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FINANCING AND INVESTING ACTIVITIES AND THE PREEMPTION OF EARNINGS

By

Jeffrey Jay Archambault

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ABSTRACT

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AND THE PREEMPTION OF EARNINGS

By

Jeffrey Jay Archambault

Prior research suggests that the market reaction to earnings announcements decreases as more information is available about the firm. Other research suggests that announcements related to firm cash flows signal earnings information. This study tested whether such announcements preempt earnings information.

News announcements were classified as dividend changes, constant dividends, financing, investing, or other. Announcements related to dividend changes, financing, and investing were hypothesized to preempt earnings information.

Preemption was measured using analyst forecasts or capital market returns. News announcements that preempt earnings information were expected to decrease absolute forecast errors, the capital market reaction to earnings announcements, and the proportion of the abnormal return associated with unexpected earnings realized at the time of earnings announcements. Earnings forecast revisions were examined to determine if news announcements provide information about future earnings.

A random sample of 203 manufacturing firms continuously covered by Value Line and CRSP from 1983 through 1987 was studied. News announcements were gathered from the Wall Street Journal Index.

The results of the absolute forecast error model suggest that announcements of dividend changes and constant dividends preempt earnings information. However, the coefficients on financing and investing announcements were never significantly negative. The market-based models did not support any of the hypotheses.

The forecast revision model examined both short-term and long-term earnings forecast revisions. The interaction between cash flow variables and unexpected earnings significantly influenced revisions in many cases. For dividend changes and constant dividends, the significant interactions were positive. Financing and investing announcements had both positive and negative interactions. The results suggest that cash flow related announcements provide information about future earnings.

A variety of specification tests were conducted. The results were generally robust. The primary differences involved analyst forecasts and firm size. The results for the absolute forecast error model held only for small firms. The forecast revision model also had significant differences between large and small firms. For smaller firms, cash flow announcements directly provide information about future earnings. The general result that cash flow related announcements significantly influence forecast revisions was unaffected.

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CHAPTER 1

INTRODUCTION

The Financial Accounting Standards Board [1984, p. 5] categorizes information useful for investment decisions into financial statements, notes to financial statements, supplementary information, other means of financial reporting (e.g., letters to stockholders), and other information (e.g., analysts' reports, economic statistics, or news articles). This statement recognizes that accounting disclosures are only one of several competing sources of public information for investors.

If other sources of information compete with accounting reports, then investors may anticipate earnings by obtaining other, more timely information. Earnings are preempted if some of the information contained in earnings is released to the market by another disclosure prior to the earnings announcement (Beaver [1981], p. 130). In addition to providing information about current earnings, other sources of information may also substitute for current earnings by providing information about future earnings.

Empirical evidence suggests that changes in firm cash flows, such as dividends and stock issues or repurchases, may signal information about earnings (Asquith and Mullins [1986b]). Miller and Rock [1985] develop a model in which unexpected changes in the financing or investing activities of the firm imply unexpected changes in earnings. However,

little empirical research has been conducted to test whether announcements related to these activities preempt earnings information.

This study hypothesizes that announcements related to dividend changes, other financing activities, or investing activities preempt earnings information. Preemption is tested while controlling for other news announcements (that may also preempt earnings) using regressions with either capital market reactions to earnings announcements or analysts' forecast errors as dependent variables and independent variables representing the news announcements. Preemption is measured as a reduction in either the market reaction to earnings announcements or absolute earnings forecast errors. Substitution of information for current earnings is measured, through regressions, as use of the information in forecast revisions.

This investigation extends the research into the cross-sectional differential reaction to earnings announcements (see section 2.2 for a review of this literature) by identifying specific sources of predisclosure information that relate to earnings. These sources of predisclosure information compete with accounting reports. Lev [1989] discusses the importance of the stability of the relation between earnings and returns if earnings are to be useful for predicting returns. A possible cause of instability in the relation is varying degrees of preemption of earnings over time. Control of other sources of information may improve the measurement of the relation between earnings and returns.

An understanding of how announcements related to the financing or investing activities of the firm preempt earnings may be useful in exploring the persistence and/or growth of earnings. Collins and Kothari [1989] demonstrate that the persistence and/or growth of earnings is

related to the earnings response coefficient, the coefficient on unexpected earnings in a regression of abnormal returns against unexpected earnings. However, Easton and Zmijewski [1991] show that, to estimate the earnings response coefficient, earnings expectations need to be conditioned on all available information. Therefore, better estimates of earnings response coefficients may be achieved if there is an understanding of how such announcements preempt earnings. Furthermore, control of any preemption effects may be necessary to study the relation between the persistence and/or growth of earnings and such announcements events via the earnings response coefficient.

Schipper [1991] notes that research into the properties of analysts' earnings forecasts is moving "toward investigations of what information appears to be impounded in these forecasts" (p. 109). This study investigates the relation between predisclosure information and the earnings forecast process. An improved understanding of the information used by analysts may result.

