4807	-0.6709	-0.1322	-0.8182
-5	21691.2812	5.1545*	0.7836	-0.6926
-4	-1422.1950	-0.3380	-1.9882*	-0.1381
-3	-1228.5760	-0.2919	-1.2977	0.5958
-2	-8601.3855	-2.0439*	-2.1118*	0.9065
-1	3217.3764	0.7645	0.2198	-0.8397
0	-263.9093	-0.0627	-0.6137	0.5907
1	15591.8526	3.7051*	1.7504@	-0.7164
2	-3375.0998	-0.8020	-0.3908	-0.9897
3	-2324.0045	-0.5523	0.5442	-0.0526
4	-6252.1950	-1.4857	-0.1253	0.5523
5	-2641.4807	-0.6277	-0.8633	-1.4491
6	-5392.6236	-1.2814	-1.5005	-0.1471
7	-4563.1474	-1.0843	-1.7417@	-1.5080
8	-5290.9093	-1.2573	-1.7912@	-0.4329
9	4485.8050	1.0660	0.2086	-1.0892
10	5913.3764	1.4052	-0.2173	-0.5353

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at p < 0.05, 2 tailed
   @ = significant at p < 0.10, 2 tailed
6. Sample size: 21 firm-events

Table 35

Behavior of daily mean-adjusted spread: Dividends signal Medium differential information portfolio based on analysts' following

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0698	-1.2388	-1.2206	-0.0662
-14	-0.0335	-0.5947	-0.3827	0.5382
-13	-0.0013	-0.0222	-0.0993	0.0602
-12	0.0552	0.9798	0.5459	1.4016
-11	-0.0496	-0.8809	-1.1653	-2.2577*
-10	-0.0375	-0.6662	-0.6932	-0.1505
-9	0.0109	0.1926	-0.1340	-1.0921
-8	0.1520	2.6973*	1.4988	-0.2517
-7	0.0673	1.1945	1.3643	0.1361
-6	0.0028	0.0494	-0.1433	-0.1662
-5	-0.0456	-0.8094	-0.9493	-0.6731
-4	-0.0214	-0.3800	-0.6349	-1.0355
-3	-0.0456	-0.8094	-0.3935	-0.0506
-2	-0.0537	-0.9525	-0.8299	-1.8519@
-1	-0.0859	-1.5250	-1.3999	-1.9915*
0	0.0270	0.4788	0.3224	-0.9536
1	-0.0577	-1.0241	-1.2039	-1.5087
2	-0.0375	-0.6662	-0.3399	0.8284
3	-0.1021	-1.8113@	-1.6724@	-0.3540
4	-0.0295	-0.5231	-0.4781	-1.1896
5	0.1036	1.8386@	1.6032	0.6249
6	-0.0496	-0.8809	-0.7077	0.3468
7	-0.1263	-2.2407*	-2.1136*	-0.1132
8	-0.0295	-0.5231	-0.5532	0.0048
9	0.0028	0.0494	0.3011	1.4774
10	0.0310	0.5504	0.9484	-0.0205

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 31 firm-events

Table 36

Behavior of daily mean-adjusted volume: Dividends signal Medium differential information portfolio based on analysts' following

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-2836.7133	-0.5028	-2.3621*	-1.0281
-14	-4410.6488	-0.7817	-1.3168	-0.5019
-13	1077.9964	0.1911	-0.8259	-1.0089
-12	3448.2222	0.6112	1.1378	0.5262
-11	-6712.2294	-1.1896	-0.3482	-1.5442
-10	-3479.9068	-0.6168	-0.1132	-0.3387
-9	-4601.6488	-0.8156	-0.9341	-0.4096
-8	1332.2867	0.2361	-0.2591	0.0000
-7	-946.4552	-0.1678	0.2290	0.8963
-6	-3666.6165	-0.6499	0.2386	0.3823
-5	4310.0609	0.7639	0.6725	0.4542
-4	-1401.3907	-0.2484	-0.0715	-0.8588
-3	-611.2617	-0.1083	-1.0671	-0.5130
-2	-4382.6810	-0.7768	-3.6809*	-1.8920@
-1	1628.5126	0.2886	-0.9593	-1.9538@
0	-1292.1649	-0.2290	-0.4815	-1.1285
1	-6758.1649	-1.1978	-0.9512	0.4583
2	-7505.7455	-1.3303	-2.1508*	-1.1285
3	-4022.5197	-0.7129	-1.5549	-1.1042
4	7680.8351	1.3613	-0.8133	-0.4593
5	2367.1900	0.4196	0.8375	-0.0061
6	-1833.4875	-0.3250	-0.0813	-0.6591
7	-3729.0681	-0.6609	-2.3676*	-1.1498
8	-5858.1649	-1.0383	-0.8900	-1.4986
9	-4229.1649	-0.7496	0.2623	0.8882
10	1149.7061	0.2038	-0.7562	-0.8750

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at p < 0.05, 2 tailed
   @ = significant at p < 0.10, 2 tailed
6. Sample size: 31 firm-events

Table 37

Behavior of daily mean-adjusted spread: Dividends signal High differential information portfolio based on analysts' following

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0315	0.1416	-1.2206	0.0935
-14	0.2041	0.9174	-0.3827	2.4875*
-13	0.0970	0.4359	-0.0993	1.0998
-12	0.0196	0.0881	0.5459	-0.7272
-11	0.1565	0.7034	-1.1653	0.2566
-10	-0.0756	-0.3399	-0.6932	-0.9374
-9	0.0672	0.3021	-0.1340	1.2389
-8	0.0256	0.1149	1.4988	0.4968
-7	0.0970	0.4359	1.3643	0.7107
-6	-0.0161	-0.0724	-0.1433	-0.3015
-5	-0.0280	-0.1259	-0.9493	0.6195
-4	-0.0340	-0.1527	-0.6349	0.4848
-3	0.0851	0.3824	-0.3935	0.9823
-2	0.0137	0.0614	-0.8299	-0.7564
-1	0.1208	0.5429	-1.3999	2.2421*
0	0.1268	0.5696	0.3224	0.8873
1	0.1565	0.7034	-1.2039	1.4820
2	-0.0102	-0.0457	-0.3399	1.3930
3	0.0434	0.1951	-1.6724@	1.0242
4	0.1029	0.4626	-0.4781	0.4205
5	0.0256	0.1149	1.6032	0.4137
6	-0.0518	-0.2329	-0.7077	-0.4279
7	-0.0102	-0.0457	-2.1136*	-0.6763
8	-0.0280	-0.1259	-0.5532	-0.9524
9	0.0553	0.2486	0.3011	0.9539
10	0.2398	1.0779	0.9484	1.5217

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 38

Behavior of daily mean-adjusted volume: Dividends signal High differential information portfolio based on analysts' following

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	8549.2328	0.2799	1.0938	0.6845
-14	39072.2804	1.2791	1.6154	1.7023@
-13	11508.4709	0.3768	-0.2927	-0.0627
-12	26425.7566	0.8651	-2.9156*	-1.4723
-11	62174.1376	2.0354*	1.0880	0.1288
-10	1446.2328	0.0474	-0.0428	0.3925
-9	-1915.7672	-0.0627	-3.1177*	-0.3856
-8	-4978.9577	-0.1630	0.6132	-0.1357
-7	-6893.2910	-0.2257	1.0569	1.1514
-6	-707.3862	-0.0232	0.8279	0.0689
-5	17636.5185	0.5774	2.1367*	0.7465
-4	-285.7672	-0.0094	-1.5718	0.2300
-3	10110.2328	0.3310	1.4406	0.3987
-2	3909.8519	0.1280	1.9447@	0.7499
-1	16918.4233	0.5539	2.2021*	2.1740*
0	4460.9471	0.1460	1.5481	1.9502@
1	26558.7566	0.8695	1.2516	1.6190
2	6483.8519	0.2123	1.5358	1.6513@
3	-7464.0053	-0.2444	0.3028	0.0799
4	33889.0900	1.1094	1.4950	1.2995
5	17741.2328	0.5808	3.2555*	0.5977
6	24985.1376	0.8179	2.6378*	-0.5268
7	8352.5661	0.2734	3.3232*	0.8105
8	-10663.6243	-0.3491	-1.2293	-1.8710@
9	4355.8995	0.1426	-0.1369	0.2431
10	17992.0900	0.5890	4.1343*	1.7622@

NOTES:

1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at p < 0.05, 2 tailed
   @ = significant at p < 0.10, 2 tailed
6. Sample size: 21 firm-events

Table 39

Behavior of daily mean-adjusted spread: Earnings signal High quality of earnings portfolio based on earnings predictability score (=1)

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0340	-0.5903	-0.5001	-0.5680
-14	0.0259	0.4505	0.4186	0.7892
-13	0.0285	0.4958	0.5215	0.2371
-12	0.0416	0.7220	0.5372	0.4805
-11	-0.0288	-0.4997	-0.5651	-0.3994
-10	0.0181	0.3148	0.6793	1.0676
-9	0.0311	0.5410	0.3161	0.3119
-8	-0.0340	-0.5903	-0.6027	-0.7876
-7	0.0155	0.2695	0.2914	0.5983
-6	-0.0496	-0.8618	-0.7954	-0.7033
-5	-0.0678	-1.1785	-1.2833	-1.2936
-4	-0.0965	-1.6763@	-1.6533@	-1.7980@
-3	-0.0183	-0.3187	-0.6241	-1.0995
-2	-0.0210	-0.3640	-0.4976	-1.1233
-1	-0.0288	-0.4997	-0.2712	0.0127
0	0.0311	0.5410	0.6566	0.1289
1	0.0598	1.0388	0.9464	1.0310
2	-0.0626	-1.0880	-0.9961	-0.8465
3	0.0494	0.8578	0.9524	0.8990
4	0.0884	1.5366	1.2690	1.3588
5	0.0858	1.4913	1.7589@	1.7041@
6	-0.0001	-0.0020	-0.5532	-0.7876
7	-0.0288	-0.4997	-0.4933	-0.6508
8	0.0754	1.3103	1.1158	0.8401
9	0.0520	0.9030	0.7806	0.3628
10	0.0233	0.4053	0.3678	0.7224

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at p < 0.05, 2 tailed
   @ = significant at p < 0.10, 2 tailed
6. Sample size: 48 firm-events

Table 40

Behavior of daily mean-adjusted volume: Earnings signal High quality of earnings portfolio based on earnings predictability score (=1)

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	8846.4934	1.5329	-1.5847	-0.0885
-14	10561.7017	1.8301@	2.1677*	2.1015*
-13	-5116.5275	-0.8866	0.4964	0.0442
-12	-2132.4650	-0.3695	0.4798	0.6437
-11	9840.8267	1.7052@	1.9179@	2.4832*
-10	8366.0142	1.4496	2.0790*	2.4046*
-9	2714.0559	0.4703	0.3189	0.5422
-8	-482.0691	-0.0835	0.6342	0.4767
-7	-2223.5900	-0.3853	0.8003	0.5979
-6	3800.1601	0.6585	0.4058	-0.4390
-5	-636.4441	-0.1103	0.3824	0.3210
-4	-3324.5066	-0.5761	0.2189	0.1196
-3	-5466.7566	-0.9473	-1.4792	-0.9468
-2	576.4934	0.0999	-0.0360	-0.6142
-1	1451.9309	0.2516	1.5963	2.3243*
0	4310.6809	0.7469	1.7138@	2.0589*
1	3021.7642	0.5236	-1.0537	-0.3161
2	1463.3267	0.2536	0.2835	0.1900
3	-4822.6733	-0.8356	-1.3229	-0.4619
4	-4854.9650	-0.8412	0.6090	0.2703
5	-2001.1941	-0.3468	-0.3532	-0.3178
6	-6436.4650	-1.1153	-0.1018	-0.7305
7	-4733.1525	-0.8201	-0.4191	-0.7551
8	-3888.9858	-0.6739	-1.3170	-1.1499
9	3509.4517	0.6081	-0.7256	0.0770
10	2592.2017	0.4492	-0.6578	0.1163

NOTES:

1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at p < 0.05, 2 tailed
   @ = significant at p < 0.10, 2 tailed
6. Sample size: 48 firm-events

Table 41

Behavior of daily mean-adjusted spread: Earnings signal Low quality of earnings portfolio based on earnings predictability score (=4)

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0159	0.3749	0.6725	0.3726
-14	-0.0196	-0.4628	-0.2026	0.1797
-13	-0.0233	-0.5509	-0.3773	0.0040
-12	-0.0159	-0.3746	-0.1959	-0.0806
-11	-0.0961	-2.2704*	-2.3896*	-1.6251@
-10	-0.0625	-1.4768	-1.5754	-1.6000
-9	-0.0569	-1.3445	-1.4248	-1.0742
-8	-0.0028	-0.0660	0.0782	0.1718
-7	-0.0103	-0.2423	-0.1397	-0.3145
-6	-0.0457	-1.0800	-1.1203	-0.7135
-5	-0.0588	-1.3886	-1.3621	-1.1111
-4	-0.0569	-1.3445	-1.1640	-1.1019
-3	-0.0429	-1.0139	-1.2017	-1.0306
-2	-0.0233	-0.5509	-0.4754	-0.5681
-1	0.0821	1.9401@	1.7481@	1.4520
0	0.0942	2.2267*	1.4933	1.1389
1	-0.0298	-0.7053	-0.5479	-0.4849
2	-0.0047	-0.1100	0.0401	0.2854
3	-0.0830	-1.9618*	-2.0068*	-1.8233@
4	-0.0401	-0.9477	-1.0071	-1.0623
5	0.0233	0.5513	0.6424	1.3873
6	-0.0233	-0.5509	-0.7212	-0.1982
7	-0.0047	-0.1100	-0.2357	0.0753
8	-0.0616	-1.4548	-1.2370	-0.5602
9	-0.0569	-1.3445	-1.4239	-1.0557
10	-0.0345	-0.8155	-0.9987	-1.0266

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 67 firm-events

Table 42

Behavior of daily mean-adjusted volume: Earnings signal Low quality of earnings portfolio based on earnings predictability score (=4)

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	8372.5302	0.3757	-1.5880	-0.7298
-14	14563.7839	0.6536	0.7715	1.0129
-13	2392.9332	0.1074	-0.3133	0.7832
-12	3018.4556	0.1355	-0.2937	0.3133
-11	-6969.1713	-0.3128	-1.6362@	-1.4062
-10	-34646.3205	-1.5549	-0.7264	-1.6023
-9	-27399.2011	-1.2296	-0.9895	-1.0616
-8	-15185.3355	-0.6815	-2.3775*	-1.1602
-7	-23252.6041	-1.0435	-0.9723	-1.5361
-6	-23279.8280	-1.0448	-0.2755	-0.0012
-5	-22346.8579	-1.0029	-0.4950	-0.7530
-4	-20158.0220	-0.9047	-0.8348	-1.3180
-3	-31714.1862	-1.4233	0.5942	0.1671
-2	13237.8138	0.5941	-0.0356	0.4966
-1	71965.3213	3.2297*	2.5146*	2.0072*
0	48769.1422	2.1887*	2.4640*	2.4005*
1	14970.7839	0.6719	0.9290	0.5059
2	14251.0526	0.6396	1.4445	1.2751
3	-26509.4996	-1.1897	0.0353	-0.3794
4	-11043.9325	-0.4956	0.2697	0.1926
5	-7948.2907	-0.3567	-0.4679	-0.5233
6	-13778.8280	-0.6184	-0.1603	-0.5360
7	-5631.2310	-0.2527	-0.7266	-1.0465
8	-24049.2310	-1.0793	0.6904	-0.4885
9	-15101.9773	-0.6778	-1.4373	-1.5292
10	-23551.2310	-1.0569	-0.7795	-1.9039@

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 67 firm-events

Table 43

Behavior of daily mean-adjusted spread: Dividends signal High quality of earnings portfolio based on earnings predictability score

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0696	-1.2093	-1.2569	-1.1824
-14	-0.0885	-1.5384	-1.6010	-0.6010
-13	-0.0014	-0.0246	0.0413	-0.9509
-12	0.0137	0.2387	-0.4003	0.2054
-11	-0.0128	-0.2220	0.0117	0.2315
-10	-0.0961	-1.6701@	-1.8218@	-1.3205
-9	-0.0355	-0.6169	-0.3758	-0.5228
-8	0.0175	0.3046	0.1659	0.7955
-7	0.0971	1.6868@	1.9384@	1.6508@
-6	-0.0734	-1.2751	-1.0772	-1.4943
-5	-0.0772	-1.3410	-1.3271	-1.0096
-4	-0.0014	-0.0246	0.0353	-0.1163
-3	0.0971	1.6868@	1.9444@	1.2183
-2	-0.0696	-1.2093	-1.2626	-0.1489
-1	-0.0052	-0.0904	0.0308	-0.7086
0	0.1198	2.0817*	1.5693	-0.5021
1	0.1350	2.3450*	2.2271*	0.5021
2	-0.0885	-1.5384	-1.3982	0.4076
3	0.0062	0.1071	0.3690	-0.2098
4	-0.1605	-2.7890*	-2.8497*	-0.2358
5	0.1236	2.1475*	2.1071*	2.2681*
6	-0.0317	-0.5511	-0.4129	0.3173
7	0.0706	1.2260	0.4459	-0.1815
8	-0.0507	-0.8802	-0.7413	0.1033
9	0.1047	1.8184@	1.7897@	0.0815
10	0.1539	2.6741*	2.4231*	1.5759

NOTES:

1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 33 firm-events

Table 44

Behavior of daily mean-adjusted volume: Dividends signal High quality of earnings portfolio based on earnings predictability score