Based on absolute earnings forecast errors, both dividend changes and constant dividends preempt earnings information. However, this result is limited to smaller firms. The market-based models do not support any of the hypotheses. Cash flow related announcements are generally incorporated with earnings information in revising forecasts.

The next chapter of this paper reviews related literature. The third chapter develops hypotheses. Chapter four discusses the study design. Chapter five analyzes the results. The last chapter summarizes the study and discusses the conclusions, limitations, and recommendations for future research.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews prior research. Section 2.1 discusses studies that document a relation between stock market returns and earnings. Section 2.2 reviews studies that examine the cross-sectional differential reaction to earnings announcements. Section 2.3 examines studies of analysts' forecast superiority over time-series forecasts. Section 2.4 reviews studies of financing and investing activities.

2.1 The Relation Between Stock Market Returns and Earnings

Both a directional and nondirectional relation between stock market returns and earnings has been documented. The studies that have documented these relations form the basis for much of the research into the cross-sectional differential reaction to earnings announcements. This study extends that research by identifying specific sources of predisclosure information that relates to earnings.

Ball and Brown [1968] compare the abnormal returns of firms with positive and negative unexpected annual earnings. They find that the sign of the abnormal returns is positively related to the sign of unexpected earnings. However, they also find that about 85 to 90 percent of the market reaction occurs prior to the month annual earnings are announced. The latter finding has also been documented by others, such as Freeman [1987] and Collins and Kothari [1989]. Furthermore, Brown and Kennelly [1972] compare the abnormal returns of firms with positive and negative

unexpected quarterly earnings. They also find that the sign of the abnormal returns is positively related to the sign of unexpected earnings and that, depending on the quarter and the earnings forecasting model, 40 to 60 percent of the market reaction during the quarter occurs prior to the month quarterly earnings are announced (see their Table 7). These findings imply that other sources provide information that is related to earnings.

Beaver, Clarke, and Wright [1979] examine the magnitude as well as the sign of unexpected earnings by forming portfolios based on relative unexpected earnings. They report a significant rank correlation between abnormal returns and the magnitude of unexpected earnings. Therefore, abnormal returns are related to the sign and magnitude of unexpected earnings, which suggests that a linear model of the relation may be reasonable.

Beaver [1968] examines the variance of returns at the time of earnings announcements through use of the U-statistic, which, as discussed below, is equal to the square of the ratio of the abnormal return to the standard error from the estimation of the market model. A U-statistic greater than one indicates an increase in the variance of returns and is interpreted as evidence of information content. He finds a significant increase in variance during the week of announcement. As discussed below, several studies (e.g., Atiase [1985], Grant [1980], and Lobo and Mahmoud [1989]) of the cross-sectional differential reaction to earnings announcements have used a form of the U-statistic as a measure of the information content of earnings.

2.2 The Cross-Sectional Differential Reaction to Earnings Announcements

While studies discussed in the previous section document a relation between abnormal returns and unexpected earnings, other research finds that the relation is not the same for all firms. In this section, empirical studies that relate to differential reaction are reviewed.

In general, studies of the cross-sectional differential reaction to earnings announcements suggest that the strength of the market reaction to earnings is negatively related to the amount of investors' available information. These findings imply that there is information that preempts earnings. However, specific types of information used by investors have not been identified.

Collins, Kothari, and Rayburn [1987] find that price-based earnings models outperform univariate time-series forecasts by a greater margin for larger firms than for smaller firms, implying that stock prices of larger firms reflect more information related to earnings. Similarly, Freeman [1987] reports that the abnormal returns of larger firms reflect earnings earlier than the abnormal returns of smaller firms. However, the total reaction, conditional on unexpected earnings, is greater for smaller firms, which is consistent with there being less other public information related to earnings for smaller firms.

Atiase [1985] uses a standardized U-statistic to compare the market reaction to earnings announcements of relatively small (market value < $20 million) to relatively large (> $400 million) firms. He finds that the statistic is significantly greater than one for the smaller firms but not for the larger firms. The finding is replicated using a regression approach in which the coefficient on size is significantly negative. Lobo and Mahmoud [1989] report a similar relation for the number of security

analysts' annual earnings forecasts as well as firm size. Bhushan [1989] and Shores [1990] also document a firm size result. Ro [1989] reports that the earnings announcement return variability decreases with firm size even after controlling for absolute unexpected earnings. Kross and Schroeder [1989] use directional tests (i.e., regress abnormal returns against unexpected earnings and other variables) and find that the magnitude of the market reaction to unexpected earnings decreases with firm size. These results are consistent with the assertion that there is more information about large firms that preempts earnings information.

Grant [1980] compares the market reaction to earnings announcements of OTC firms and NYSE firms. He computes the Spearman rank order correlation coefficient of the U-statistic to the number of interim news items in the Wall Street Journal Index (WSJI). For NYSE firms, the correlation is -.091, which is significantly less than zero. A similar correlation is reported for OTC firms. These findings are consistent with interim news items in the WSJI preempting earnings information.

Kross and Schroeder [1989] measure coverage in the WSJI in inches. They find that the directional market reaction to unexpected earnings decreases as WSJI coverage increases even after controlling for firm size, which is not significant when both variables are included.[1] This result suggests that WSJI coverage is a better proxy for information than firm size.

Shores [1990] examines the relation between a standardized U-statistic and the amount of information available about OTC firms for

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[1]Similarly, Dempsey [1989] finds that earnings announcement return variability decreases with analyst coverage even after controlling for firm size, which is not significant when both variables are included.

several information proxies, including firm size, number of financial analysts, number of interim earnings announcements, and number of non-earnings announcements. She also examines the relation between the proportion of the abnormal return realized prior to the earnings announcement and the information proxies. While results are generally consistent with the information hypothesis, the results, using the standardized U-statistic, for the number of non-earnings announcements are either insignificant or of the wrong sign.

Shores' results with respect to non-earnings announcements could be due to several factors. First, nondirectional measures (the U-statistic) are used, which are of lower power than directional tests. Second, the Wall Street Journal may not report as many of the news releases made by small firms, such as OTC firms, thus weakening the tests. Third, it is possible that some announcements, in addition to any preemption effects, increase the market reaction to unexpected earnings if, for example, they signal reinforcing information about future cash flows (Holthausen and Verrecchia [1988]). Therefore, treating all non-earnings announcements in the same manner may introduce additional measurement error.

Prior studies have proxied for the information used by investors to anticipate earnings. This study seeks to extend the literature by more clearly identifying that information set. Prior studies also call for research into the effects of specific interim news events on the market reaction to earnings. For example, Ball and Brown [1968] comment:

> This study raises several issues for further investigation. For example, there remains the task of identifying the media by which the market is able to anticipate net income: of what help are interim reports and dividend announcements? (p. 177)

Grant [1977] has the following suggestion for future research:

> This study did not distinguish between the different types of news items which appear in the Wall Street Journal; however it is reasonable to expect that some announcements are more useful than others in anticipating results. Therefore, one suggested avenue for future research might be to relate the various types of news releases (e.g., management forecasts, changes in managements, acquisitions and/or divestitures, loss of major customers, pending litigation, etc.) to the observed market reaction to the annual earnings. (pp. 116-7)

2.3 Analysts' Forecast Superiority Over Time-Series Forecasts

Factors that affect the ability of analysts to forecast earnings relative to time-series models have been studied. Again, proxies have been used for the information used by analysts. This study seeks to extend that literature by identifying the relevant information set.

Brown et. al. [1987a] conclude that the superiority of analyst forecasts over time-series forecasts is due to the better use by analysts of the information existing at the time of the most recent earnings announcement and to the use of information released after the most recent earnings announcement. However, they do not investigate the types of information used by analysts. Similarly, Brown, Richardson, and Schwager [1987] find that the superiority of analyst forecasts is partially due to the amount of information available about the firm as measured by firm size. Kross, Ro, and Schroeder [1990] examine the effect of coverage in the Wall Street Journal and firm size. They measure analyst superiority over time-series forecasts as the difference in absolute forecast error. They find that analyst superiority increases with coverage in the Wall Street Journal but not with firm size. However, they do not examine the differential effects of various types of coverage.

2.4 Financing and Investing Activities

Empirical evidence suggests that changes in firm cash flows, such as dividends and stock issues or repurchases, may signal information about earnings (Asquith and Mullins [1986b]). Therefore, financing and investing activities may be a source of information that preempts earnings.

Numerous empirical studies (e.g., Ahorony and Swary [1980], Asquith and Mullins [1983], and Healy and Palepu [1988]) find a positive relation between dividend changes and abnormal returns. In addition, Healy and Palepu report a positive relation between earnings changes around dividend initiations or omissions and the dividend change. The results are interpreted as being consistent with the hypothesis that dividends signal managers' expectations of future earnings and/or cash flows.

Brown, Choi, and Kim [1989] report that dividend changes reduce the subsequent market reaction to unexpected earnings for small firms but not for larger firms. Their findings are consistent with the assertion that dividend changes signal earnings information for small firms but not for large firms. However, this result may be due to their use of a random walk with drift model for earnings expectations, which is a better model for small firms than for large firms (Collins, Kothari, and Rayburn [1987]). Increased noise in the measure of unexpected earnings could weaken the results for large firms.

Asquith and Mullins [1986a] and Mikkelson and Partch [1986] find negative abnormal returns at the announcement of common stock offerings. Vermaelen [1981] reports significantly positive abnormal returns at the announcement of common stock repurchases via open market transactions or tender offers. Eckbo [1986] and Mikkelson and Partch [1986] generally

find significantly negative abnormal returns at the announcement of debt issues. The above results are consistent with cash flows signalling information about earnings.