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	3074.2799	0.5327	-0.9643	-0.2163
-14	-3549.3564	-0.6150	-1.7588@	-0.4849
-13	-5186.5685	-0.8987	-0.8063	-1.1223
-12	4948.7951	0.8575	-0.5748	-0.3354
-11	-1283.9928	-0.2225	0.9767	0.2665
-10	-243.5685	-0.0422	-0.6459	-0.8642
-9	-1684.6292	-0.2919	1.2365	-0.0021
-8	-2829.3261	-0.4903	0.9176	-0.8391
-7	1983.6739	0.3437	2.1350*	0.8266
-6	1744.3406	0.3023	1.2515	0.0596
-5	18384.6739	3.1856*	2.1409*	0.0408
-4	3846.8557	0.6666	0.6533	-0.0669
-3	4394.6436	0.7615	-2.5676*	-1.2049
-2	-2873.1746	-0.4979	-4.3170*	-2.2760*
-1	-3831.9928	-0.6640	0.7876	-0.0742
0	-2092.9322	-0.3627	0.8586	-0.1850
1	14396.8254	2.4946*	-0.0534	-0.1808
2	-353.9322	-0.0613	-0.8908	-1.7054
3	-1210.9322	-0.2098	0.4942	-0.5737
4	8648.4921	1.4986	-1.1375	-0.9426
5	11552.6739	2.0018*	1.5956	0.9071
6	4597.6133	0.7967	1.6131	1.3742
7	3414.2799	0.5916	-0.7516	1.3250
8	-1434.5988	-0.2486	-0.2325	0.5183
9	4445.0678	0.7702	1.0135	0.7890
10	4440.7951	0.7695	-0.4136	-0.5309

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 33 firm-events

Table 45

Behavior of daily mean-adjusted spread: Dividends signal Low quality of earnings portfolio based on earnings predictability score

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0744	-1.7572@	-2.0663*	-1.0502
-14	0.1161	2.7441*	2.5417*	1.8603@
-13	-0.0565	-1.3352	-1.4297	-0.2493
-12	0.0626	1.4781	0.5669	1.4772
-11	-0.0267	-0.6319	-0.7910	-0.1785
-10	-0.0386	-0.9132	-1.1993	-0.5332
-9	-0.0684	-1.6165	-1.5706	-0.9737
-8	-0.1458	-3.4452*	-3.8394*	-2.2151*
-7	-0.0148	-0.3505	-0.3959	0.0538
-6	0.0506	1.1968	0.7928	1.9177@
-5	-0.0446	-1.0539	-0.8208	1.4255
-4	-0.1636	-3.8672*	-4.1912*	-2.1238*
-3	-0.0267	-0.6319	-0.1144	0.4100
-2	-0.0446	-1.0539	-1.1452	-1.6989@
-1	-0.0744	-1.7572@	-2.2157*	-1.0842
0	-0.0446	-1.0539	-1.0677	-0.1069
1	0.0685	1.6188	1.5680	0.6388
2	0.0209	0.4935	0.3566	0.3484
3	-0.1041	-2.4605*	-2.5099*	-0.9588
4	0.0149	0.3528	-1.6388@	-1.6351@
5	-0.1220	-2.8825*	-3.0045*	-2.1089*
6	-0.1160	-2.7418*	-3.1284*	-0.4646
7	-0.1577	-3.7265*	-3.8583*	-0.4681
8	-0.0803	-1.8979@	-1.8843@	0.1884
9	-0.0744	-1.7572	-1.7237	1.0070
10	-0.0386	-0.9132	-1.1297	-0.3498

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 46

Behavior of daily mean-adjusted volume: Dividends signal Low quality of earnings portfolio based on earnings predictability score

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	44961.5911	2.0178*	-0.7181	-2.0943*
-14	27880.4006	1.2512	1.2801	0.9316
-13	20756.9244	0.9315	0.5672	1.0269
-12	25075.9720	1.1254	-0.9479	0.2833
-11	59652.6387	2.6771*	0.1814	-0.4137
-10	-6761.5042	-0.3034	-1.5849	-0.3455
-9	-12828.1232	-0.5757	-4.6576*	-0.1129
-8	1607.0197	0.0721	-2.8263*	-1.5528
-7	-5156.6946	-0.2314	0.4637	1.0877
-6	-8140.8375	-0.3654	-0.7328	0.5591
-5	18624.6387	0.8358	0.6481	0.7200
-4	-9399.5518	-0.4218	-4.2357*	-0.9789
-3	-10295.7899	-0.4621	0.3226	-0.0101
-2	-7291.9804	-0.3273	-1.6190	-1.2797
-1	11915.4006	0.5347	-0.8547	-1.2878
0	-9310.9327	-0.4179	-0.7771	-1.3784
1	8571.5435	0.3847	1.3907	1.5123
2	-2715.2661	-0.1219	0.1992	-0.5084
3	-11477.9327	-0.5151	-0.7300	-0.7578
4	15410.4006	0.6916	-0.3339	-0.5807
5	-2660.8851	-0.1194	-0.3510	-0.6612
6	11514.8292	0.5168	0.3389	-0.3455
7	-9228.6470	-0.4142	-2.3521*	-1.4988
8	-15877.3137	-0.7125	-3.3313*	-1.9929*
9	2216.5435	0.0995	0.0766	1.1661
10	13050.2101	0.5857	1.1574	-0.5746

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Explanations for Tables 47 to 52

1. The following cross-sectional regression is run on the cumulative standardized mean-adjusted spread and log-spread:

$$CSU1_i = a_0 + a_1(INFO1_i) + a_2(INFO2_i) + a_3(QS_i) + a_4(INFO1*QS_i) + a_5(INFO2*QS_i) + a_6(D1_i) + a_7(D2_i) + a_8(D3_i) + \eta_i .$$

*p1146X

where,

i = the firm-events ranging from i = 1 to N ;

$INFO1_i$ = ' 1 ', for low differential information environment, and, ' 0 ' otherwise;

$INFO2_i$ = ' 1 ', for median differential information environment, and, ' 0 ' otherwise;

QS_i = the quality score of the firm. This score takes the value of ' 1 ' (for high quality of earnings disclosures) to ' 4 ' (for low quality of earnings disclosures) if the earnings predictability approach is used, or, takes the value of ' 4 ' (high quality of earnings) to ' 8 ' (low quality of earnings) in the case of the earnings noise approach.

$D1_i$ = ' 1 ', if it is a joint announcement and ' 0 ' otherwise;

$D2_i$ = ' 1 ', if it is a sole earnings announcement and '0 ' otherwise;

$D3_i$ = ' 1 ', if it is a dividend announcement subsequent to a earnings announcement and ' 0 ' otherwise.

$CSU1_i$ = the cumulative standardized unexpected spread (or, log spread). This is calculated as follows:

$$CSU1_i = \sum_{t=-15}^{+10} SU_{i,d} \quad \ldots(1)$$

where:

$$SU_{i,d} = U_{i,d} / \hat{s}(U_d) \quad \ldots(2)$$

$$U_{i,d} = S_{i,d} - E(S_{i,d}) \quad \ldots(3)$$

$$\hat{s}(U_d) = \{ \sum_{t=-147}^{-21} (U_{i,t} - \bar{U}_i)^2/125 \}^{0.5} \quad \ldots(4)$$

$$\bar{U}_i = \sum_{t=-147}^{-21} (U_{i,t})/126 \quad \ldots(5)$$

2. The F-statistic has (8,217) degrees of freedom.

3. The cross-sectional regressions are run for all possible combinations of the differential information variable and the quality of earnings variable:

DIFFERENTIAL INFORMATION	QUALITY OF EARNINGS
1. Analysts' Following	Earnings Noise Score
2. Analysts' Following	Earnings Predictability Score
3. Firm Size	Earnings Predictability Score
4. Firm Size	Earnings Noise Score

Results for combinations (3) and (4) are displayed here. Combinations (1) and (2) are in the Appendix.

Table 47
Cross-sectional means of $CSU1_i$

Firm size x Earnings noise score

MEAN CUMULATIVE STANDARDIZED UNEXPECTED SPREAD

EARNINGS NOISE SCORE

FIRM SIZE	4	5	6	7	TOTAL
1	19.18 (2)	-2.33 (35)	-6.56 (19)	-3.79 (6)	-3.07 (62)
2	-6.35 (8)	-1.99 (37)	-1.40 (8)	8.36 (1)	-2.36 (54)
3	2.28 (28)	3.31 (74)	-4.91 (8)	0.00 (0)	2.45 (110)
TOTAL	1.35 (38)	0.62 (146)	-5.00 (35)	-2.06 (7)	

MEAN CUMULATIVE STANDARDIZED UNEXPECTED LOG SPREAD

EARNINGS NOISE SCORE

FIRM SIZE	4	5	6	7	TOTAL
1	17.42 (2)	-2.49 (35)	-6.64 (19)	-3.34 (6)	-3.20 (62)
2	-6.95 (8)	-2.73 (37)	-1.29 (8)	7.00 (1)	-2.96 (54)
3	1.69 (28)	2.15 (74)	-5.77 (8)	0.00 (0)	1.46 (110)
TOTAL	0.70 (38)	-0.20 (146)	-5.22 (35)	-1.87 (7)	

Table 48

Results of cross-sectional test on cumulative standardized unexpected spread: Firm size X Earnings noise score

Variable:		Coefficient:	Stnd. Dev.:	t-Statistics:
CONSTANT	a0	10.84	10.57	1.02
$INFO1_i$	a1	6.88	15.60	0.44
$INFO2_i$	a2	-28.62	17.07	-1.67@
QE_i	a3	-1.75	2.20	-0.79
$INFO1_i*QE_i$	a4	-2.06	3.00	-0.68
$INFO2_i*QE_i$	a5	4.81	3.42	1.41
D1i	a6	-0.52	2.51	-0.21
D2i	a7	0.55	2.41	0.23
D3i	a8	0.06	1.97	0.03

R-square: 6.89 %   F-statistics (zero slopes)$_2$: 2.01 (SIGNF.)

* = significant at $p < 0.05$ levels with 217 degrees of freedom

@ = significant at $p < 0.10$ levels with 217 degrees of freedom

Table 49

Results of cross-sectional test on cumulative standardized unexpected log spread: Firm size X Earnings noise score

Variable:		Coefficient:	Stnd. Dev.:	t-Statistics:
CONSTANT	a0	11.82	9.55	1.23
$INFO1_i$	a1	4.19	14.09	0.30
$INFO2_i$	a2	-30.91	15.42	-2.00*
QE_i	a3	-2.08	1.98	-1.05
$INFO1_i*QE_i$	a4	-1.37	2.71	-0.51
$INFO2_i*QE_i$	a5	5.36	3.09	1.73@
D1i	a6	-1.20	2.27	-0.53
D2i	a7	0.36	2.17	0.16
D3i	a8	-0.68	1.78	-0.38

R-square: 7.17 % F-statistics (zero slopes)$_2$: 2.10 (SIGNF.)

* = significant at $p < 0.05$ levels with 217 degrees of freedom
@ = significant at $p < 0.10$ levels with 217 degrees of freedom

Table 50

Cross-sectional means of $CSU1_i$

Firm size x Earnings predictability score

MEAN CUMULATIVE STANDARDIZED UNEXPECTED SPREAD

	EARNINGS PREDICTABILITY SCORE				
FIRM SIZE	1	2	3	4	TOTAL
1	4.83 (8)	-5.70 (8)	-4.08 (5)	-3.98 (41)	-3.07 (62)
2	-8.67 (34)	0.57 (11)	-1.49 (14)	-1.94 (21)	-2.36 (54)
3	2.55 (65)	-2.14 (14)	11.88 (6)	2.51 (25)	2.45 (110)
TOTAL	1.67 (81)	-2.19 (32)	1.20 (25)	-1.63 (88)	

MEAN CUMULATIVE STANDARDIZED UNEXPECTED LOG SPREAD

	EARNINGS PREDICTABILITY SCORE				
FIRM SIZE	1	2	3	4	TOTAL
1	4.33 (8)	-6.06 (8)	-4.66 (5)	-3.94 (41)	-3.20 (62)
2	-8.88 (34)	0.56 (11)	-2.51 (14)	-2.70 (21)	-2.96 (54)
3	1.71 (65)	-2.79 (14)	8.49 (6)	1.51 (25)	1.46 (110)
TOTAL	0.92 (81)	-2.56 (32)	-0.30 (25)	-2.08 (88)	

Table 51

Results of cross-sectional test on cumulative standardized unexpected spread: Firm size X Earnings predictability

Variable:		Coefficient:	Stnd. Dev.:	t-Statistics:
CONSTANT	a0	1.85	2.34	0.79
$INFO1_i$	a1	1.17	5.20	0.23
$INFO2_i$	a2	-7.70	5.28	-1.46
QE_i	a3	0.36	0.96	0.38
$INFO1_i*QE_i$	a4	-2.16	1.66	-1.30
$INFO2_i*QE_i$	a5	0.88	1.79	0.49
D1i	a6	-0.50	2.52	-0.20
D2i	a7	-0.34	2.43	-0.14
D3i	a8	0.06	1.98	0.03

R-square: 5.81 %   F-statistics (zero slopes)$_2$: 1.67 (N.S.)

* = significant at $p < 0.05$ levels with 217 degrees of freedom

Table 52

Results of cross-sectional test on cumulative standardized unexpected log spread: Firm size X Earnings predictability

Variable:		Coefficient:	Stnd. Dev.:	t-Statistics:
CONSTANT	a0	1.56	2.12	0.73
$INFO1_i$	a1	1.08	4.71	0.23
$INFO2_i$	a2	-6.63	4.79	-1.38
QE_i	a3	0.19	0.87	0.21
$INFO1_i*QE_i$	a4	-1.80	1.50	-1.19
$INFO2_i*QE_i$	a5	0.72	1.62	0.44
D1i	a6	-1.27	2.29	-0.55
D2i X	a7	-0.44	2.21	-0.20
D3i	a8	-0.63	1.80	-0.38

R-square: 5.51 % F-statistics (zero slopes)$_2$: 1.58 (N.S.)

* = significant at $p < 0.05$ levels with 217 degrees of freedom

Explanation for Tables 53 to 71

1. The abnormal spread ($U_{i,d}$): This is the cross-sectional daily mean of the abnormal spread for day d in the event period. For each firm-event, the abnormal spread is calculated as follows: $U_{i,d} = S_{i,d} - E(S_{i,d})$. To estimate the expected spread, the following simultaneous equation model was run for each of the sample firm-events:

$$S_{i,t} = a_0 + a_1(TV_{i,t}) + a_2(P_{i,t}) + a_3(R_{i,t}) + a_4(S_{i,t-1}) + \eta_{i,t} \quad (1a)$$
$$TV_{i,t} = b_0 + b_1(S_{i,t}) + b_2(MF_{i,t}) + b_3(TV_{i,t-1}) + \mu_{i,t} \quad (1b)$$

The predicted structural coefficients were used to estimate the reduced form coefficients for the spread equation. The expected value of the spread in the event period is derived by using the spread reduced form equation.

Abnormal log spread was calculated in a similar fashion after log-transforming the dependent variable, the bid-ask spread.

2. The Brown and Warner test-statistic:

$$(\bar{U}_d / \hat{S}(\bar{U}_d))$$

This statistic has a t-distribution with 125 degrees of freedom. Here,

$$\hat{S}(\bar{U}_d) = \{\sum_{t=-147}^{-21} (\bar{U}_t - \bar{U})^2/125\}^{0.5}$$

and,

$$\bar{U}_t = \frac{1}{M}\sum_{i=1}^{M} U_{i,t}$$

$$\bar{U} = \{\sum_{t=-147}^{-21} \bar{U}_t\}/126$$

The same procedure was adopted to calculate the Brown and Warner test-statistics for abnormal log spread.