Other studies directly examine the relation between stock or debt transactions and earnings. Dann, Masulis, and Mayers [1991] report that earnings increase and that stock price reactions to unexpected earnings based on time-series forecasts decrease following stock repurchase tender offers. Hertzel and Jain [1991] find positive earnings forecast revisions by analysts following stock repurchase tender offers. Similarly, Bartov [1991] reports both earnings increases and positive forecast revisions following stock repurchases on the open market. These studies suggest that stock repurchases signal information about earnings.

On the other hand, Eckbo [1986] reports no relation between the market reaction to debt issues and subsequent earnings changes. Likewise, Healy and Palepu [1990] find neither earnings decreases nor negative earnings forecast revisions following stock issue announcements. Instead, their findings suggest that the negative abnormal return at the announcement of common stock offerings is due to increases in the riskiness of firm assets. However, such findings may not be inconsistent with signalling earnings information if, for example, security issues occur when earnings increases anticipated by management are not realized. Consistent with that argument, the Wall Street Journal recently reported:

> General Motors Corp. plans to tap the stock market for an additional $750 million in a fresh signal that the No. 1 auto maker doesn't expect to return to profitability soon. . . . With hopes for a year-end rally in the North American auto market fizzling, GM is looking to investors for more cash to avoid delaying much-needed new vehicles and to sustain its stock dividends. (White [1991])

Indeed, the earnings growth in the second and third years following stock

issue announcements found by Healy and Palepu [1990] could represent delayed earnings increases anticipated by management. More research is needed into the relation between earnings and stock or debt transactions.

Investing activities have received much less attention. McConnell and Muscarella [1985] examine the market reaction to the public announcement of company-wide future capital expenditure plans and find significantly positive abnormal returns for announcements by industrial firms.

While some studies have examined the relation between earnings and individual activities, no study has considered the activities simultaneously. Examining the activities together, while controlling for other news announcements, may clarify the relation between earnings and financing and investing activities.

CHAPTER 3

THEORY AND HYPOTHESES

In this chapter, theoretical literature that relates to the financing and investing activities of the firm is reviewed. Hypotheses relating these activities to the preemption of earnings are developed.

Miller and Rock [1985] use a model in which managers maximize the value of the firm subject to the firm's budget constraint:

$$X + B = I + D \qquad (1)$$

where:

- X = the firm's earnings
- B = additional funds raised by the firm through security issues
- I = investment by the firm
- D = dividends or other distributions by the firm to security holders

They assume that managers have more information about earnings than do investors but that investors know the investment policy of the firm. They then argue that, holding investment policy constant, any unexpected change in dividend or financing policy must imply an unexpected change in earnings to maintain the budget equality. Their model gives a theoretical structure to the signalling hypothesis (see Spence [1973] and Rasmusen [1989], chapter 9).

According to the signalling hypothesis, high earnings firms differentiate themselves from low earnings firms by entering into transactions, such as dividend increases or stock repurchases, that are

too costly for low earnings firms to imitate. For the high earnings firms, the cost of the transaction must be less than the benefit gained from the signal.

Inspection of equation (1) reveals that simultaneous announcements with opposite cash flows (e.g., stock issues to finance investment) may provide ambiguous signals regarding current earnings. However, such announcements may provide information about future earnings and substitute for current earnings. For example, a debt for equity swap may substitute for current earnings by signalling that future earnings will be great enough to service the debt. Due to their infrequency,[2] such announcements are not considered in this study.

Based on the Miller and Rock model, dividend increases (decreases), holding investment and security issues constant, must imply earnings increases (decreases). Ross [1977] provides a signalling model for capital structure that can be adapted to the case of dividends: Let there be two firms with future earnings *a* and *b*, respectively, known by managers but not by investors, where $a > b$. Let v_0 be the current value of the firm, E_1 be the future earnings and D be the dividend. Let the managers' compensation be

$$M = \Phi_0 v_0 + \Phi_1 E_1 \text{ if } E_1 \geq D$$

or

$$\Phi_0 v_0 + \Phi_1 (E_1 - L) \text{ if } E_1 < D$$

where $L > 0$ represents a penalty imposed if earnings are less than dividends. The manager of the firm with future earnings a chooses

[2]There were only 69 announcements between earnings that were classified as simultaneous in the entire sample.

a dividend, D^*, such that $b < D^* \leq a$. This dividend is a signal of future earnings if the following conditions are satisfied:

future earnings	condition
a	$\Phi_0 v_0^a + \Phi_1 a > \Phi_0 v_0^b + \Phi_1 a$
b	$\Phi_0 v_0^a + \Phi_1 (b-L) < \Phi_0 v_0^b + \Phi_1 b$

where v_0^a is the current value of a firm that has chosen dividend $D = D^*$, v_0^b is the current value of a firm that has chosen dividend $D < D^*$ and $v_0^a > v_0^b$.