3. The Corrado Rank test-statistic:

To test the behavior of unexpected bid-ask spread in the presence of non-normalities, Corrado's Rank Test statistic has also been estimated over the event periods. This statistic involves the ranking of each $U_{i,t}$, where t = 1 to 152 days in the estimation and event period. Further:

(i) $K_{i,t} = \text{rank}(U_{i,t})$

(ii) $J_{i,t} = (K_{i,t} - 76.5)$, where 76.5 is the average rank over the 152 days.
For each t=127 to 152 days, the z-statistic is computed as follows:

$$\bar{J}_t / \hat{s}\,(\bar{J}_t)$$

where,

$$\bar{J}_t = \frac{1}{N}\sum_{i=1}^{N} J_{i,t}$$

and,

$$\hat{s}(\bar{J}_t) = \sqrt{\frac{1}{152}\sum_{t=1}^{152} (\bar{J}_t)^2}$$

4. The event period has been broken up into three sub-periods. These are as follows:

Sub-period	Days
1. Pre-announcement period	-15 to -2
2. Announcement period	-1 to 0
3. Post-announcement period	+1 to +10

Table 53

Behavior of daily abnormal spread: Earnings signal, Full sample

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0182	-0.4130	-0.4486	-0.8304
-14	-0.0053	-0.1196	-0.4168	0.2844
-13	-0.0397	-0.9010	-1.1226	-1.0243
-12	0.0133	0.3021	0.1873	-0.5995
-11	-0.0695	-1.5766	-3.0380*	-2.3651*
-10	-0.0273	-0.6190	-1.0321	-1.0557
-9	-0.0246	-0.5566	-1.2695	-0.9459
-8	0.0066	0.1489	-0.1073	-0.6480
-7	0.0016	0.0366	-0.4052	-0.6308
-6	-0.0550	-1.2465	-2.4352*	-1.4214
-5	-0.0263	-0.5964	-1.6954@	-0.7991
-4	-0.0751	-1.7024@	-3.0045*	-2.5654*
-3	-0.0346	-0.7847	-1.8914@	-1.3608
-2	0.0094	0.2119	-0.4707	-0.3864
-1	0.0723	1.6388@	1.8027@	0.9944
0	0.0622	1.4092	1.2257	0.6080
1	-0.0476	-1.0798	-2.0385*	-1.8626@
2	-0.0520	-1.1800	-1.8614@	-1.4770
3	-0.0395	-0.8951	-1.5424	-1.3216
4	0.0182	0.4116	-0.1822	-0.1212
5	0.0009	0.0204	0.1460	0.4084
6	-0.0312	-0.7078	-2.1053*	-1.7386@
7	-0.0331	-0.7499	-1.3816	-1.0707
8	-0.0010	-0.0218	-0.2688	-0.7727
9	-0.0253	-0.5735	-1.3691	-1.6844@
10	-0.0388	-0.8789	-1.5365	-1.8968@

NOTES:

1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 153 firm-events

Table 54

Behavior of daily abnormal spread: Dividends signal, Full sample

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0836	-1.8964@	-2.6380*	0.6710
-14	-0.0062	-0.1405	-0.3969	-1.3402
-13	-0.0209	-0.4747	-0.7988	-0.9760
-12	-0.0115	-0.2604	-1.5356	1.8206@
-11	-0.0266	-0.6027	-0.6362	-1.6063
-10	-0.0851	-1.9290@	-3.2683*	-1.1259
-9	-0.0460	-1.0435	-1.7451@	-2.0132*
-8	0.0022	0.0487	-0.7950	-1.2548
-7	0.0499	1.1307	1.8105@	-0.2177
-6	0.0198	0.4491	-0.4957	0.7789
-5	0.0002	0.0041	-1.1759	-1.7711@
-4	0.0039	0.0878	-1.6908@	-1.3148
-3	0.0646	1.4657	1.7652@	1.4856
-2	-0.0317	-0.7181	-1.4676	-2.4306*
-1	-0.0370	-0.8396	-1.3448	-1.6565@
0	0.0785	1.7788@	1.3143	0.2075
1	0.0493	1.1189	2.2567*	-0.3765
2	-0.0689	-1.5632	-2.0555*	-0.7138
3	-0.0362	-0.8214	-0.9526	0.6452
4	-0.0603	-1.3672	-3.0092*	-2.0971*
5	0.0299	0.6774	0.9636	-0.5751
6	-0.0935	-2.1202*	-2.9203*	-1.2338
7	-0.0339	-0.7681	-2.2198*	0.3885
8	-0.0472	-1.0696	-1.6060	-0.5279
9	0.0388	0.8799	0.5470	1.6344@
10	0.0535	1.2125	1.4674	-0.6654

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 55

Behavior of daily abnormal spread: Earnings signal
Low differential information portfolio based on firm size

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0161	0.3210	0.7755	0.1717
-14	-0.0723	-1.4434	-1.4812	-0.2670
-13	-0.0314	-0.6269	-0.6133	-0.7088
-12	0.0194	0.3879	0.3000	-0.6612
-11	-0.0975	-1.9480@	-1.9737@	-1.2842
-10	-0.0318	-0.6346	-0.7823	-1.1729
-9	-0.0673	-1.3433	-1.7076@	-1.6084
-8	0.0345	0.6891	0.7529	0.1367
-7	-0.0329	-0.6567	-0.6882	-0.2670
-6	-0.0783	-1.5634	-1.7322@	-1.0235
-5	-0.0562	-1.1230	-1.0801	-0.7216
-4	-0.0323	-0.6454	-0.9308	-1.0744
-3	-0.0235	-0.4698	-0.6209	-1.2874
-2	-0.0024	-0.0476	0.1095	-0.0890
-1	0.0118	0.2355	0.4879	0.2607
0	0.0396	0.7914	0.8077	0.8074
1	-0.0519	-1.0367	-0.2880	-1.0744
2	-0.1157	-2.3112*	-2.1591*	-1.4081
3	-0.0438	-0.8747	-0.8951	-0.7804
4	-0.0734	-1.4655	-1.1113	-0.8137
5	-0.0170	-0.3402	0.0795	0.9250
6	-0.1121	-2.2378*	-2.3993*	-2.1933*
7	0.0155	0.3092	0.2847	0.2734
8	-0.0196	-0.3911	-0.6858	-0.8233
9	-0.0365	-0.7291	-0.7997	-0.9663
10	-0.0768	-1.5333	-1.3587	-1.5798

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 46 firm-events

Table 56

Behavior of daily abnormal spread: Earnings signal
Low differential information portfolio based on analysts' following

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0120	0.2395	0.9922	0.7018
-14	-0.0723	-1.4416	-1.2433	-0.5547
-13	-0.0480	-0.9575	-0.7895	-0.9784
-12	-0.0104	-0.2063	-0.2035	-1.0490
-11	-0.1022	-2.0374*	-1.8930@	-1.4051
-10	-0.0320	-0.6390	-0.5335	-0.7254
-9	-0.0876	-1.7479@	-1.8160@	-2.0995*
-8	0.0539	1.0748	1.4343	0.3752
-7	-0.0248	-0.4936	-0.4869	-0.2016
-6	-0.0417	-0.8323	-1.3442	-0.6400
-5	-0.0250	-0.4978	-0.5588	-0.2075
-4	-0.0374	-0.7457	-1.0092	-1.0549
-3	-0.0531	-1.0581	-1.4944	-0.9990
-2	-0.0125	-0.2483	-0.4498	-0.1074
-1	0.0561	1.1189	1.1632	1.3021
0	0.0421	0.8402	0.8057	0.7048
1	-0.0391	-0.7796	-0.6266	-0.8695
2	-0.1119	-2.2311*	-2.2155*	-1.6405@
3	-0.0736	-1.4683	-1.3334	-1.4242
4	-0.0026	-0.0519	-0.5786	-0.1339
5	0.0086	0.1722	0.4704	1.1255
6	-0.1508	-3.0085*	-3.0360*	-2.8381*
7	-0.0154	-0.3075	-0.4552	-0.4958
8	-0.0737	-1.4692	-1.5736	-1.8259@
9	-0.0526	-1.0485	-1.2329	-1.2521
10	-0.0637	-1.2709	-1.2008	-1.0314

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 53 firm-events

Table 57

Behavior of daily abnormal spread: Earnings signal
Medium differential information portfolio based on firm size

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0587	-1.2440	-1.0151	-0.9191
-14	0.0072	0.1526	0.3842	1.0801
-13	-0.0840	-1.7805@	-1.5064	-1.0479
-12	-0.0436	-0.9242	-0.8219	-0.9899
-11	-0.2006	-4.2490*	-3.8632*	-3.1887*
-10	-0.0208	-0.4402	-0.6494	-0.2495
-9	-0.0107	-0.2260	0.0124	0.8290
-8	-0.0557	-1.1802	-0.9158	-1.0157
-7	-0.1092	-2.3133*	-2.1579*	-1.7883@
-6	-0.0548	-1.1616	-1.4350	-0.8950
-5	-0.0555	-1.1762	-1.6712@	-0.7163
-4	-0.1217	-2.5775*	-2.5079*	-1.6950@
-3	-0.1466	-3.1053*	-3.0288*	-2.1199*
-2	0.0022	0.0463	-0.3875	0.1175
-1	0.0718	1.5216	0.7658	0.2688
0	0.1715	3.6342*	2.6144*	1.2378
1	-0.1613	-3.4170*	-3.5087*	-2.4161*
2	-0.0396	-0.8387	-0.3356	-1.1155
3	-0.1381	-2.9257*	-2.2804*	-1.8173@
4	-0.0293	-0.6212	-0.6802	-0.2978
5	-0.0732	-1.5507	-1.2109	-0.6068
6	-0.1082	-2.2932*	-2.1695*	-1.3666
7	-0.1075	-2.2772*	-2.2984*	-2.2970*
8	-0.1311	-2.7766*	-2.1720*	-1.9525@
9	-0.0254	-0.5379	-0.5653	-0.4266
10	-0.1343	-2.8450*	-2.8413*	-2.7445*

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 37 firm-events

Table 58

Behavior of daily abnormal spread: Earnings signal
Medium differential information portfolio based on analysts' following

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0035	0.0684	-0.1736	-0.3136
-14	-0.0034	-0.0656	-0.0629	0.9438
-13	-0.0380	-0.7377	-0.4514	-0.3863
-12	0.0280	0.5431	0.4459	-0.4287
-11	-0.1266	-2.4555*	-2.3566*	-2.2571*
-10	0.0368	0.7129	0.5245	0.9816
-9	-0.0375	-0.7273	-0.9129	-0.2287
-8	-0.0670	-1.2984	-1.1406	-1.0256
-7	-0.0120	-0.2329	-0.1414	-0.4651
-6	-0.1339	-2.5960*	-2.5428*	-1.5770
-5	-0.0587	-1.1377	-1.5050	-0.5650
-4	-0.1009	-1.9567@	-2.0934*	-2.0102*
-3	-0.0103	-0.1999	-0.3284	-0.6559
-2	-0.0263	-0.5098	-0.5546	-0.4181
-1	0.0488	0.9468	0.8177	0.4984
0	0.1057	2.0500*	1.3281	0.2560
1	-0.1539	-2.9845*	-2.9525*	-2.8010*
2	-0.0466	-0.9043	-0.5079	-0.7574
3	-0.0024	-0.0472	-0.0546	0.0106
4	-0.0149	-0.2890	0.0210	-0.1060
5	-0.0501	-0.9721	-0.6277	-0.9892
6	-0.0038	-0.0727	-0.4883	-0.6832
7	-0.0527	-1.0228	-0.9934	-1.2513
8	-0.0347	-0.6736	-0.7074	-0.7302
9	-0.0165	-0.3202	-0.0001	-0.4893
10	-0.0485	-0.9405	-1.1248	-1.7103@

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 49 firm-events

Table 59

Behavior of daily abnormal spread: Earnings signal
High differential information portfolio based on firm size

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0193	-0.2492	-0.6792	-0.8261
-14	0.0322	0.4146	0.3880	-0.1224
-13	-0.0218	-0.2810	-0.2067	-0.4001
-12	0.0394	0.5080	0.5293	0.2236
-11	0.0181	0.2336	-0.4289	-0.6225
-10	-0.0278	-0.3584	-0.4601	-0.6920
-9	-0.0038	-0.0492	-0.4433	-0.9768
-8	0.0211	0.2723	-0.2217	-0.4284
-7	0.0829	1.0679	1.3064	0.4637
-6	-0.0397	-0.5121	-1.2399	-0.9344
-5	0.0088	0.1136	-0.5552	-0.2613
-4	-0.0786	-1.0126	-2.0818*	-2.2006*
-3	0.0173	0.2228	-0.3902	0.2565
-2	0.0208	0.2686	-0.5422	-0.6578
-1	0.1123	1.4469	1.7621@	1.2521
0	0.0191	0.2466	-0.4853	-0.4990
1	0.0153	0.1968	-0.5881	-0.5131
2	-0.0168	-0.2161	-0.7198	-0.5802
3	0.0155	0.1996	-0.1107	-0.2754
4	0.1034	1.3326	1.0774	0.6202
5	0.0518	0.6682	0.8917	0.4331
6	0.0626	0.8071	0.2503	-0.2471
7	-0.0257	-0.3306	-0.8475	-0.2907
8	0.0800	1.0316	1.5128	0.7614
9	-0.0179	-0.2303	-0.9906	-1.7534@
10	0.0367	0.4732	0.6289	0.0447

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 70 firm-events

Table 60

Behavior of daily abnormal spread: Earnings signal
High differential information portfolio based on analysts' following

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0705	-0.7278	-1.6160	-1.9334
-14	0.0626	0.6456	0.6219	0.2061
-13	-0.0328	-0.3382	-0.6774	-0.6966
-12	0.0238	0.2458	0.1043	0.2088
-11	0.0192	0.1982	-1.0049	-1.1762
-10	-0.0839	-0.8663	-1.7117	-2.2042*
-9	0.0535	0.5518	0.5613	0.3382
-8	0.0280	0.2893	-0.5685	-0.6561
-7	0.0421	0.4346	-0.0583	-0.5942
-6	0.0071	0.0729	-0.3621	-0.6979
-5	0.0034	0.0351	-0.8902	-0.8178
-4	-0.0895	-0.9233	-2.1025*	-2.0950*
-3	-0.0388	-0.4005	-1.3834	-1.0738
-2	0.0662	0.6837	0.1845	-0.2600
-1	0.1116	1.1522	1.1068	0.2439
0	0.0411	0.4244	0.0042	0.2762
1	0.0456	0.4708	-0.0314	-0.2331
2	0.0049	0.0509	-0.4236	-0.6157
3	-0.0396	-0.4086	-1.2130	-1.2031
4	0.0715	0.7378	0.2619	-0.0121
5	0.0419	0.4324	0.3633	0.6211
6	0.0667	0.6886	-0.0181	-0.0795
7	-0.0325	-0.3357	-0.9468	-0.4567
8	0.1070	1.1049	1.8243@	0.8609
9	-0.0054	-0.0556	-1.0722	-1.6019
10	-0.0035	-0.0358	-0.3227	-1.1196

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 51 firm-events

Table 61

Behavior of daily abnormal spread: Dividends signal
Low differential information portfolio based on analysts' following

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.1643	-3.2763*	-2.9409*	0.3997
-14	-0.1632	-3.2542*	-2.9479*	-1.4824
-13	-0.1483	-2.9581*	-2.7008*	-1.5975
-12	-0.1207	-2.4064*	-2.6012*	0.7451
-11	-0.1428	-2.8475*	-2.0114*	-1.4370
-10	-0.1120	-2.2330*	-2.1924*	-1.5776
-9	-0.2308	-4.6031*	-4.0115*	-2.0304*
-8	-0.1548	-3.0872*	-2.9708*	-1.5078
-7	-0.0058	-0.1156	0.1653	-0.9133
-6	0.1368	2.7280*	1.4116	1.6318@
-5	0.1471	2.9331*	0.9410	-0.7152
-4	0.1042	2.0788*	-0.5828	-1.3108
-3	0.2529	5.0450*	3.3026*	0.7727
-2	-0.0208	-0.4152	-1.1408	-1.2897
-1	-0.0308	-0.6144	-1.1564	-0.9056
0	0.1599	3.1883*	1.4488	0.6023
1	0.2285	4.5575*	5.7813*	1.0550
2	-0.1310	-2.6128*	-2.0203*	-1.8687@
3	-0.0153	-0.3055	0.8257	0.9847
4	-0.2101	-4.1913*	-4.5161*	-1.3296
5	-0.0356	-0.7091	-0.1246	-0.6499
6	-0.1348	-2.6876*	-1.7686@	-1.3794
7	0.1095	2.1836*	0.3087	0.2867
8	-0.0810	-1.6161	-1.5421	-1.0971
9	0.0751	1.4968	0.8423	1.1835
10	-0.0652	-1.2996	-0.8192	-1.1724

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 62

Behavior of daily abnormal spread: Dividends signal
Medium differential information portfolio based on analysts' following

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0813	-1.5763	-1.6759@	-0.6574
-14	-0.0287	-0.5562	-0.7952	0.7117
-13	0.0073	0.1421	-0.3321	0.3558
-12	0.0558	1.0812	0.3056	1.6994@
-11	-0.0703	-1.3639	-1.5704	-2.0876*
-10	-0.0427	-0.8288	-1.1973	0.4101
-9	0.0022	0.0432	-0.5688	-0.6423
-8	0.1299	2.5195*	1.0202	-0.5280
-7	0.0727	1.4088	1.2945	0.3605
-6	-0.0237	-0.4589	-1.0884	-0.3397
-5	-0.0815	-1.5812	-2.0077*	-1.0813
-4	-0.0189	-0.3658	-1.0831	-0.5684
-3	-0.0597	-1.1581	-0.7575	0.2923
-2	-0.0434	-0.8412	-0.7609	-1.3921
-1	-0.1059	-2.0536*	-1.9512	-1.2015
0	0.0524	1.0168	0.4830	-0.3431
1	-0.1121	-2.1729*	-2.3409*	-1.7271@
2	-0.0210	-0.4073	-0.5163	1.0733
3	-0.0881	-1.7081@	-2.0436*	-0.6065
4	-0.0489	-0.9489	-1.0722	-0.9231
5	0.0988	1.9160@	1.4907	0.6296
6	-0.0746	-1.4466	-1.6142	0.5129
7	-0.1236	-2.3970*	-2.7298*	-0.0150
8	-0.0052	-0.1016	-0.4688	0.1259
9	0.0024	0.0462	-0.2273	1.1853
10	0.0427	0.8283	0.6965	0.1548

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 31 firm-events

Table 63

Behavior of daily abnormal spread: Dividends signal
High differential information portfolio based on analysts' following

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0065	-0.0669	0.1297	-0.3965
-14	0.1840	1.8988@	3.2801*	2.2424*
-13	0.0647	0.6680	1.5669	0.6706
-12	-0.0016	-0.0162	-0.9173	-1.4277
-11	0.1542	1.5916	3.0155*	0.8467
-10	-0.1207	-1.2459	-2.5513*	-1.4308
-9	0.0675	0.6969	1.3337	1.5445
-8	-0.0295	-0.3049	-0.1322	-0.1472
-7	0.0719	0.7423	1.5260	0.4541
-6	-0.0330	-0.3406	-0.7825	-1.2875
-5	-0.0261	-0.2690	-0.3217	0.3918
-4	-0.0629	-0.6495	-1.1866	0.2796
-3	0.0599	0.6184	1.3392	0.0756
-2	-0.0253	-0.2606	-0.6658	-1.2937
-1	0.0584	0.6030	1.3284	1.7533@
0	0.0355	0.3659	0.4649	-0.9183
1	0.1084	1.1193	2.1781*	1.1551
2	-0.0777	-0.8015	-1.3179	-0.6582
3	0.0194	0.2003	0.2853	-0.1207
4	0.0728	0.7511	0.0676	-0.1706
5	-0.0064	-0.0665	-0.1478	-0.3918
6	-0.0802	-0.8276	-1.6730@	-0.1815
7	-0.0448	-0.4622	-0.7082	-1.3965
8	-0.0752	-0.7765	-0.9702	-1.6131
9	0.0563	0.5815	0.5825	1.1644
10	0.1880	1.9406@	2.6905*	0.0117

NOTES:

1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 64

Behavior of daily abnormal spread: Earnings signal
High quality of earnings portfolio based on earnings predictability score

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0786	-1.3786	-1.1115	-1.4050
-14	-0.0118	-0.2069	-0.1929	-0.3270
-13	0.0016	0.0282	0.1802	-0.1829
-12	0.0277	0.4854	0.4728	0.0582
-11	-0.0599	-1.0516	-0.9268	-0.9436
-10	-0.0188	-0.3294	0.1260	-0.0291
-9	-0.0238	-0.4166	-0.2818	-0.8646
-8	-0.0617	-1.0830	-1.1309	-1.4992
-7	-0.0149	-0.2622	0.0404	-0.0776
-6	-0.0756	-1.3264	-1.5780	-1.3441
-5	-0.0557	-0.9774	-1.2818	-0.6623
-4	-0.0981	-1.7204@	-1.6047	-1.8346@
-3	-0.0144	-0.2521	-0.6793	-0.6374
-2	-0.0225	-0.3955	-0.4977	-0.6887
-1	-0.0257	-0.4506	-0.6037	-0.0111
0	0.0044	0.0768	0.3138	-0.3714
1	0.0451	0.7914	0.5306	0.4877
2	-0.0965	-1.6930@	-1.4244	-1.2318
3	0.0125	0.2199	0.5584	0.1136
4	0.0775	1.3594	0.7911	0.8106
5	0.0496	0.8708	0.9725	0.4018
6	-0.0521	-0.9136	-1.3637	-1.6295
7	-0.0444	-0.7782	-0.5576	-0.7053
8	0.0527	0.9243	1.3666	0.4559
9	0.0485	0.8513	0.4387	0.1940
10	-0.0104	-0.1824	-0.0832	-0.2106

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 48 firm-events

Table 65

Behavior of daily abnormal spread: Earnings signal
Low quality of earnings portfolio based on earnings predictability score

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0260	0.7067	0.5291	0.2039
-14	0.0068	0.1835	-0.1708	0.8974
-13	-0.0051	-0.1376	-0.4938	-0.3981
-12	0.0065	0.1768	0.1640	-0.4092
-11	-0.0690	-1.8752@	-2.5771*	-1.7851@
-10	-0.0250	-0.6789	-1.1058	-1.4592
-9	-0.0065	-0.1769	-0.7145	-0.2760
-8	0.0251	0.6813	0.5361	0.2067
-7	0.0091	0.2477	-0.3317	-0.4230
-6	-0.0190	-0.5174	-1.0269	-0.5937
-5	-0.0278	-0.7559	-1.1246	-1.2608
-4	-0.0412	-1.1193	-1.5152	-1.9432@
-3	-0.0165	-0.4481	-1.0361	-1.0916
-2	-0.0007	-0.0182	-0.1891	-0.5895
-1	0.0973	2.6448*	2.3590*	1.1582
0	0.0980	2.6623*	1.5102	0.8891
1	-0.0595	-1.6167	-1.2614	-1.7324@
2	0.0016	0.0435	0.3224	-0.3204
3	-0.0644	-1.7504@	-2.3213*	-2.2387*
4	-0.0144	-0.3917	-0.5572	-1.1304
5	0.0355	0.9646	0.9676	1.2220
6	0.0000	0.0010	-0.4111	-0.4064
7	0.0165	0.4484	-0.1428	-0.1179
8	-0.0226	-0.6153	-0.6924	-0.4896
9	-0.0354	-0.9609	-1.3129	-1.9266@
10	-0.0308	-0.8360	-1.2947	-2.0902*

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 67 firm-events

Table 66

Behavior of daily abnormal spread: Dividends signal High quality of earnings portfolio based on earnings predictability score

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.1240	-2.1757*	-1.7229@	-1.7070@
-14	-0.1074	-1.8833@	-2.0863*	-0.9782
-13	0.0158	0.2778	0.4467	-0.6585
-12	-0.0065	-0.1132	-0.6158	-0.5167
-11	-0.0665	-1.1672	-0.4902	-0.3921
-10	-0.1192	-2.0905*	-2.3111*	-1.6125
-9	-0.0790	-1.3861	-0.7921	-1.3461
-8	-0.0366	-0.6428	-0.4217	0.1247
-7	0.0776	1.3615	1.6780@	1.1330
-6	-0.1302	-2.2843*	-2.1775*	-2.0458*
-5	-0.0983	-1.7244@	-1.9238@	-1.4788
-4	-0.0425	-0.7455	-0.6199	-0.8294
-3	0.0467	0.8192	1.4857	0.3639
-2	-0.1171	-2.0550*	-2.0830*	-0.9229
-1	-0.0217	-0.3798	-0.1953	-1.0546
0	0.1247	2.1878*	0.9938	-0.6344
1	0.0312	0.5477	1.4091	-0.1428
2	-0.1324	-2.3221*	-1.9596@	-0.4323
3	-0.0256	-0.4498	0.2715	-0.7118
4	-0.2284	-4.0063*	-4.1353*	-0.7258
5	0.0852	1.4946	2.0392*	1.1923
6	-0.1028	-1.8036@	-1.1733	-0.5198
7	0.0314	0.5502	-0.2912	-0.9691
8	-0.1161	-2.0366*	-1.4346	-0.5228
9	0.1235	2.1666*	1.8356@	-0.0292
10	0.0952	1.6704@	1.8269@	0.9822

NOTES:

1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 33 firm-events

Table 67

Behavior of daily abnormal spread: Dividends signal
Low quality of earnings portfolio based on earnings predictability score

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0334	-0.9079	-1.6330@	-0.7180
-14	0.1751	4.7595*	4.4117*	2.2763*
-13	-0.0389	-1.0585	-1.1740	-0.2271
-12	0.1160	3.1530*	1.9829*	2.1090*
-11	0.0018	0.0476	-0.3514	-0.0258
-10	-0.0031	-0.0855	-0.7051	-0.0612
-9	-0.0154	-0.4188	-0.8012	-0.6051
-8	-0.0869	-2.3624*	-3.1089*	-2.1729*
-7	0.0526	1.4291	1.7035@	0.4773
-6	0.1151	3.1296*	2.4925*	2.1294*
-5	0.0239	0.6488	0.9072	1.2496
-4	-0.1178	-3.2005*	-3.9267*	-1.8806@
-3	0.0676	1.8368@	2.2339*	1.7500@
-2	0.0370	1.0044	0.8060	-1.5365
-1	0.0004	0.0116	-0.4884	-1.0022
0	0.0178	0.4848	0.7577	0.0945
1	0.1078	2.9302*	2.8533*	0.8947
2	0.0544	1.4783	1.6327	-0.0150
3	-0.0416	-1.1304	-1.2309	-0.7268
4	0.1085	2.9490*	-0.0185	-0.9219
5	-0.0524	-1.4237	-1.7331	-1.7269@
6	-0.0357	-0.9700	-1.4175	0.7642
7	-0.0710	-1.9297	-2.3999*	0.0884
8	0.0171	0.4642	-0.0721	0.7506
9	0.0061	0.1643	-0.3765	1.1857
10	0.0081	0.2194	-0.3387	-0.1006

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 68

Behavior of daily abnormal spread: Earnings and dividend signal, Joint announcement sample

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0069	0.0538	0.5192	0.1320
-14	0.0165	0.1275	0.5093	-0.0503
-13	-0.0546	-0.4232	-0.3991	-1.0148
-12	-0.0149	-0.1155	0.0214	-0.0785
-11	-0.0552	-0.4273	-1.5476	-0.8923
-10	-0.0920	-0.7122	-1.4356	-1.3604
-9	-0.0442	-0.3420	-1.1173	-0.2513
-8	0.0909	0.7043	1.4693	0.7163
-7	-0.0533	-0.4129	-0.9977	-0.9708
-6	-0.0478	-0.3705	-1.7227@	-1.0996
-5	-0.1408	-1.0906	-2.8538*	-2.1584*
-4	-0.0308	-0.2387	-0.9715	-0.5435
-3	-0.1102	-0.8532	-2.3251*	-1.6149
-2	-0.0451	-0.3495	-1.3419	-0.8514
-1	0.0555	0.4300	0.6826	0.3519
0	-0.0781	-0.6050	-1.8881	-1.4829
1	-0.0310	-0.2398	-1.1246	-1.3007
2	-0.1901	-1.4721	-3.4179*	-2.4537*
3	-0.0640	-0.4959	-1.2693	-1.1562
4	0.0116	0.0895	-0.6804	-0.1068
5	-0.0647	-0.5013	-1.3341	-1.0682
6	0.0383	0.2966	-0.3283	-0.4273
7	-0.0561	-0.4342	-1.2162	-0.9677
8	-0.0947	-0.7336	-1.7784@	-1.0870
9	-0.0926	-0.7174	-1.6213@	-1.2881
10	-0.2096	-1.6235@	-3.4396*	-3.5659*

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 36 firm-events

Table 69

Behavior of daily abnormal spread: Earnings signal, Earnings followed by dividends sequence sample

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0527	-1.1600	-1.0745	-1.4226
-14	-0.0322	-0.7092	-0.9915	0.0840
-13	-0.0337	-0.7417	-0.7530	-0.5118
-12	0.0048	0.1055	-0.2788	-0.7280
-11	-0.1116	-2.4580*	-2.4217*	-1.9850*
-10	0.0435	0.9570	0.9255	0.8533
-9	-0.0451	-0.9934	-1.1865	-1.4824
-8	-0.0635	-1.3987	-1.3947	-1.1006
-7	-0.0035	-0.0774	0.1496	0.3347
-6	-0.0764	-1.6814@	-1.8772@	-0.8453
-5	0.0132	0.2912	-0.1432	0.4888
-4	-0.1090	-2.4009*	-2.5894*	-2.6417*
-3	-0.0081	-0.1774	-0.6333	-0.4359
-2	0.0132	0.2902	-0.2035	-0.0069
-1	0.0840	1.8488@	1.3015	1.4916
0	0.0654	1.4401	1.4292	1.6434@
1	-0.0532	-1.1707	-1.5077	-1.3674
2	-0.0056	-0.1235	-0.0510	0.0621
3	0.0010	0.0217	0.1080	0.2680
4	0.0261	0.5746	-0.0045	-0.3427
5	0.0199	0.4381	0.9313	1.0983
6	-0.0662	-1.4577	-2.1522*	-1.7515@
7	-0.0491	-1.0804	-0.8967	-0.7337
8	0.0310	0.6830	0.7137	0.2484
9	0.0089	0.1963	-0.5082	-1.1236
10	-0.0171	-0.3766	-0.3846	-0.2703

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 70

Behavior of daily abnormal spread: Dividends signal, Earnings followed by dividends sequence sample

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0836	-1.8417@	-1.7391@	-1.1744
-14	-0.0062	-0.1365	-0.2617	0.5196
-13	-0.0209	-0.4610	-0.5266	-0.4358
-12	-0.0115	-0.2529	-1.0124	-1.2534
-11	-0.0266	-0.5853	-0.4194	0.1089
-10	-0.0851	-1.8734@	-2.1546*	-1.4402
-9	-0.0460	-1.0134	-1.1505	-0.7399
-8	0.0022	0.0473	-0.5241	-0.9206
-7	0.0499	1.0981	1.1936	1.2403
-6	0.0198	0.4361	-0.3268	-0.6273
-5	0.0002	0.0040	-0.7752	-0.7829
-4	0.0039	0.0852	-1.1146	-1.5084
-3	0.0646	1.4234	1.1638	0.7746
-2	-0.0317	-0.6974	-0.9675	-0.8584
-1	-0.0370	-0.8154	-0.8866	-0.6680
0	0.0785	1.7275@	0.8664	0.2167
1	0.0493	1.0866	1.4878	0.5926
2	-0.0689	-1.5181	-1.3551	-1.3732
3	-0.0362	-0.7977	-0.6280	-0.5124
4	-0.0603	-1.3277	-1.9838*	-1.1337
5	0.0299	0.6579	0.6353	0.2765
6	-0.0935	-2.0590*	-1.9252@	-1.3983
7	-0.0339	-0.7460	-1.4634	-1.4282
8	-0.0472	-1.0388	-1.0588	-0.5471
9	0.0388	0.8546	0.3606	0.4406
10	0.0535	1.1775	0.9674	1.0751

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 71

Behavior of daily abnormal spread: Earnings signal, Sole earnings announcement sample

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0184	0.3641	0.1473	-0.0199
-14	0.0216	0.4284	0.0974	0.5927
-13	-0.0376	-0.7444	-0.8112	-0.5729
-12	0.0506	1.0016	0.8132	-0.2616
-11	-0.0115	-0.2270	-1.0937	-1.6954@
-10	-0.0918	-1.8181@	-2.1099*	-2.2468*
-9	0.0256	0.5073	0.3219	0.2020
-8	0.0538	1.0660	0.3545	-0.6755
-7	0.0551	1.0906	-0.0278	-0.9239
-6	-0.0253	-0.5018	-0.4564	-0.9255
-5	0.0018	0.0358	-0.3440	-0.2848
-4	-0.0550	-1.0889	-1.3821	-1.5829
-3	-0.0169	-0.3339	-0.5728	-0.8312
-2	0.0476	0.9417	0.7519	0.0099
-1	0.0666	1.3191	1.1140	-0.2086
0	0.1715	3.3969*	2.4471*	0.6093
1	-0.0521	-1.0312	-0.8234	-0.9868
2	-0.0162	-0.3198	-0.2357	-0.9338
3	-0.0865	-1.7136@	-2.1142*	-2.2369*
4	0.0104	0.2053	0.3492	0.3245
5	0.0231	0.4568	0.3038	0.4934
6	-0.0300	-0.5949	-0.8233	-1.0663
7	0.0123	0.2427	-0.2632	-0.4106
8	0.0227	0.4494	0.2298	-1.0067
9	-0.0270	-0.5338	-0.4037	-0.9371
10	0.0651	1.2890	1.0049	-0.2583

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 44 firm-events

Explanations for Tables 72 to 77

1. The following cross-sectional regression is run on the cumulative standardized abnormal spread and log-spread:

$$CSU2_i = c_0 + c_1(INFO1_i) + c_2(INFO2_i) + c_3(QS_1) + c_4(INFO1*QS_1) + c_5(INFO2*QS_i) + c_6(UE_i) + c_7(LAG_i) + c_8(MM_i) + c_9(INSID_i) + c_{10}(INST_i) + c_{11}(QS_i*INST_i) + c_{12}(DAY_i) + c_{13}(D1_i) + c_{14}(D2_i) + c_{15}(D3_i) + c_{16}(VT_i) + \gamma_i$$

where,

i = 1.....N firm-events;
$INFO1_i$ = '1', for low differential information environment and '0' otherwise;
$INFO2_i$ = '1', for medium differential information environment and '0' otherwise;
QS_i = the quality score of the firm;
UE_i = the unexpected earnings of the firm in that quarter;
LAG_i = ' 1 ', if the earnings or dividend announcement is delayed and, '0 ', otherwise i.e. if it is timely or early;
MM_i = the average number of market makers dealing in the security in the estimation period;
$INSID_i$ = the fraction of insider share holding;
$INST_i$ = the fraction of institutional share holding;
DAY_i = ' 1 ', if the announcement is made on Friday and ' 0' otherwise;
$D1_i$ = ' 1 ', if it is a joint announcement and ' 0 ' otherwise;
$D2_i$ = ' 1 ', if it is a sole earnings announcement and '0 ' otherwise;
$D3_i$ = ' 1 ', if it is a dividend announcement subsequent to a earnings announcement and ' 0 ' otherwise.

VT_i = ' 1 ' if the variability of returns explained by lagged returns is greater than the median R^2, and is ' 0 ' otherwise.

$CSU2_i$ = the cumulative standardized abnormal spread (or, log spread). This is calculated as follows:

$$CSU2_i = \sum_{t=-15}^{+10} SU_{i,d} \qquad ...(1)$$

where:

$$SU_{i,d} = U_{i,d} / \hat{s}(U_d) \quad \ldots (2)$$

$$U_{i,d} = S_{i,d} - E(S_{i,d}) \quad \ldots (3)$$

$$\hat{s}(U_d) = \{ \sum_{t=-147}^{-21} (U_{i,t} - \overline{U}_i)^2 / 125 \}^{0.5} \quad \ldots (4)$$

$$\overline{U}_i = \sum_{t=-147}^{-21} (U_{i,t}) / 126 \quad \ldots (5)$$

2. The F-statistic has (16,209) degrees of freedom.

3. The cross-sectional regressions are run for all possible combinations of the differential information variable and the quality of earnings variable:

DIFFERENTIAL INFORMATION	QUALITY OF EARNINGS
1. Analysts' Following	Earnings Noise Score
2. Analysts' Following	Earnings Predictability Score
3. Firm Size	Earnings Predictability Score
4. Firm Size	Earnings Noise Score

Table 72
Cross-sectional means of $CSU2_i$

Firm size x Earnings noise score

MEAN CUMULATIVE STANDARDIZED ABNORMAL SPREAD

EARNINGS NOISE SCORE

FIRM SIZE	4	5	6	7	TOTAL
1	8.75 (2)	-0.02 (35)	-9.37 (19)	-6.97 (6)	-3.28 (62)
2	-6.47 (8)	-4.93 (37)	-1.13 (8)	1.83 (1)	-4.47 (54)
3	-2.31 (28)	2.65 (74)	5.28 (8)	0.00 (0)	1.58 (110)
TOTAL	-2.60 (38)	0.09 (146)	-4.14 (35)	-5.72 (7)	

MEAN CUMULATIVE STANDARDIZED ABNORMAL LOG SPREAD

EARNINGS NOISE SCORE

FIRM SIZE	4	5	6	7	TOTAL
1	7.42 (2)	0.60 (35)	-10.69 (19)	-5.77 (6)	-3.25 (62)
2	-0.35 (8)	-6.38 (37)	-2.53 (8)	-1.55 (1)	-4.83 (54)
3	-2.10 (28)	1.51 (74)	-1.90 (8)	0.00 (0)	0.34 (110)
TOTAL	-1.23 (38)	-0.71 (146)	-6.82 (35)	-5.16 (7)	

Table 73

Results of cross-sectional test on cumulative standardized abnormal spread: Firm size X Earnings noise score

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-40.24	15.63	-2.57*
$INFO1_i$	c1	57.79	15.35	3.76*
$INFO2_i$	c2	-4.77	15.85	-0.30
QE_i	c3	7.88	3.08	2.55*
$INFO1_i*QE_i$	c4	-12.37	2.96	-4.17*
$INFO2_i*QE_i$	c5	-0.57	3.17	-0.18
UE_i	c6	40.58	32.06	1.27
LAG_i	c7	4.70	1.53	3.06*
MM_i	c8	-0.13	0.15	-0.88
$INSID_i$	c9	5.65	4.00	1.41
$INST_i$	c10	50.96	33.29	1.53
$INST_i*QE_i$	c11	-9.13	6.37	-1.43
DAY_i	c12	2.92	1.73	1.69@
D1i	c13	-1.86	2.24	-0.83
D2i	c14	0.37	2.18	0.17
D3i	c15	0.10	1.75	0.06
VTi	c16	-0.40	1.50	-0.26

R-square: 20.83 % F-statistics (zero slopes)$_2$: 3.44 (Signf.)