In the case of either the Miller and Rock or Ross model, dividend changes imply information about earnings.

H1:[3] Dividend change announcements preempt earnings information.

Announcements of constant dividends may provide little information about earnings except, perhaps, that earnings have not changed. Therefore, announcements of constant dividends are not expected to preempt earnings information.

Miller and Rock argue that security issues or retirements may signal changes in operating cash flows or earnings. To maintain the budget equality, security issues (retirements), holding dividends and investment constant, must imply earnings decreases (increases). Ross [1977] and Myers and Majluf [1984] also present models in which capital structure decisions signal earnings information.

H2: Security transaction announcements preempt earnings information.

Within the Miller and Rock model, announcements related to investments may also provide information to investors if the assumption that investors know the investment policy of the firm is relaxed. When

[3]All hypotheses in this study are stated in the alternative form.

the net present value of projects is less than the signalling costs of issuing securities, capital expenditures are only financed with earnings. Changes in the amount of investment may then result from changes in earnings. Furthermore, changes in investment may result from changes in the number of projects with positive net present values. Entry or exit into markets is signalled by economic profits or losses. In either case, investing announcements may provide information about earnings.

H3: Investing announcements preempt earnings information.

The effects of merger announcements on the acquiring firms are not clear. The model of Miller and Rock suggests that unexpected merger bids may imply information about unexpected earnings. However, the acquiring firm may be motivated by the desire to capture synergy (Bradley, Desai, and Kim [1983]). This desire may add a considerable amount of noise to the merger announcement. Thus, merger and acquisition announcements are not considered in this study.

CHAPTER 4

METHODOLOGY

The purpose of this chapter is to discuss the methodology used in this study. The sample is described in section 4.1 and the data in section 4.2. Section 4.3 develops the models to be tested. Other tests related to the specification of the model are discussed in section 4.4.

4.1 Sample

The population for this study was the set of firms continuously covered by Value Line and CRSP from 1983 through 1987. Value Line forecasts have been found to be significantly more accurate than time-series forecasts (Brown and Rozeff [1978]. In addition, Value Line provides dates on which its forecasts are released and covers a large variety of firms. Bamber [1987] reports:

> From a personal interview with a Value Line representative, I determined that firms listed in VL generally meet the following criteria:
>
> 1. capitalization in excess of $50,000,000,
> 2. at least 2,000,000 shares held by outside investors, and
> 3. over 100,000 shares traded per month.
>
> If these criteria omit one or two major firms from a covered industry, VL includes the omitted firms. Likewise, if coverage is thin in a particular industry, VL makes an exception and includes smaller, less widely held or traded firms. (p. 514)

The use of Value Line is expected to bias the sample against smaller firms. However, not as many of the news announcements made by smaller firms may be reported so such a bias as introduced by the criteria may

reduce noise in the data by eliminating many firms for which available news announcements are not reported.

In order to control for confounding events by holding the time period examined reasonably constant, only firms with calendar year ends were retained in the sample. The calendar year end requirement restriction may introduce some additional biases. Smith and Pourciau [1988] compare December and non-December year end companies. Sixty percent of firms have December year ends. However, non-December companies are significantly smaller. These biases may reduce the generalizability of the results. The calendar year end requirement should introduce minimal cross-sectional correlation because relatively few firms announced earnings on the same day.

The market reaction to earnings announcements may not be the same for all industries (Bhushan [1989]). Therefore, only manufacturing firms (SIC codes 20 through 39) were included in the tests. From this set of manufacturing firms continuously covered by Value Line and CRSP, 203 firms were randomly selected. All earnings announcements related to fiscal years 1983 through 1987 were studied.

Appendix A lists the sample firms and their industry classification. Table 1 summarizes the industry classification of the sample firms per the 1988 CRSP returns file.[4] Every 2-digit manufacturing industry was represented in the sample. In addition, two firms were listed in the non-manufacturing industries in 1988 but were included as manufacturing firms in 1987, from which file the sample was selected. CRSP regularly reclassifies firms.

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[4] The industry classification was based on the last year from which returns were used. Earnings for the fourth quarter of 1987 were reported in 1988.