* = significant at $p < 0.05$ levels with 209 degrees of freedom.
@ = significant at $p < 0.10$ levels with 209 degrees of freedom.

Table 74

Results of cross-sectional test on cumulative standardized abnormal log spread: Firm size X Earnings noise score

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-18.99	15.43	-1.23
$INFO1_i$	c1	44.32	15.16	2.92*
$INFO2_i$	c2	2.78	15.65	0.18
QE_i	c3	3.32	3.04	1.09
$INFO1_i*QE_i$	c4	-9.30	2.92	-3.17*
$INFO2_i*QE_i$	c5	-1.78	3.13	-0.57
UE_i	c6	48.86	31.64	1.54
LAG_i	c7	5.38	1.51	3.56*
MM_i	c8	-0.13	0.15	-0.82
$INSID_i$	c9	2.08	3.94	0.53
$INST_i$	c10	32.38	32.86	0.98
$INST_i*QE_i$	c11	-5.78	6.28	-0.92
DAY_i	c12	2.98	1.71	1.74@
D1i	c13	-0.94	2.21	-0.43
D2i	c14	2.29	2.15	1.06
D3i	c15	-0.11	1.73	-0.06
VTi	c16	-0.15	1.48	-0.10

R-square: 17.82 % F-statistics (zero slopes)$_2$: 2.83 (Signf.)

* = significant at $p < 0.05$ levels with 209 degrees of freedom.

@ = significant at $p < 0.10$ levels with 209 degrees of freedom.

Table 75
Cross-sectional means of $CSU2_i$

Firm size x Earnings predictability score

MEAN CUMULATIVE STANDARDIZED ABNORMAL SPREAD

FIRM SIZE	EARNINGS PREDICTABILITY SCORE 1	2	3	4	TOTAL
1	0.47 (8)	-10.20 (8)	-8.45 (5)	-2.03 (41)	-3.28 (62)
2	-11.15 (34)	-3.34 (11)	-3.03 (14)	-3.47 (21)	-4.47 (54)
3	0.59 (65)	-1.61 (14)	6.74 (6)	4.71 (25)	1.58 (110)
TOTAL	-0.58 (81)	-4.30 (32)	-1.77 (25)	-0.47 (88)	

MEAN CUMULATIVE STANDARDIZED ABNORMAL LOG SPREAD

FIRM SIZE	EARNINGS PREDICTABILITY SCORE 1	2	3	4	TOTAL
1	0.96 (8)	-13.62 (8)	-8.93 (5)	-1.36 (41)	-3.25 (62)
2	-5.12 (34)	-1.82 (11)	-7.00 (14)	-4.71 (21)	-4.83 (54)
3	-0.33 (65)	-3.13 (14)	3.49 (6)	3.27 (25)	0.34 (110)
TOTAL	-0.67 (81)	-5.34 (32)	-4.87 (25)	-0.88 (88)	

Table 76

Results of cross-sectional test on cumulative standardized abnormal spread: Firm size X Earnings predictability score

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-6.03	4.33	-1.39
$INFO1_i$	c1	-7.02	4.93	-1.42
$INFO2_i$	c2	-10.53	4.98	-2.11*
QE_i	c3	2.01	1.42	1.42
$INFO1_i*QE_i$	c4	-0.04	1.55	-0.02
$INFO2_i*QE_i$	c5	1.07	1.68	0.64
UE_i	c6	73.52	33.24	2.21*
LAG_i	c7	3.62	1.56	2.31*
MM_i	c8	-0.16	0.16	-1.01
$INSID_i$	c9	3.49	4.06	0.86
$INST_i$	c10	13.31	8.52	1.56
$INST_i*QE_i$	c11	-2.82	2.82	-1.00
DAY_i	c12	3.16	1.79	1.76@
D1i	c13	-2.32	2.34	-0.99
D2i	c14	-0.43	2.31	-0.19
D3i	c15	0.08	1.81	0.05
VTi	c16	0.40	1.55	0.26

R-square: 15.29 % F-statistics (zero slopes)$_2$: 2.35 (Signf.)

* = significant at $p < 0.05$ levels with 209 degrees of freedom.

@ = significant at $p < 0.10$ levels with 209 degrees of freedom.

Table 77

Results of cross-sectional test on cumulative standardized abnormal log spread: Firm size X Earnings predictability score

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-6.79	4.25	-1.60
$INFO1_i$	c1	-7.90	4.83	-1.64@
$INFO2_i$	c2	-2.77	4.88	-0.56
QE_i	c3	1.89	1.39	1.35
$INFO1_i*QE_i$	c4	0.71	1.52	0.47
$INFO2_i*QE_i$	c5	-1.17	1.64	-0.71
UE_i	c6	67.39	32.57	2.06*
LAG_i	c7	4.19	1.53	2.72*
MM_i	c8	-0.12	0.16	-0.77
$INSID_i$	c9	2.05	3.98	0.52
$INST_i$	c10	12.94	8.35	1.54
$INST_i*QE_i$	c11	-3.17	2.77	-1.14
DAY_i	c12	2.86	1.76	1.63@
D1i	c13	-2.99	2.30	-1.30
D2i	c14	0.62	2.26	0.27
D3i	c15	-0.10	1.78	-0.06
VTi	c16	0.20	1.52	0.13

R-square: 13.31 % F-statistics (zero slopes)$_2$: 2.00 (Signf.)

* = significant at $p < 0.05$ levels with 209 degrees of freedom.

@ = significant at $p < 0.10$ levels with 209 degrees of freedom.

Explanation for Tables 78 to 87

1. The mean-adjusted spread (U_d): Daily cross-sectional mean of the mean-adjusted spread for each day d in the event period. Further,

$$\bar{U}_d = \frac{1}{M}\sum_{i=1}^{M} U_{i,d}$$

where, M = the number of firm-events in the sample.

In the case of mean-adjusted log spread, the cross-sectional daily mean of the mean-adjusted log spread for each day d in the analysis period has been calculated.

2. The Brown and Warner test-statistic:

$$(\bar{U}_d / \hat{S}(\bar{U}_d))$$

This statistic has a t-distribution with 125 degrees of freedom. Here,

$$\hat{S}(\bar{U}_d) = \left\{ \sum_{t=-147}^{-21} (\bar{U}_t - \bar{U})^2 / 125 \right\}^{0.5}$$

and,

$$\bar{U}_t = \frac{1}{M}\sum_{i=1}^{M} U_{i,t}$$

$$\bar{U} = \left\{ \sum_{t=-147}^{-21} \bar{U}_t \right\} / 126$$

The same procedure has been adopted for calculation of the test-statistics for mean-adjusted log spread.

3. The Corrado Rank test-statistic:

To test the behavior of unexpected bid-ask spread in the presence of non-normalities, Corrado's Rank Test statistic has also been estimated over the event periods. This statistic involves the ranking of each $U_{i,t}$, where t = 1 to 152 days in the estimation and event period. Further:

(i) $K_{i,t}$ = rank $(U_{i,t})$

(ii) $J_{i,t} = (K_{i,t} - 76.5)$, where 76.5 is the average rank over the 152 days.

For each t=127 to 152 days, the z-statistic is computed as follows:

$$\bar{J}_t / \hat{s}\,(\bar{J}_t)$$

where,

$$\bar{J}_t = \frac{1}{N}\sum_{i=1}^{N} J_{i,t}$$

and,

$$\hat{s}\,(\bar{J}_t) = \sqrt{\frac{1}{152}\sum_{t=1}^{152} (\bar{J}_t)^2}$$

4. The cross-sectional mean of the mean-adjusted volume, bid and ask price for each day d in the analysis period have been calculated in a manner similar to (1).

5. The Brown and Warner and the Corrado Rank test-statistics for volume, bid and ask price have been calculated as in (2) and (3) above.

6. The event period has been broken up into three sub-periods. These are as follows:

Sub-period	Days
1. Pre-announcement period	-15 to -2
2. Announcement period	-1 to 0
3. Post-announcement period	+1 to +10

Table 78

Behavior of daily mean-adjusted ask price: Earnings signal, Full sample

DAY	MEAN-ADJ. ASK PRC.[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.5400	0.6139	0.7474	0.9911
-14	0.5734	0.6520	0.7449	1.0056
-13	0.5702	0.6483	0.6983	0.9315
-12	0.6478	0.7365	0.8027	1.0239
-11	0.6249	0.7105	0.7970	0.9892
-10	0.6225	0.7077	0.7889	0.9202
-9	0.6274	0.7133	0.7939	0.9580
-8	0.6699	0.7616	0.8511	1.0379
-7	0.6396	0.7273	0.8419	1.0678
-6	0.6208	0.7059	0.8096	1.0075
-5	0.6037	0.6864	0.7809	0.9459
-4	0.5996	0.6817	0.7635	0.8941
-3	0.5902	0.6711	0.7433	0.8247
-2	0.6004	0.6827	0.7703	0.9114
-1	0.6858	0.7797	0.8496	0.9469
0	0.6805	0.7737	0.8033	0.9399
1	0.6494	0.7384	0.7720	0.9303
2	0.6527	0.7421	0.7826	0.9352
3	0.6404	0.7282	0.7576	0.9091
4	0.6069	0.6901	0.7349	0.8670
5	0.5154	0.5861	0.6553	0.8588
6	0.4190	0.4764	0.5745	0.7161
7	0.4427	0.5034	0.5998	0.7683
8	0.4333	0.4927	0.5735	0.7629
9	0.4288	0.4876	0.5913	0.8069
10	0.4301	0.4890	0.6189	0.8233

NOTES:
1. The mean-adjusted ask price: Daily cross-sectional mean of the mean-adjusted ask price. The expected price for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted price
3. Brown and Warner test-statistic for the mean-adjusted log price
4. Corrado's Rank test-statistic for the mean-adjusted price
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 153 firm-events

Table 79

Behavior of daily mean-adjusted bid price: Earnings signal, Full sample

DAY	MEAN-ADJ. BID PRC.[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.5625	0.6107	0.6758	0.9431
-14	0.5886	0.6391	0.6932	0.9410
-13	0.6123	0.6648	0.6951	0.9299
-12	0.6499	0.7056	0.7690	1.0282
-11	0.7063	0.7668	0.8289	1.1205
-10	0.6728	0.7305	0.7822	0.9952
-9	0.6720	0.7296	0.7831	0.9274
-8	0.6777	0.7358	0.7897	1.0160
-7	0.6450	0.7003	0.7934	1.0107
-6	0.6924	0.7517	0.8274	1.0260
-5	0.6687	0.7260	0.7891	0.9934
-4	0.6907	0.7500	0.7945	0.9897
-3	0.6491	0.7047	0.7525	0.9015
-2	0.6246	0.6781	0.7220	0.8965
-1	0.6376	0.6923	0.7005	0.8767
0	0.6238	0.6772	0.6916	0.8732
1	0.6928	0.7522	0.7581	0.9632
2	0.7136	0.7748	0.7895	0.9895
3	0.6907	0.7500	0.7588	1.0093
4	0.6156	0.6684	0.6978	0.9404
5	0.5118	0.5557	0.5989	0.8044
6	0.4693	0.5096	0.5976	0.8266
7	0.4898	0.5318	0.6069	0.8586
8	0.4563	0.4954	0.5926	0.8470
9	0.4726	0.5131	0.5917	0.8231
10	0.4632	0.5029	0.6188	0.9005

NOTES:
1. The mean-adjusted bid price: Daily cross-sectional mean of the mean-adjusted bid price. The expected price for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted price
3. Brown and Warner test-statistic for the mean-adjusted log price
4. Corrado's Rank test-statistic for the mean-adjusted price
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 153 firm-events

Table 80

Behavior of daily mean-adjusted ask price: Dividends signal, Full sample

DAY	MEAN-ADJ. ASK PRC.[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.4971	0.5652	0.3752	0.5784
-14	0.5330	0.6060	0.4469	0.2618
-13	0.5193	0.5905	0.4102	0.6570
-12	0.5108	0.5807	0.4436	0.7904
-11	0.5467	0.6216	0.4807	0.7769
-10	0.4183	0.4756	0.3818	0.3931
-9	0.4132	0.4698	0.3625	0.3380
-8	0.3892	0.4425	0.3436	0.3409
-7	0.3738	0.4250	0.3265	0.7498
-6	0.3566	0.4055	0.3193	0.6787
-5	0.3310	0.3763	0.3074	0.2894
-4	0.3036	0.3452	0.2658	0.1716
-3	0.3738	0.4250	0.3041	0.4221
-2	0.2676	0.3043	0.2185	-0.0517
-1	0.2316	0.2634	0.1825	0.0065
0	0.2060	0.2342	0.1606	0.2297
1	0.1888	0.2147	0.1603	0.2288
2	-0.0355	-0.0404	-0.0453	-0.4183
3	-0.0509	-0.0579	-0.0911	-0.2717
4	-0.1382	-0.1572	-0.1662	-0.5935
5	-0.1331	-0.1513	-0.2476	-0.4377
6	-0.2290	-0.2604	-0.3350	-0.6850
7	-0.1468	-0.1669	-0.2831	-0.5014
8	-0.1845	-0.2097	-0.3386	-0.6896
9	-0.1964	-0.2234	-0.3421	-0.5372
10	-0.0817	-0.0929	-0.2524	-0.3880

NOTES:

1. The mean-adjusted ask price: Daily cross-sectional mean of the mean-adjusted ask price. The expected price for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted price
3. Brown and Warner test-statistic for the mean-adjusted log price
4. Corrado's Rank test-statistic for the mean-adjusted price
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 153 firm-events

Table 81

Behavior of daily mean-adjusted bid price: Dividends signal, Full sample

DAY	MEAN-ADJ. BID PRC.[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.5599	0.6079	0.3798	0.3759
-14	0.5376	0.5837	0.3618	0.4777
-13	0.5445	0.5911	0.3983	0.8899
-12	0.5222	0.5670	0.3972	0.6252
-11	0.5513	0.5986	0.4471	1.0154
-10	0.4862	0.5279	0.3825	0.5702
-9	0.4434	0.4815	0.3661	0.6068
-8	0.3664	0.3978	0.3275	0.5904
-7	0.3287	0.3569	0.2775	0.9195
-6	0.3150	0.3420	0.2810	0.4793
-5	0.3270	0.3550	0.3034	0.5598
-4	0.2876	0.3123	0.2573	0.3309
-3	0.2962	0.3216	0.2397	0.1552
-2	0.2962	0.3216	0.2182	0.2073
-1	0.2619	0.2844	0.2075	0.2538
0	0.1352	0.1468	0.1115	0.2279
1	0.0838	0.0910	0.0693	0.2020
2	-0.0086	-0.0094	-0.0369	-0.3095
3	-0.0223	-0.0242	-0.0438	-0.3022
4	-0.0994	-0.1079	-0.1622	-0.3631
5	-0.1799	-0.1953	-0.2236	-0.4775
6	-0.1593	-0.1730	-0.2325	-0.5139
7	-0.1131	-0.1228	-0.1912	-0.5167
8	-0.1456	-0.1581	-0.2555	-0.5096
9	-0.2261	-0.2455	-0.3134	-0.6606
10	-0.1559	-0.1693	-0.2693	-0.2149

NOTES:
1. The mean-adjusted bid price: Daily cross-sectional mean of the mean-adjusted bid price. The expected price for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted price
3. Brown and Warner test-statistic for the mean-adjusted log price
4. Corrado's Rank test-statistic for the mean-adjusted price
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 153 firm-events

Table 82

Behavior of daily mean-adjusted spread: Earnings signal
High quality of earnings portfolio based on earnings noise score (=4)