TABLE 1
INDUSTRY CLASSIFICATION OF SAMPLE FIRMS

SIC Code		Number of Firms
13	Oil and gas extraction	1
14	Nonmetallic minerals mining	1
20	Food and kindred products	12
21	Tobacco products	2
22	Textile mill products	5
23	Apparel and other finished fabric products	4
24	Lumber and wood products	2
25	Furniture and fixtures	1
26	Paper and allied products	10
27	Printing, publishing	15
28	Chemicals and allied products	22
29	Petroleum refining	10
30	Rubber and plastics products	9
31	Leather and leather products	3
32	Stone, clay, glass, and concrete products	5
33	Primary metal industries	12
34	Fabricated metal products	16
35	Industrial and commercial machinery, computer equipment	23
36	Electrical and electronic equipment and components	24
37	Transportation equipment	12
38	Measuring instruments, photographic, medical, and optical goods	10
39	Miscellaneous manufacturing	4
	Total	203

Table 2 describes the distribution of firm size in the sample for the first and last quarters examined in this study. Firm size was measured as the market value of equity. Firm size varies from $8.3 million to $57,981.6 million with a mean of $1,698.8 million in the first quarter and from $9.3 million to $91,122.6 million with a mean of $3,795.2 million in the last quarter. As can be seen from the table, the typical firm approximately doubled in size during the time-period of this study. This increase is similar to that experienced by the market, as indicated by the S & P 500 Index, which increased from 140.64 to 321.83 during this time period. In addition, the distribution of firm size was positively skewed. Therefore, in the sensitivity tests, the natural logarithm of firm size was used.

4.2 Data

Public information was defined in this study as the news announcements contained in the WSJI. Such an approach ignores all other sources of public information but provides a well defined source and is consistent with prior research. For each firm included in the sample, the entries in the WSJI were obtained.[5] The earnings announcement date was also gathered from the WSJI.

The number of common shares outstanding and the price per share of common stock as of the end of each quarter were gathered from COMPUSTAT

[5] The Dow Jones News Retrieval Service (DJNRS) was considered for this study. On the one hand, Table 9 of Thompson, Olsen, and Dietrich [1987] seems to indicate that, overall, the DJNRS reports about one and one-half times as many announcements as the WSJI. On the other hand, Shores [1990] reports: "The Dow Jones News Retrieval Service was considered as an alternative source, but the results of a pilot study suggest that this source does not consistently report more announcements for a given firm (and often reports fewer) than the Wall Street Journal Index" (p. 168). Thus, the advantage of using the DJNRS is not clear.

TABLE 2
SAMPLE FIRM SIZE[A] CHARACTERISTICS
(in $millions)

	Quarter[B]	
	1983:1	1987:4
Mean	1,698.8	3,795.2
Median	452.5	1,062.2
Percentiles:		
0% (Minimum)	8.3	9.3
1%	13.4	17.4
10%	45.6	90.9
25%	134.3	241.4
75%	1,369.5	3,363.3
90%	3,509.1	8,545.8
99%	25,597.7	67,576.3
100% (Maximum)	57,981.6	91,122.6

Notes:

A. Firm size was measured as the market value of equity.

B. The quarters reported are the first and last quarters examined in this study. Firm size was measured on the last trading day before the beginning of the quarter. Therefore, firm size for 1983:1 and 1987:4 was measured on 12/31/82 and 9/30/87, respectively.

to the extent possible. Missing data was gathered from the Daily Stock Price Record. The most recent preceding analyst forecast (VLF) was gathered from Value Line. The forecast for the next quarter and the long-term annual earnings forecast was also gathered. As the treatment of such items as extraordinary gains or losses may vary, the actual earnings per share was gathered from Value Line to provide a consistent EPS and VLF.[6] Philbrick and Ricks [1991] examine a variety of forecast error metrics and conclude that unexpected earnings based on Value Line forecasts and Value Line actual EPS produce the smallest absolute forecast errors and the strongest association with capital market reaction to the earnings announcement.

For the first, second, and third quarters, the CRSP return data was collected from day -220 through day +3, where day 0 was the day of the current quarter earnings announcement. The market model, using the CRSP Value-Weighted Index, was used to estimate the market parameters for each firm:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

where: R_{it} = return for firm i on day t

R_{mt} = return for market on day t

ϵ_{it} = error residual for firm i on day t

α_i, β_i = market parameters

The estimation period was days -220 through -101 and preceded the prior quarter earnings announcements for all firms. Fourth quarter return data was collected from day -230 through day +3. The estimation period

[6] Based on a review of Value Line reports, Value Line does not consistently report any particular earnings, such as operating EPS or fully diluted EPS excluding extraordinary items, as actual EPS.

was days -230 through -111 to adjust for the longer reporting delay for fourth quarter earnings. Firms with more than 20 missing daily returns during the estimation period were deleted from the market tests for that quarter.

The market reaction to the earnings announcement (AR) was defined as the sum of the prediction errors for days -1 and 0. The sum of the abnormal returns during the period prior to the earnings announcement (CAR) was defined as the sum of the prediction errors for days -50 through -3. Day -2 was excluded from CAR to avoid adding noise from the inclusion of the return effects of concurrent announcements. Unexpected earnings (UE) were defined as the difference, scaled by price at the end of the prior quarter, between actual EPS per Value Line and VLF. The earnings forecast revision was defined as the change in VLF scaled by price at the end of the prior quarter.