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0346	-0.4774	-0.3430	-0.5109
-14	-0.1298	-1.7931@	-1.8156@	-1.2893
-13	-0.0703	-0.9708	-0.8500	-0.5849
-12	0.0488	0.6738	0.6334	0.2698
-11	-0.0167	-0.2307	-0.2474	-0.3557
-10	0.0369	0.5094	0.4558	0.1958
-9	0.0071	0.0982	-0.1558	0.1361
-8	0.0012	0.0160	0.0642	0.3748
-7	0.0726	1.0028	1.2195	1.6020
-6	-0.1119	-1.5464	-1.6539@	-1.3895
-5	0.1083	1.4961	1.3564	1.4230
-4	-0.1000	-1.3819	-1.4506	-1.0624
-3	0.0369	0.5094	0.5953	0.7783
-2	0.0488	0.6738	-0.0072	-1.3394
-1	0.0369	0.5094	0.6705	0.8332
0	0.1559	2.1540*	2.1558*	2.0771*
1	-0.0703	-0.9708	-0.8272	-0.5133
2	0.0785	1.0850	1.2126	0.9120
3	0.0726	1.0028	1.1262	0.6088
4	0.1202	1.6606@	1.7376@	1.9124@
5	0.0309	0.4271	0.7206	0.8834
6	-0.0286	-0.3952	-0.3486	-0.2626
7	-0.1417	-1.9575@	-2.0625*	-2.1249*
8	-0.0465	-0.6418	-1.0653	-1.4540
9	-0.0346	-0.4774	-0.6579	-0.6327
10	-0.0346	-0.4774	-0.3597	-0.5587

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 83

Behavior of daily mean-adjusted volume: Earnings signal High quality of earnings portfolio based on earnings noise score (=4)

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-8649.4021	-1.0393	-0.1110	-0.3210
-14	-1963.2593	-0.2359	0.2481	0.1457
-13	-8175.6402	-0.9824	-0.0008	-0.6964
-12	-8342.8783	-1.0025	0.1755	-0.3457
-11	-2187.2593	-0.2628	-1.1927	-0.0445
-10	7377.5979	0.8865	-0.8040	-0.4223
-9	-4578.9259	-0.5502	-0.7422	-0.6915
-8	-2425.1164	-0.2914	-0.3953	-0.4618
-7	-5848.7355	-0.7028	0.0958	-0.0667
-6	-7268.6878	-0.8734	-0.4698	-1.1977
-5	-1294.3069	-0.1555	1.1105	0.8372
-4	-725.4974	-0.0872	0.7685	0.5532
-3	9257.6455	1.1124	1.1171	0.7977
-2	65229.7884	7.8378*	1.5803	1.0125
-1	6867.0265	0.8251	0.0947	1.4299
0	-420.3545	-0.0505	1.1284	1.0496
1	5672.4074	0.6816	-0.8152	-0.0099
2	49759.6455	5.9790*	1.0220	1.4793
3	3946.8836	0.4743	-0.4620	0.5680
4	1252.2169	0.1505	0.7899	0.6371
5	-10950.7355	-1.3158	-0.3064	-0.7952
6	7340.0741	0.8820	-0.1807	-0.5087
7	-7940.9259	-0.9542	-0.9758	-1.8324@
8	993.5503	0.1194	-0.9838	-1.0076
9	4504.3598	0.5412	-0.2806	-0.3285
10	-977.4021	-0.1174	0.2969	0.1926

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 84

Behavior of daily mean-adjusted spread: Earnings signal
High quality of earnings portfolio based on earnings noise score (=5)

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	0.0166	0.4229	0.8513	0.3761
-14	0.0463	1.1770	1.3210	1.6824@
-13	-0.0130	-0.3313	-0.2266	-0.2646
-12	0.0115	0.2917	-0.0142	-0.1705
-11	-0.0491	-1.2494	-1.6255@	-1.4518
-10	-0.0491	-1.2494	-1.2248	-1.3709
-9	-0.0001	-0.0034	-0.0097	0.0918
-8	0.0218	0.5540	0.3536	-0.1946
-7	-0.0053	-0.1345	-0.5535	-0.9839
-6	-0.0401	-1.0199	-0.7847	-0.1848
-5	-0.0646	-1.6429@	-1.7705@	-1.4562
-4	-0.0362	-0.9215	-0.8746	-0.8833
-3	-0.0220	-0.5608	-0.8120	-0.9423
-2	0.0012	0.0294	0.1514	-0.0743
-1	0.0914	2.3247*	2.2216*	1.6442@
0	0.1004	2.5542*	2.0410*	1.4223
1	-0.0001	-0.0034	-0.0032	0.0295
2	-0.0646	-1.6429	-1.7650@	-1.4201
3	-0.0465	-1.1838	-1.2138	-0.7729
4	0.0024	0.0622	-0.1640	-0.3159
5	0.0179	0.4557	0.6757	1.2047
6	-0.0156	-0.3969	-0.9469	-1.0232
7	0.0024	0.0622	0.1355	0.0787
8	0.0347	0.8819	0.7480	1.0189
9	-0.0079	-0.2001	-0.2654	-0.4023
10	0.0037	0.0950	-0.2145	-0.3881

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 97 firm-events

Table 85

Behavior of daily mean-adjusted volume: Earnings signal
High quality of earnings portfolio based on earnings noise score (=5)

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	8967.6193	1.5302	-1.1933	-0.1217
-14	11456.1141	1.9548@	1.9322@	2.5716*
-13	-840.0508	-0.1433	-0.4520	0.2301
-12	-1311.1951	-0.2237	-0.5775	-0.3374
-11	11386.3925	1.9429@	-0.4512	-0.2920
-10	-2867.9683	-0.4894	-0.1217	0.0819
-9	2559.2482	0.4367	1.0385	1.2300
-8	4163.6399	0.7105	-0.3946	0.4369
-7	14636.1760	2.4974*	-2.1767*	-1.4512
-6	1882.9698	0.3213	0.0208	-0.5210
-5	1268.0729	0.2164	-0.9295	-0.7632
-4	-2591.1539	-0.4421	-1.3609	-1.7576@
-3	-4606.0714	-0.7860	-1.1556	-0.9015
-2	-4368.3395	-0.7454	-0.7641	-0.7709
-1	8725.1966	1.4888	2.3266*	2.5174*
0	4962.6915	0.8468	2.7507*	3.1756*
1	615.8873	0.1051	-0.2693	-0.2633
2	1813.3719	0.3094	0.9753	0.7134
3	-2328.3498	-0.3973	-0.9261	-0.6448
4	-5456.9065	-0.9311	-0.7421	-0.8262
5	-6257.5869	-1.0678	-0.5184	-0.6493
6	-8406.2158	-1.4344	-0.3559	-0.8141
7	-3345.4116	-0.5708	-0.5704	-0.3418
8	-280.7828	-0.0479	-0.0513	-0.3728
9	-1379.6797	-0.2354	-1.1446	-0.5907
10	2192.0317	0.3740	-0.4680	-0.8174

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 97 firm-events

Table 86

Behavior of daily mean-adjusted spread: Earnings signal Medium quality of earnings portfolio based on earnings noise score (=6)

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.1268	-0.3221	-0.4532	-0.2286
-14	-0.1626	-0.4128	-0.8959	-0.5540
-13	-0.1536	-0.3902	-0.7445	-0.3061
-12	-0.0688	-0.1747	0.0148	-0.1763
-11	-0.2429	-0.6169	-2.1523*	-1.8033@
-10	-0.1268	-0.3221	-0.6173	-0.6024
-9	-0.2027	-0.5149	-1.4484	-1.2765
-8	-0.1626	-0.4128	-0.8094	-0.4378
-7	-0.0822	-0.2088	0.0293	0.1375
-6	-0.1983	-0.5035	-1.3758	-0.9898
-5	-0.1893	-0.4809	-1.1214	-0.6857
-4	-0.2831	-0.7190	-2.3403*	-2.3031*
-3	-0.2652	-0.6736	-2.1959*	-1.8072@
-2	-0.1492	-0.3788	-0.6512	-0.2828
-1	-0.0956	-0.2428	-0.2689	-0.3215
0	-0.1224	-0.3108	-0.3726	-0.1046
1	-0.1804	-0.4582	-1.0778	-1.2203
2	-0.1760	-0.4468	-1.1828	-0.8465
3	-0.1804	-0.4582	-1.0154	-0.6334
4	-0.1492	-0.3788	-0.6776	0.0078
5	-0.0867	-0.2201	-0.1554	0.4901
6	-0.1938	-0.4922	-1.2767	-0.8620
7	-0.1536	-0.3902	-0.8505	-0.2034
8	-0.2072	-0.5262	-1.4095	-1.2765
9	-0.1893	-0.4809	-1.4360	-1.5612
10	-0.1581	-0.4015	-1.0712	-0.6780

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 28 firm-events

Table 87

Behavior of daily mean-adjusted volume: Earnings signal
Medium quality of earnings portfolio based on earnings noise score (=6)

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	10624.4875	0.2160	-1.9341@	-1.2323
-14	14427.2732	0.2932	-0.5751	-1.4320
-13	-2828.6553	-0.0575	0.7162	0.4462
-12	-434.2625	-0.0088	0.1721	0.0659
-11	-31984.0482	-0.6501	-0.4103	-1.0262
-10	-73811.1553	-1.5002	0.1085	-1.1856
-9	-69792.9768	-1.4186	-0.7081	-1.4044
-8	-45831.6196	-0.9316	-2.1892*	-1.8612@
-7	-39635.3339	-0.8056	1.6733@	0.3336
-6	-55093.4053	-1.1198	-0.0868	0.1190
-5	-49644.6553	-1.0091	0.1835	0.2188
-4	-37488.4053	-0.7620	-1.8157@	-1.9632*
-3	-87479.3696	-1.7781@	-0.3775	-0.9327
-2	-3872.0482	-0.0787	-0.1382	0.7734
-1	149622.9161	3.0411*	2.5212*	2.5347*
0	104610.6304	2.1263*	2.0895*	2.0036*
1	31296.3804	0.6361	1.3906	0.3952
2	-16872.5482	-0.3429	1.2177	0.2996
3	-69290.7268	-1.4084	0.6984	-0.3208
4	-32417.8696	-0.6589	1.8609@	1.2472
5	-8276.9053	-0.1682	0.0981	-0.6735
6	-38027.1553	-0.7729	0.4499	-0.3803
7	-7956.2268	-0.1617	0.2908	-0.4781
8	-56627.4410	-1.1510	0.7804	-0.2720
9	-19111.6910	-0.3885	0.7770	0.6055
10	-35888.3696	-0.7295	-0.4113	-0.8138

NOTES:

1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at p < 0.05, 2 tailed
   @ = significant at p < 0.10, 2 tailed
6. Sample size: 28 firm-events

Explanations for Tables 88 to 93

1. The following cross-sectional regression is run on the cumulative standardized mean-adjusted spread and log-spread:

$$CSU1_i = a_0 + a_1(INFO1_i) + a_2(INFO2_i) + a_3(QS_i) + a_4(INFO1*QS_i) + a_5(INFO2*QS_i) + a_6(D1_i) + a_7(D2_i) + a_8(D3_i) + \eta_i .$$

where,

i = the firm-events ranging from i = 1 to N ;

$INFO1_i$ = ' 1 ', for low differential information environment, and, ' 0 ' otherwise;

$INFO2_i$ = ' 1 ', for median differential information environment, and, ' 0 ' otherwise;

QS_i = the quality score of the firm. This score takes the value of ' 1 ' (for high quality of earnings disclosures) to ' 4 ' (for low quality of earnings disclosures) if the earnings predictability approach is used, or, takes the value of ' 4 ' (high quality of earnings) to ' 8 ' (low quality of earnings) in the case of the earnings noise approach.

$D1_i$ = ' 1 ', if it is a joint announcement and ' 0 ' otherwise;

$D2_i$ = ' 1 ', if it is a sole earnings announcement and '0 ' otherwise;

$D3_i$ = ' 1 ', if it is a dividend announcement subsequent to a earnings announcement and ' 0 ' otherwise.

$CSU1_i$ = the cumulative standardized unexpected spread (or, log spread). This is calculated as follows:

$$CSU1_i = \sum_{t=-15}^{+10} SU_{i,d} \quad \ldots(1)$$

where:

$$SU_{i,d} = U_{i,d} / \hat{s}(U_d) \quad \ldots(2)$$

$$U_{i,d} = S_{i,d} - E(S_{i,d}) \quad \ldots(3)$$

$$\hat{S}(U_d) = \{ \sum_{t=-147}^{-21} (U_{i,t} - \bar{U}_i)^2/125 \}^{0.5} \quad \ldots(4)$$

$$\bar{U}_i = \sum_{t=-147}^{-21} (U_{i,t})/126 \quad \ldots(5)$$

2. The F-statistic has (8,217) degrees of freedom.

3. The cross-sectional regressions are run for all possible combinations of the differential information variable and the quality of earnings variable:

DIFFERENTIAL INFORMATION	QUALITY OF EARNINGS
1. Analysts' Following	Earnings Noise Score
2. Analysts' Following	Earnings Predictability Score
3. Firm Size	Earnings Predictability Score
4. Firm Size	Earnings Noise Score

Results for combinations (1) and (2) are displayed here. Combinations (3) and (4) are in the text.

Table 88

Cross-sectional means of $CSU1_i$

Analysts' following x Earnings noise score

MEAN CUMULATIVE STANDARDIZED UNEXPECTED SPREAD

ANALYSTS' FOLLOWING	EARNINGS NOISE SCORE 4	5	6	7	TOTAL
1	-0.18 (13)	-0.32 (35)	-6.56 (19)	-2.06 (7)	-2.06 (74)
2	-3.07 (14)	-0.43 (61)	-3.42 (5)	0.00 (0)	-1.08 (80)
3	8.79 (11)	2.55 (50)	-3.03 (11)	0.00 (0)	2.65 (72)
TOTAL	1.35 (38)	0.62 (146)	-5.00 (35)	-2.06 (7)	

MEAN CUMULATIVE STANDARDIZED UNEXPECTED LOG SPREAD

ANALYSTS' FOLLOWING	EARNINGS NOISE SCORE 4	5	6	7	TOTAL
1	-0.29 (13)	-0.95 (35)	-6.64 (19)	-1.87 (7)	-2.28 (74)
2	-3.57 (14)	-0.91 (61)	-3.14 (5)	0.00 (0)	-1.52 (80)
3	7.32 (11)	1.20 (50)	-3.71 (11)	0.00 (0)	1.39 (72)
TOTAL	0.70 (38)	-0.20 (146)	-5.22 (35)	-1.87 (7)	

Table 89

Results of cross-sectional test on cumulative standardized unexpected spread: Analysts' following X Earnings noise

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	a0	28.04	11.61	2.41*
$INFO1_i$	a1	-18.76	14.72	-1.27
$INFO2_i$	a2	-33.69	17.95	-1.87@
QE_i	a3	-5.07	2.31	-2.19*
$INFO1_i*QE_i$	a4	2.99	2.86	1.04
$INFO2_i*QE_i$	a5	6.02	3.61	1.67
D1i	a6	-1.44	2.55	-0.56
D2i	a7	0.16	2.48	0.07
D3i	a8	0.06	1.99	0.03

R-square: 2.84 %   F-statistics (zero slopes)$_2$: 0.91 (N.S.)

* = significant at p < 0.05 levels with 217 degrees of freedom
@ = significant at p < 0.10 levels with 217 degrees of freedom

Table 90

Results of cross-sectional test on cumulative standardized unexpected log spread: Analysts' following X Earnings noise

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	a0	25.23	10.52	2.39*
$INFO1_i$	a1	-16.81	13.34	-1.26
$INFO2_i$	a2	-32.09	16.26	-1.97*
QE_i	a3	-4.69	2.09	-2.24*
$INFO1_i*QE_i$	a4	2.78	2.59	1.07
$INFO2_i*QE_i$	a5	5.88	3.27	1.80@
D1i	a6	-2.01	2.31	-0.87
D2i	a7	0.06	2.24	0.03
D3i	a8	-0.68	1.80	-0.38

R-square: 5.13 %   F-statistics (zero slopes)$_2$: 1.47 (N.S.)

* = significant at p < 0.05 levels with 217 degrees of freedom

@ = significant at p < 0.10 levels with 217 degrees of freedom

Table 91

Cross-sectional means of $CSU1_i$

Analysts' following x Earnings predictability

MEAN CUMULATIVE STANDARDIZED UNEXPECTED SPREAD

ANALYSTS' FOLLOWING	EARNINGS PREDICTABILITY SCORE 1	2	3	4	TOTAL
1	3.81 (14)	-4.65 (11)	1.07 (10)	-4.24 (39)	-2.06 (74)
2	-2.11 (34)	1.90 (11)	0.59 (14)	-2.07 (21)	-1.08 (80)
3	4.65 (33)	-3.96 (10)	11.15 (1)	2.35 (28)	2.65 (72)
TOTAL	1.67 (81)	-2.19 (32)	1.20 (25)	-1.63 (88)	

MEAN CUMULATIVE STANDARDIZED UNEXPECTED LOG SPREAD

ANALYSTS' FOLLOWING	EARNINGS PREDICTABILITY SCORE 1	2	3	4	TOTAL
1	3.25 (14)	-4.48 (11)	-1.15 (10)	-4.13 (39)	-2.38 (74)
2	-2.30 (34)	1.67 (11)	-0.46 (14)	-2.62 (21)	-1.52 (80)
3	3.25 (33)	-5.11 (10)	10.39 (1)	1.19 (28)	1.39 (72)
TOTAL	0.92 (81)	-2.56 (32)	-0.30 (25)	-2.08 (88)	

6X

Table 92
Results of cross-sectional test on cumulative standardized unexpected spread: Analysts' following X Earnings predictability

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	a0	4.46	3.01	1.48
$INFO1_i$	a1	-0.14	4.76	-0.03
$INFO2_i$	a2	-5.74	3.98	-1.44
QE_i	a3	-0.71	1.03	-0.68
$INFO1_i$*QE_i	a4	-1.17	1.57	-0.74
$INFO2_i$*QE_i	a5	0.92	1.47	0.63
D1i	a6	-1.84	2.52	-0.73
D2i	a7	-1.03	2.49	-0.41
D3i	a8	0.06	2.00	0.03

R-square: 3.99 % F-statistics (zero slopes)$_2$: 1.12 (N.S.)