Each entry in the WSJI was classified into one of the following categories:

1. Dividend changes (CHG)

   Dividends that differ from the prior dividend

2. Constant dividends (CON)

   Dividends that are the same amount as the prior dividend

3. Financing (FIN)

   Announcements related to actual or potential stock issues or repurchases or to actual or potential debt issues or retirements

4. Investing (INV)

   Announcements related to the acquisition or disposition of plant assets other than companies or segments of companies

5. Other (OTH)

Announcements not classified into one of the other four categories

CHG, FIN, and INV represent the announcements used to test the hypotheses. CON and OTH control for other announcements made by the firm.

Each entry was also classified into one of three time periods: prior to the VLF, after the VLF, and concurrent with the earnings announcement. There is a time lag between the generation of a VLF and its release. As a result, news announcements immediately preceding the release of a forecast are actually after-forecast events. The Value Line Summary & Index consistently quotes market prices nine days prior to the release date. Therefore, news items appearing in the WSJI up to nine days before the date of the VLF were classified as after the VLF. Concurrent news announcements (See section 4.4.1.) were defined as any items appearing in the WSJI on days -1, 0, +1, where day 0 was the day of the current quarter earnings announcement.

Table 3 summarizes the frequency of each of the 15 news variables (5 categories x 3 time periods). Each of the variables before or after the VLF occurred at least 28 times. The four cash flow variables (CHG, CON, FIN, INV) represented, on average, approximately 38 percent of the announcements in the WSJI before the VLF, 30 percent of the announcements after the VLF, and 45 percent of the concurrent announcements. Therefore, these variables represented a large portion of the firm-specific public information available in the WSJI.

TABLE 3
FREQUENCIES OF NEWS ANNOUNCEMENTS
(1983-1987 combined)

	Quarter			
Before VLF[A]	First	Second	Third	Fourth
CHG[B]	56	59	53	89
CON[C]	208	376	320	440
FIN[D]	57	101	65	74
INV[E]	55	58	51	53
OTH[F]	630	966	794	990
After VLF				
CHG	28	48	36	84
CON	215	278	266	248
FIN	101	104	85	74
INV	72	60	51	56
OTH	1062	1097	1025	1019
Concurrent				
CHG	19	20	11	28
CON	141	110	102	131
FIN	21	6	9	8
INV	6	7	12	6
OTH	214	154	196	214

Notes:

A. Announcements were classified as before Value Line Forecast (VLF) if the announcement occurs after the prior quarter's earnings announcement but before the VLF, as after VLF if the announcement occurs after the VLF but before the current quarter's earnings announcement, and as concurrent if the announcement occurs on the day before, the day of, or the day after the current quarter's earnings announcement.

B. Dividends that differ from the prior dividend

C. Dividends that are the same amount as the prior dividend

D. Announcements related to actual or potential stock issues or repurchases or to actual or potential debt issues or retirements

E. Announcements related to the acquisition or disposition of plant assets other than companies or segments of companies

F. Announcements not classified into one of the other four categories

4.3 Models

Preemption of earnings information may be measured using analysts' absolute forecast errors, the sign and magnitude of abnormal returns, announcement period return variance, the proportion of abnormal return associated with earnings that occurs at the time of the earnings announcement, or analysts' forecast revisions. The use of these measures allowed preemption to be tested using the information used by both analysts and investors. Each of these measures was tested in this study.

The absolute forecast error model used analyst forecasts to test preemption of earnings information by financing and investing activities. The forecast revision model tested for substitution effects and for relations between financing and investing activities and the informativeness of current earnings in forecasting future earnings.

The directional, variance, and proportion of abnormal returns models used investors to test for preemption effects. Each model made different econometric use of available data and each had its strengths and weaknesses in ability to measure preemption. The different models were used to assure that the results are not sensitive to model selection.

4.3.1 The absolute forecast error model News announcements that preempt earnings may move analyst's earnings expectations closer to actual earnings. This effect may be demonstrated with a model adapted from Holthausen and Verrecchia [1988]. Let a be a random variable representing actual earnings with mean m and variance v known by analysts. Let p be a news release that provides information about actual earnings with noise. Therefore, $p = a + r$, where r is a random variable with mean 0 and variance n. The variance of p is then $v + n$ and the covariance between a and p is v. Let f^0 and f^1 be the (unbiased) analyst forecast before and

after the news release, respectively. Then $f^0 = m$ and $f^1 = m + v(v+n)^{-1}(p-m)$. Without a news release, the forecast error is $m - a$ and has variance v. With a news release, the forecast error is $m + v(v+n)^{-1}(p-m) - a$ and has variance $v - v^2(v+n)^{-1}$. Since each term in $v^2(v+n)^{-1}$ is positive, $v - v^2(v+n)^{-1} < v$.