* = significant at $p < 0.05$ levels with 217 degrees of freedom

Table 93

Results of cross-sectional test on cumulative standardized unexpected log spread: Analysts' following X Earnings predictability

Variable:		Coefficient:	Stnd. Dev.:	t-Statistics:
CONSTANT	a0	3.40	2.72	1.25
$INFO1_i$	a1	0.45	4.31	0.10
$INFO2_i$	a2	-4.23	3.61	-1.17
QE_i	a3	-0.66	0.94	-0.71
$INFO1_i*QE_i$	a4	-1.07	1.43	-0.75
$INFO2_i*QE_i$	a5	0.63	1.34	0.47
D1i	a6	-2.37	2.29	-1.04
D2i	a7	-0.90	2.26	-0.40
D3i	a8	-0.68	1.82	-0.37

R-square: 3.59 % F-statistics (zero slopes)$_2$: 1.01 (N.S.)

* = significant at p < 0.05 levels with 217 degrees of freedom

Explanation for Tables 94 to 104

1. The abnormal spread ($U_{i,d}$): This is the cross-sectional daily mean of the abnormal spread for day d in the event period. For each firm-event, the abnormal spread is calculated as follows: $U_{i,d} = S_{i,d} - E(S_{i,d})$. To estimate the expected spread, the following simultaneous equation model was run for each of the sample firm-events:

$$S_{i,t} = a_0 + a_1(TV_{i,t}) + a_2(P_{i,t}) + a_3(R_{i,t}) + a_4(S_{i,t-1}) + \eta_{i,t} \quad (1a)$$
$$TV_{i,t} = b_0 + b_1(S_{i,t}) + b_2(MF_{i,t}) + b_3(TV_{i,t-1}) + \mu_{i,t} \quad (1b)$$

The predicted structural coefficients were used to estimate the reduced form coefficients for the spread equation. The expected value of the spread in the event period is derived by using the spread reduced form equation.

Abnormal log spread was calculated in a similar fashion after log-transforming the dependent variable, the bid-ask spread.

2. The Brown and Warner test-statistic:

$$(\bar{U}_d / \hat{S}(\bar{U}_d))$$

This statistic has a t-distribution with 125 degrees of freedom. Here,

$$\hat{S}(\bar{U}_d) = \left\{ \sum_{t=-147}^{-21} (\bar{U}_t - \bar{U})^2 / 125 \right\}^{0.5}$$

and,

$$\bar{U}_t = \frac{1}{M} \sum_{i=1}^{M} U_{i,t}$$

$$\bar{U} = \left\{ \sum_{t=-147}^{-21} \bar{U}_t \right\} / 126$$

The same procedure was adopted to calculate the Brown and Warner test-statistics for abnormal log spread.

3. The Corrado Rank test-statistic:

To test the behavior of unexpected bid-ask spread in the presence of non-normalities, Corrado's Rank Test statistic has also been estimated over the event periods. This statistic involves the ranking of each $U_{i,t}$, where t = 1 to 152 days in the estimation and event period. Further:

(i) $K_{i,t} = \text{rank}(U_{i,t})$

(ii) $J_{i,t} = (K_{i,t} - 76.5)$, where 76.5 is the average rank over the 152 days.
For each t=127 to 152 days, the z-statistic is computed as follows:

$$\bar{J}_t / \hat{s}\,(\bar{J}_t)$$

where,

$$\bar{J}_t = \frac{1}{N}\sum_{i=1}^{N} J_{i,t}$$

and,

$$\hat{s}(\bar{J}_t) = \sqrt{\frac{1}{152}\sum_{t=1}^{152} (\bar{J}_t)^2}$$

4. The event period has been broken up into three sub-periods. These are as follows:

Sub-period	Days
1. Pre-announcement period	-15 to -2
2. Announcement period	-1 to 0
3. Post-announcement period	+1 to +10

Table 94

Behavior of daily abnormal spread: Earnings signal
High quality of earnings portfolio based on earnings noise score (=4)

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0497	-0.6945	-0.0400	-0.8767
-14	-0.1346	-1.8799@	-1.7119@	-1.0268
-13	-0.0683	-0.9536	-0.4669	-0.2850
-12	0.0299	0.4174	0.7757	-0.0979
-11	-0.0470	-0.6559	-0.3222	-0.8680
-10	0.0182	0.2543	0.4023	0.0413
-9	-0.0297	-0.4144	-0.0546	-0.4025
-8	-0.0246	-0.3431	-0.0261	-0.0239
-7	0.0237	0.3303	1.1345	0.9942
-6	-0.1476	-2.0616*	-2.4681*	-2.1124*
-5	0.1439	2.0106*	2.0635*	2.0297*
-4	-0.1196	-1.6707@	-1.6563@	-1.7904@
-3	0.0539	0.7527	0.4860	1.2509
-2	0.0085	0.1191	-0.7121	-1.7252@
-1	0.0577	0.8063	0.5498	0.4634
0	0.0912	1.2734	1.9375@	1.0551
1	-0.1423	-1.9871*	-2.1514*	-1.9732*
2	0.0308	0.4296	1.0133	0.5243
3	-0.0532	-0.7425	0.0138	-0.8854
4	0.0915	1.2779	1.1741	0.7157
5	0.0144	0.2004	0.4835	-0.1066
6	-0.0754	-1.0532	-0.6533	-0.2328
7	-0.1700	-2.3745*	-2.2849*	-2.4104*
8	-0.0780	-1.0896	-0.8113	-1.4989
9	-0.0114	-0.1593	-0.7532	-0.3111
10	-0.0469	-0.6554	-0.2832	-0.5896

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 21 firm-events

Table 95

Behavior of daily abnormal spread: Earnings signal
High quality of earnings portfolio based on earnings noise score (=5)

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0067	-0.1735	0.0990	-0.3166
-14	0.0272	0.7091	0.6733	1.0424
-13	-0.0346	-0.9022	-0.7228	-1.2185
-12	0.0125	0.3248	0.2146	-0.1456
-11	-0.0611	-1.5924	-1.8151@	-1.6144
-10	-0.0546	-1.4235	-1.3560	-1.4648
-9	-0.0050	-0.1306	-0.0736	0.0438
-8	0.0077	0.2001	0.1108	-0.5812
-7	-0.0188	-0.4887	-0.8660	-1.2714
-6	-0.0455	-1.1864	-1.2237	-0.2718
-5	-0.0651	-1.6966	-2.1103*	-1.4363
-4	-0.0469	-1.2206	-1.3346	-1.3834
-3	-0.0329	-0.8560	-1.1339	-1.2246
-2	0.0055	0.1431	0.1764	0.3135
-1	0.0818	2.1311*	2.1693*	1.4343
0	0.0748	1.9480@	1.3711	0.6179
1	-0.0325	-0.8461	-0.7781	-0.9192
2	-0.0769	-2.0032*	-2.0872*	-1.9890*
3	-0.0526	-1.3707	-1.4286	-1.2571
4	-0.0014	-0.0354	-0.3221	-0.7064
5	-0.0173	-0.4503	-0.0908	0.2148
6	-0.0321	-0.8352	-1.4821	-1.6806@
7	-0.0141	-0.3685	-0.2248	-0.3166
8	0.0275	0.7167	0.7988	0.3054
9	-0.0230	-0.5994	-0.4330	-1.0963
10	-0.0326	-0.8488	-0.9315	-1.8455@

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 97 firm-events

Table 96

Behavior of daily abnormal spread: Earnings signal
Medium quality of earnings portfolio based on earnings noise score (=6)

DAY	ABNORMAL SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0110	-0.0706	-0.6895	-0.3560
-14	-0.0432	-0.2785	-1.3508	-1.1500
-13	-0.0677	-0.4364	-1.2909	-0.8676
-12	0.0297	0.1914	-0.1162	-0.6384
-11	-0.1156	-0.7460	-3.1908*	-2.6109*
-10	0.0271	0.1748	-0.2342	-0.5156
-9	-0.0446	-0.2879	-1.8036@	-1.4241
-8	-0.0227	-0.1465	-1.1026	-0.7898
-7	0.0554	0.3573	-0.2709	-0.1228
-6	-0.0538	-0.3467	-1.6658@	-1.2175
-5	0.0151	0.0977	-0.9225	-0.3233
-4	-0.1422	-0.9175	-3.0232*	-2.4841*
-3	-0.0918	-0.5924	-2.3931*	-2.1035*
-2	0.0492	0.3175	-0.3708	0.3356
-1	0.0552	0.3558	-0.3654	-0.4420
0	0.0562	0.3626	-0.3371	0.6875
1	-0.0385	-0.2486	-1.5736	-1.7474@
2	-0.0435	-0.2805	-1.2758	-0.6589
3	-0.0021	-0.0136	-0.9203	-0.3356
4	0.0416	0.2685	-0.4816	0.3356
5	0.0418	0.2699	-0.1454	0.1473
6	0.0106	0.0683	-1.4470	-0.9372
7	0.0032	0.0207	-0.9383	-0.0859
8	-0.0359	-0.2315	-1.2415	-1.1008
9	-0.0408	-0.2629	-1.7075@	-2.1526*
10	-0.0410	-0.2643	-1.2807	-0.9003

NOTES:
1. The abnormal spread or the proxy for the adverse selection cost component of the spread. This is the daily cross-sectional mean abnormal spread. The expected spread is estimated using a simultaneous equation system.
2. Brown and Warner test-statistic for the abnormal spread
3. Brown and Warner test-statistic for the abnormal log spread
4. Corrado's Rank test-statistic for the abnormal spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 28 firm-events

Table 97

Behavior of daily mean-adjusted spread: Earnings signal, Joint announcement sample

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0502	-0.1638	0.3132	0.1919
-14	-0.0224	-0.0731	0.6471	1.0302
-13	-0.0641	-0.2091	-0.1291	-0.1503
-12	-0.0467	-0.1525	0.1367	0.1014
-11	-0.1266	-0.4131	-1.2295	-1.1062
-10	-0.1509	-0.4925	-1.2657	-1.2945
-9	-0.1300	-0.4245	-0.9381	-0.5268
-8	0.0193	0.0629	0.9699	0.8057
-7	-0.1092	-0.3565	-0.5240	-0.3748
-6	-0.1405	-0.4585	-1.4866	-1.1152
-5	-0.2307	-0.7531	-2.3075*	-2.1037*
-4	-0.1266	-0.4131	-0.9621	-0.7948
-3	-0.1925	-0.6285	-1.8470@	-1.3560
-2	-0.1509	-0.4925	-1.2154	-1.1297
-1	-0.0294	-0.0958	0.6178	0.5377
0	-0.1544	-0.5038	-1.2965	-1.3615
1	-0.1231	-0.4018	-0.8937	-1.3524
2	-0.2481	-0.8098	-2.7839*	-2.6650*
3	-0.1648	-0.5378	-1.4405	-1.1551
4	-0.0953	-0.3111	-0.3529	0.3929
5	-0.0953	-0.3111	-0.5519	-0.4001
6	-0.0675	-0.2205	-0.1790	-0.1629
7	-0.1092	-0.3565	-0.6872	-0.3730
8	-0.1648	-0.5378	-1.4597	-0.7568
9	-0.1752	-0.5718	-1.4470	-1.0048
10	-0.2446	-0.7985	-2.7066*	-3.0868*

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 36 firm-events

Table 98

Behavior of daily mean-adjusted volume:: Earnings signal, Joint announcement sample

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	17812.3818	1.5834	0.5835	1.2818
-14	2729.2985	0.2426	1.9864*	1.7294@
-13	-1673.9515	-0.1488	0.3419	-0.2035
-12	-1523.3959	-0.1354	-0.1386	-0.2136
-11	-16295.5348	-1.4486	-0.0409	-1.5219
-10	-8010.2848	-0.7121	0.3049	-0.9969
-9	-3621.7848	-0.3220	0.4784	0.1261
-8	-15913.4237	-1.4146	-1.9762*	-1.6541@
-7	-8444.3959	-0.7507	-0.9689	-1.2024
-6	1893.3263	0.1683	0.8251	0.4680
-5	-4197.9793	-0.3732	-0.2897	-0.9196
-4	5001.7985	0.4446	-0.8542	-0.8749
-3	-12833.0071	-1.1408	-1.6826@	-2.0610*
-2	-16395.0626	-1.4575	-2.9398*	-2.0203*
-1	3323.7985	0.2955	2.0483*	2.5534*
0	-2894.5626	-0.2573	1.7977@	1.1190
1	-2437.0348	-0.2166	1.9342@	1.2736
2	-429.4515	-0.0382	0.3031	-0.0509
3	-8665.5348	-0.7703	1.0929	0.3642
4	-4158.4793	-0.3697	2.0634*	1.6317@
5	-7964.7848	-0.7080	-1.0125	-1.2187
6	-2785.0348	-0.2476	-0.4280	0.4212
7	-9320.7293	-0.8286	0.3690	-0.2380
8	-2213.9793	-0.1968	1.1086	0.8627
9	326.3818	0.0290	0.4412	0.6816
10	-10487.7571	-0.9323	0.5714	-0.5799

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 36 firm-events

Table 99

Behavior of daily mean-adjusted spread: Earnings signal, Earnings followed by dividends sequence sample

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0183	-0.3967	-0.2226	-0.3904
-14	-0.0200	-0.4338	-0.3699	0.2450
-13	-0.0234	-0.5081	-0.3032	-0.2679
-12	0.0091	0.1975	-0.1632	-0.4414
-11	-0.0936	-2.0307*	-2.1417*	-1.4327
-10	0.0468	1.0145	1.1238	0.8956
-9	-0.0097	-0.2110	-0.4944	-0.6570
-8	-0.0508	-1.1023	-0.9938	-0.8407
-7	0.0211	0.4574	0.5816	0.6966
-6	-0.0508	-1.1023	-0.8515	-0.4657
-5	-0.0012	-0.0253	-0.1439	-0.0383
-4	-0.0885	-1.9193@	-2.0411*	-1.9353@
-3	-0.0097	-0.2110	-0.5478	-0.7616
-2	0.0160	0.3460	0.1860	-0.4312
-1	0.0690	1.4972	1.4573	1.0870
0	0.0982	2.1286*	2.2887*	2.2428*
1	-0.0217	-0.4710	-0.3950	-0.0447
2	0.0211	0.4574	0.4499	0.5830
3	0.0451	0.9773	1.0603	1.3778
4	0.0416	0.9031	0.6022	0.4057
5	0.0451	0.9773	1.5480	2.1088*
6	-0.0406	-0.8795	-1.3760	-1.4097
7	-0.0371	-0.8052	-0.7765	-0.7425
8	0.0416	0.9031	0.7209	0.4567
9	0.0108	0.2346	-0.1542	-1.0053
10	0.0125	0.2718	0.1355	0.4618

NOTES:

1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 100

Behavior of daily mean-adjusted volume:: Earnings signal, Earnings followed by dividends sequence sample

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-1289.9770	-0.2806	-2.7366*	-0.9711
-14	10513.0505	2.2870*	0.1512	0.6207
-13	3627.0641	0.7890	0.8321	1.1524
-12	50.9135	0.0111	-0.1384	-0.4605
-11	3468.0231	0.7544	0.2011	0.7353
-10	5798.6943	1.2614	0.4255	1.1402
-9	2515.5984	0.5472	0.6928	0.7420
-8	3088.5573	0.6719	-0.3114	0.4027
-7	498.1189	0.1084	0.0030	0.3571
-6	-398.4564	-0.0867	0.3812	-0.5262
-5	-1890.4701	-0.4113	0.8508	0.7787
-4	-3432.5112	-0.7467	-0.8977	-1.1713
-3	-400.1961	-0.0871	-0.2428	0.0534
-2	11296.8587	2.4575*	0.8170	-0.0968
-1	2057.2833	0.4475	1.8950@	2.2114*
0	6366.2148	1.3849	2.6715*	3.1981*
1	2754.2833	0.5992	-0.5514	-0.3404
2	17108.3381	3.7217*	0.7128	0.6485
3	2013.6943	0.4381	-1.1420	0.1824
4	563.1052	0.1225	-0.0666	-0.3849
5	-3506.3605	-0.7628	0.1942	-0.2303
6	-6873.6893	-1.4953	-0.2372	-0.8410
7	22.0505	0.0048	-0.6915	-0.7142
8	-3793.7989	-0.8253	-0.9041	-0.7486
9	-1330.5112	-0.2894	-1.7180@	-0.9433
10	224.2696	0.0488	-0.7069	-0.3649

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at p < 0.05, 2 tailed
   @ = significant at p < 0.10, 2 tailed
6. Sample size: 73 firm-events

Table 101

Behavior of daily mean-adjusted spread: Dividends signal, Earnings followed by dividends sequence sample

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0628	-1.3622	-1.4666	-0.8536
-14	-0.0046	-0.0996	-0.0890	0.2927
-13	-0.0251	-0.5453	-0.5761	-0.6778
-12	-0.0114	-0.2482	-0.8976	-1.5224
-11	-0.0046	-0.0996	-0.1828	0.0988
-10	-0.0680	-1.4737	-1.5756	-1.3183
-9	-0.0303	-0.6567	-0.9204	-0.7727
-8	0.0228	0.4946	-0.1809	-0.6636
-7	0.0451	0.9773	1.1042	0.7317
-6	0.0416	0.9031	0.2699	-0.3504
-5	0.0040	0.0861	-0.5085	-0.7535
-4	0.0160	0.3460	-0.7762	-1.4723
-3	0.0776	1.6829@	1.2875	0.7817
-2	-0.0286	-0.6195	-0.9028	-1.3632
-1	-0.0303	-0.6567	-0.7815	-0.7753
0	0.0708	1.5344	1.1084	0.4429
1	0.1050	2.2771*	2.2434*	1.6302@
2	-0.0269	-0.5824	-0.7415	-0.6174
3	-0.0286	-0.6195	-0.5391	-0.0847
4	-0.0388	-0.8423	-1.4039	-1.5429
5	0.0468	1.0145	0.8477	0.5237
6	-0.0697	-1.5108	-1.5774	-1.4736
7	-0.0337	-0.7309	-1.2710	-1.5057
8	-0.0388	-0.8423	-0.9603	-0.7676
9	0.0297	0.6431	0.5448	0.5109
10	0.0742	1.6087	1.4032	1.2156

NOTES:
1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 102

Behavior of daily mean-adjusted volume: Dividends signal, Earnings followed by dividends sequence sample

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	14445.3929	3.1424*	-2.2811*	-1.4671
-14	7632.6943	1.6604@	-1.2620	-0.3776
-13	1677.7491	0.3650	-1.6354@	-1.7867@
-12	8726.9683	1.8984@	-0.3637	-0.9679
-11	16378.2559	3.5629*	-0.1489	-0.1786
-10	-1637.6071	-0.3562	-0.5381	-0.5004
-9	-4143.8263	-0.9014	-1.0766	-0.3537
-8	1950.3244	0.4243	0.3827	0.9337
-7	-448.5797	-0.0976	1.5398	1.6320@
-6	-2572.7852	-0.5597	0.2831	0.6403
-5	13143.7765	2.8593*	1.2623	0.9690
-4	-1086.4427	-0.2363	-1.3543	-1.2192
-3	2295.4203	0.4993	-0.7105	0.1797
-2	-3210.7578	-0.6985	-2.2157*	-1.2454
-1	6484.0505	1.4105	0.2298	0.6073
0	658.6395	0.1433	-0.0884	0.2104
1	9255.6121	2.0134*	0.6605	0.9292
2	-2293.0728	-0.4988	-0.8080	-0.5311
3	-4523.9222	-0.9841	-0.4338	-0.9360
4	11212.0641	2.4390*	-0.0462	0.1388
5	5349.0094	1.1636	0.9099	1.1919
6	4857.5984	1.0567	0.0069	0.5869
7	-493.4701	-0.1074	-1.0321	-0.4151
8	-7077.3742	-1.5396	-1.5728	-1.3852
9	747.5573	0.1626	0.1844	0.3253
10	7365.1463	1.6022	0.6599	1.2010

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 73 firm-events

Table 103

Behavior of daily mean-adjusted spread: Earnings signal, Sole earnings sample

DAY	MEAN-ADJ. SPREAD[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	-0.0069	-0.1234	-1.4666	0.1931
-14	-0.0012	-0.0221	-0.0890	0.0605
-13	-0.0552	-0.9843	-0.5761	-0.7647
-12	0.0158	0.2817	-0.8976	0.1911
-11	-0.0240	-0.4272	-0.1828	-0.8977
-10	-0.1291	-2.3010*	-1.5756	-2.3961*
-9	-0.0325	-0.5792	-0.9204	-0.6327
-8	0.0414	0.7375	-0.1809	0.4131
-7	0.0357	0.6362	1.1042	-0.0786
-6	-0.0495	-0.8830	0.2699	-0.7251
-5	-0.0353	-0.6298	-0.5085	-0.6371
-4	-0.0666	-1.1869	-0.7762	-1.0463
-3	-0.0311	-0.5539	1.2875	-0.5521
-2	0.0130	0.2311	-0.9028	0.3127
-1	0.0769	1.3705	-0.7815	1.1180
0	0.1607	2.8645*	1.1084	1.9630*
1	-0.0140	-0.2500	2.2434*	-0.2037
2	-0.0439	-0.7817	-0.7415	-0.6529
3	-0.1149	-2.0478*	-0.5391	-2.0153*
4	-0.0211	-0.3766	-1.4039	-0.2845
5	0.0158	0.2817	0.8477	0.2345
6	-0.0524	-0.9337	-1.5774	-0.9864
7	-0.0126	-0.2247	-1.2710	-0.2618
8	-0.0140	-0.2500	-0.9603	-0.4021
9	-0.0268	-0.4779	0.5448	-0.4001
10	0.0641	1.1427	1.4032	0.9774

NOTES:

1. The mean-adjusted spread: Daily cross-sectional mean of the mean-adjusted spread. The expected spread for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted spread
3. Brown and Warner test-statistic for the mean-adjusted log spread
4. Corrado's Rank test-statistic for the mean-adjusted spread
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 44 firm-events

Table 104

Behavior of daily mean-adjusted volume:: Earnings signal, Sole earnings sample

DAY	MEAN-ADJ. VOLUME[1]	t-STATS.[2]	t-STATS.[3]	t-STATS.[4]
-15	11756.0615	0.3579	-1.2132	-1.0167
-14	14003.5388	0.4264	0.7126	0.8732
-13	-10898.5521	-0.3318	-0.8964	-0.6159
-12	-3831.8249	-0.1167	0.0447	0.3337
-11	12840.7888	0.3910	-1.3181	-0.4460
-10	-52978.4385	-1.6130	-1.3609	-1.8852@
-9	-44104.0294	-1.3428	-1.2004	-1.1149
-8	-12339.4158	-0.3757	-0.4910	0.0873
-7	10532.0161	0.3207	-0.9484	-1.2989
-6	-36077.1658	-1.0984	-1.7878@	-1.0448
-5	-23043.7340	-0.7016	-1.3100	-0.6113
-4	-24451.2567	-0.7444	-0.6253	-0.8077
-3	-50128.5067	-1.5262	0.9412	0.2183
-2	12919.1524	0.3933	0.8783	1.6498@
-1	114556.7433	3.4878*	1.8139@	1.7153@
0	67860.5161	2.0661*	1.1712	1.1679
1	19635.1979	0.5978	-0.8991	-0.8280
2	-10608.5749	-0.3230	1.4208	1.1352
3	-42175.8703	-1.2841	-0.0990	-0.9902
4	-27294.0067	-0.8310	-0.7933	-0.4974
5	-11951.8021	-0.3639	-0.5100	-0.6331
6	-24559.1885	-0.7477	0.0658	-0.9325
7	-9898.0294	-0.3014	-0.6784	-0.9761
8	-28126.3249	-0.8563	0.3930	-0.7344
9	-8301.6885	-0.2528	0.1411	-0.0733
10	-10486.0521	-0.3193	-0.5757	-0.7298

NOTES:
1. The mean-adjusted volume: Daily cross-sectional mean of the mean-adjusted volume. The expected volume for each-firm event is the estimation period mean.
2. Brown and Warner test-statistic for the mean-adjusted volume
3. Brown and Warner test-statistic for the mean-adjusted log volume
4. Corrado's Rank test-statistic for the mean-adjusted volume
5. * = significant at $p < 0.05$, 2 tailed
   @ = significant at $p < 0.10$, 2 tailed
6. Sample size: 44 firm-events

Explanations for Tables 105 to 110

1. The following cross-sectional regression is run on the cumulative standardized abnormal spread and log-spread:

$$
\begin{aligned}
CSU2_i = c_0 &+ c_1(INFO1_i) + c_2(INFO2_i) + c_3(QS_1) + c_4(INFO1*QS_1) \\
&+ c_5(INFO2*QS_i) + c_6(UE_i) + c_7(LAG_i) + c_8(MM_i) \\
&+ c_9(INSID_i) + c_{10}(INST_i) + c_{11}(QS_i*INST_i) + c_{12}(DAY_i) \\
&+ c_{13}(D1_i) + c_{14}(D2_i) + c_{15}(D3_i) + c_{16}(VT_i) + \gamma_i
\end{aligned}
$$

where,

i = 1.....N firm-events;

$INFO1_i$ = '1', for low differential information environment and '0' otherwise;

$INFO2_i$ = '1', for medium differential information environment and '0' otherwise;

QS_i = the quality score of the firm;

UE_i = the unexpected earnings of the firm in that quarter;

LAG_i = ' 1 ', if the earnings or dividend announcement is delayed and, '0 ', otherwise i.e. if it is timely or early;

MM_i = the average number of market makers dealing in the security in the estimation period;

$INSID_i$ = the fraction of insider share holding;

$INST_i$ = the fraction of institutional share holding;

DAY_i = ' 1 ', if the announcement is made on Friday and ' 0' otherwise;

$D1_i$ = ' 1 ', if it is a joint announcement and ' 0 ' otherwise;

$D2_i$ = ' 1 ', if it is a sole earnings announcement and '0 ' otherwise;

$D3_i$ = ' 1 ', if it is a dividend announcement subsequent to a earnings announcement and ' 0 ' otherwise.

VT_i = ' 1 ' if the variability of returns explained by lagged returns is greater than the median R^2, and is ' 0 ' otherwise.

$CSU2_i$ = the cumulative standardized abnormal spread (or, log spread). This is calculated as follows:

$$CSU2_i = \sum_{t=-15}^{+10} SU_{i,d} \qquad \ldots(1)$$

where:

$$SU_{i,d} = U_{i,d} / \hat{S}(U_d) \quad \ldots (2)$$

$$U_{i,d} = S_{i,d} - E(S_{i,d}) \quad \ldots (3)$$

$$\hat{S}(U_d) = \{ \sum_{t=-147}^{-21} (U_{i,t} - \overline{U}_i)^2 / 125 \}^{0.5} \quad \ldots (4)$$

$$\overline{U}_i = \sum_{t=-147}^{-21} (U_{i,t}) / 126 \ \ldots (5)$$

2. The F-statistic has (16,209) degrees of freedom.

3. The cross-sectional regressions are run for all possible combinations of the differential information variable and the quality of earnings variable:

DIFFERENTIAL INFORMATION	QUALITY OF EARNINGS
1. Analysts' Following	Earnings Noise Score
2. Analysts' Following	Earnings Predictability Score
3. Firm Size	Earnings Predictability Score
4. Firm Size	Earnings Noise Score

Table 105

Cross-sectional means of $CSU2_i$

Analysts' following x Earnings noise score

MEAN CUMULATIVE STANDARDIZED ABNORMAL SPREAD

ANALYSTS' FOLLOWING	EARNINGS NOISE SCORE 4	5	6	7	TOTAL
1	-4.94 (13)	1.47 (35)	-9.37 (19)	-5.72 (7)	-3.12 (74)
2	-2.34 (14)	-1.58 (61)	-2.60 (5)	0.00 (0)	-1.77 (80)
3	-0.17 (11)	1.15 (50)	4.20 (11)	0.00 (0)	1.42 (72)
TOTAL	-2.60 (38)	0.09 (146)	-4.14 (35)	-5.72 (7)	

MEAN cumulative standardized abnormal log spread

ANALYSTS' FOLLOWING	EARNINGS NOISE SCORE 4	5	6	7	TOTAL
1	0.69 (13)	0.81 (35)	-10.69 (19)	-5.16 (7)	-2.73 (74)
2	-3.99 (14)	-2.18 (61)	-4.80 (5)	0.00 (0)	-2.66 (80)
3	0.02 (11)	0.03 (50)	-1.05 (11)	0.00 (0)	-0.14 (72)
TOTAL	-1.23 (38)	-0.71 (146)	-6.82 (35)	-5.16 (7)	

Table 106

Results of cross-sectional test on cumulative standardized abnormal spread: Analysts' following X Earnings noise

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-5.36	16.54	-0.32
$INFO1_i$	c1	8.40	14.32	0.59
$INFO2_i$	c2	-4.26	18.69	-0.23
QE_i	c3	0.29	3.17	0.09
$INFO1_i*QE_i$	c4	-2.41	2.79	-0.86
$INFO2_i*QE_i$	c5	0.34	3.74	0.09
UE_i	c6	73.37	35.21	2.08*
LAG_i	c7	3.32	1.63	2.04*
MM_i	c8	-0.07	0.16	-0.40
$INSID_i$	c9	6.03	4.51	1.33
$INST_i$	c10	9.13	34.09	0.26
$INST_i*QE_i$	c11	-0.73	6.42	-0.11
DAY_i	c12	3.43	1.86	1.84@
D1i	c13	-2.41	2.79	-0.86
D2i	c14	0.20	2.35	0.08
D3i	c15	0.07	1.86	0.04
VTi	c16	1.36	1.55	0.88

R-square: 9.93 %   F-statistics (zero slopes)$_2$: 1.44 (N.S.)

* = significant at p < 0.05 levels with 209 degrees of freedom.
@ = significant at p < 0.10 levels with 209 degrees of freedom.

Table 107

Results of cross-sectional test on cumulative standardized abnormal spread: Analysts' following X Earnings noise

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-2.22	15.81	-0.14
$INFO1_i$	c1	16.24	13.69	1.18
$INFO2_i$	c2	-11.59	17.86	-0.65
QE_i	c3	-0.75	3.02	-0.24
$INFO1_i*QE_i$	c4	-3.49	2.67	-1.31
$INFO2_i*QE_i$	c5	2.01	3.57	0.56
UE_i	c6	70.32	33.64	2.08*
LAG_i	c7	4.39	1.56	2.82*
MM_i	c8	-0.03	0.15	-0.17
$INSID_i$	c9	3.74	4.31	0.87
$INST_i$	c10	21.47	32.58	0.66
$INST_i*QE_i$	c11	-3.27	6.14	-0.53
DAY_i	c12	3.28	1.78	1.84@
D1i	c13	-1.17	2.31	-0.51
D2i	c14	2.10	2.25	0.93
D3i	c15	-0.13	1.78	-0.07
VTi	c16	1.07	1.48	0.72

R-square: 12.37 %   F-statistics (zero slopes)$_2$: 1.84 (Signf.)

* = significant at p < 0.05 levels with 209 degrees of freedom.

@ = significant at p < 0.10 levels with 209 degrees of freedom.

Table 108

Cross-sectional means of $CSU2_i$

Analysts' following x Earnings predictability

MEAN CUMULATIVE STANDARDIZED ABNORMAL SPREAD

ANALYSTS' FOLLOWING	EARNINGS PREDICTABILITY SCORE 1	2	3	4	TOTAL
1	-3.21 (14)	-8.47 (11)	-1.97 (10)	-1.87 (39)	-3.12 (74)
2	-1.38 (34)	-1.54 (11)	-1.53 (14)	-2.70 (21)	-1.77 (80)
3	1.35 (33)	-2.74 (10)	-3.12 (1)	3.15 (28)	1.42 (72)
TOTAL	-0.58 (81)	-4.30 (32)	-1.77 (25)	-0.47 (88)	

MEAN CUMULATIVE STANDARDIZED ABNORMAL LOG SPREAD

ANALYSTS' FOLLOWING	EARNINGS PREDICTABILITY SCORE 1	2	3	4	TOTAL
1	0.92 (14)	-10.53 (11)	-3.68 (10)	-1.59 (39)	-2.73 (74)
2	-2.23 (34)	-0.48 (11)	-5.93 (14)	-2.32 (21)	-2.66 (80)
3	0.26 (33)	-4.98 (10)	-1.84 (1)	1.19 (28)	-0.14 (72)
TOTAL	-0.67 (81)	-5.34 (32)	-4.87 (25)	-0.88 (88)	

Table 109

Results of cross-sectional test on cumulative standardized abnormal spread: Analysts' following X Earnings predictability

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-6.80	5.50	-1.23
$INFO1_i$	c1	5.62	4.94	-1.13
$INFO2_i$	c2	-1.94	4.06	-0.48
QE_i	c3	1.50	1.80	0.83
$INFO1_i*QE_i$	c4	0.48	1.61	0.30
$INFO2_i*QE_i$	c5	-0.36	1.49	-0.24
UE_i	c6	76.95	35.12	2.19*
LAG_i	c7	2.68	1.63	1.65@
MM_i	c8	-0.04	0.16	-0.25
$INSID_i$	c9	6.05	4.27	1.42
$INST_i$	c10	12.87	9.56	1.34
$INST_i*QE_i$	c11	-3.15	3.12	-1.01
DAY_i	c12	3.25	1.85	1.75@
D1i	c13	-3.75	2.38	-1.57
D2i	c14	-0.82	2.39	-0.34
D3i	c15	0.08	1.87	0.04
VTi	c16	1.55	1.59	0.98

R-square: 9.87 %   F-statistics (zero slopes)$_2$: 1.43 (N.S.)

* = significant at $p < 0.05$ levels with 209 degrees of freedom.
@ = significant at $p < 0.10$ levels with 209 degrees of freedom.

Table 110

Results of cross-sectional test on cumulative standardized abnormal log spread: Analysts' following X Earnings predictability

Variable:	Coefficient:		Stnd. Dev.:	t-Statistics:
CONSTANT	c0	-9.79	5.36	-1.82@
$INFO1_i$	c1	-0.30	4.82	-0.06
$INFO2_i$	c2	-0.26	3.96	-0.07
QE_i	c3	1.89	1.75	1.08
$INFO1_i*QE_i$	c4	-0.62	1.57	-0.40
$INFO2_i*QE_i$	c5	-0.67	1.45	-0.45
UE_i	c6	73.20	34.23	2.13*
LAG_i	c7	3.59	1.58	2.26*
MM_i	c8	-0.01	0.16	-0.03
$INSID_i$	c9	4.55	4.16	1.09
$INST_i$	c10	16.00	9.32	1.72@
$INST_i*QE_i$	c11	-4.23	3.04	-1.41
DAY_i	c12	2.91	1.81	1.61
D1i	c13	-3.41	2.32	-1.46
D2i	c14	0.40	2.33	0.17
D3i	c15	-0.11	1.82	-0.06
VTi	c16	1.03	1.55	0.67

R-square: 8.80 %   F-statistics (zero slopes)$_2$: 1.26 (N.S.)

* = significant at $p < 0.05$ levels with 209 degrees of freedom.
@ = significant at $p < 0.10$ levels with 209 degrees of freedom.

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