Therefore, news releases that preempt earnings information decrease the variance of forecast errors. In this study, absolute, instead of squared, forecast errors were used in order to be consistent with prior research and to control for outliers. The preemption of earnings information was tested with the following regression model (see Appendix B for time-line representations of models (2) through (6)):

$$AFE_i = \alpha + \beta_1 CHGB_i + \beta_2 CONB_i + \beta_3 FINB_i + \beta_4 INVB_i + \beta_5 OTHB_i + \epsilon_i \quad (2)$$

where:
- AFE_i = absolute value of analysts' forecast error (unexpected earnings) for firm i
- $CHGB_i$ = the number of dividend changes announced prior to VLF for firm i
- $CONB_i$ = the number of constant dividends announced prior to VLF for firm i
- $FINB_i$ = the number of financing announcements made prior to VLF for firm i
- $INVB_i$ = the number of investing announcements made prior to VLF for firm i
- $OTHB_i$ = the number of other announcements made prior to VLF for firm i

News announcements that preempt earnings information were expected to have negative coefficients. Significance was determined using t-tests.

4.3.2 The directional model News announcements that preempt earnings information may decrease the magnitude of the market reaction to unexpected earnings. The directional model extends the results of Kross and Schroeder [1989] by attempting to identify specific types of coverage

in the WSJI that preempts earnings information. The preemption of earnings was tested with the following model:

$$AR_i = \alpha + \beta_0 UE_i + \beta_1 CHGA_i UE_i + \beta_2 CONA_i UE_i + \beta_3 FINA_i UE_i + \beta_4 INVA_i UE_i + \beta_5 OTHA_i UE_i + \epsilon_i \quad (3)$$

where: AR_i = abnormal returns for firm i

UE_i = unexpected earnings for firm i

$CHGA_i$ = the number of dividend changes announced after VLF for firm i

$CONA_i$ = the number of constant dividends announced after VLF for firm i

$FINA_i$ = the number of financing announcements made after VLF for firm i

$INVA_i$ = the number of investing announcements made after VLF for firm i

$OTHA_i$ = the number of other announcements made after VLF for firm i

News announcements that preempt earnings information and are announced after the VLF are reflected in the market's earnings expectations but not in the VLF and, as a result, not in the UE term in (3). Thus, such preemptive news announcements represent measurement error in unexpected earnings. The interaction terms, such as CHGUE, reduce measurement error by allowing some of the information in UE to be released in the news announcement, thus correlating the interaction terms with the measurement error. The coefficients on the interaction terms may be interpreted as the difference in the market reaction to UE when news announcements are present. As discussed in Brown et. al. [1987b] variables that reduce measurement error in unexpected earnings are expected to have negative coefficients. This result is intuitive because preemptive news announcements make earnings less informative. Significance was determined using t-tests.

4.3.3 The variance model News announcements that preempt earnings information may decrease the earnings announcement period return variance. Advantages of using variance to measure preemption are that a measure of unexpected earnings is not required and it is not necessary to distinguish between the types of preemption. In addition, the timing of the interim news events relative to the VLF is no longer an issue. Several studies (e.g., Atiase [1985] and Grant [1980]) have used return variance to measure preemption.

Holthausen and Verrecchia [1988] model the effect of sequential information releases on security return variance. In their model, two signals provide information (with error) about the cash flows of an asset. They provide conditions in which the return variance at the time of the second information release decreases as the quality of the first information increases. In other words, the more information contained in the first signal, the less in the second. They argue that this relation will often be valid:

> First, at least some of the counterexamples are difficult to generate and may represent perverse cases. Second, the results in the empirical literature are largely consistent with the intuitive predictions. However, we do anticipate that counterintuitive results will arise. (p. 105)

Holthausen and Verrecchia [1988] suggest that there may be cases in which the first information release increases the return variance at the time of the second information release. One such case may occur if the first information release is associated with an increase in the variance in earnings (e.g., the sale of a segment with earnings not perfectly correlated with those of the rest of the firm). Such an event may be detected through an increase in average absolute unexpected earnings.

Holthausen and Verrecchia [1988] also suggest that another exception may be "disclosures which provide information about cash flows beyond the current period's earnings" (p. 104). For example, a dividend increase may provide information about future earnings, such as that future earnings are expected to be great enough to maintain that dividend. This information may tend to increase the market reaction to the earnings announcement and offset some or all of the preemptive effect.

In this study, the first information release may be considered a news announcement and the second the earnings announcement. The preemption of earnings was tested with the following regression model:

$$U_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \epsilon_i \qquad (4)$$

where:

U_i = $(AR_i^2/2s_i^2)$

AR_i = abnormal returns for firm i

s_i = estimation period standard error for firm i

CHG_i = the number of dividend changes announced between earnings announcements for firm i

CON_i = the number of constant dividends announced between earnings announcements for firm i

FIN_i = the number of financing announcements made between earnings announcements for firm i

INV_i = the number of investing announcements made between earnings announcements for firm i

OTH_i = the number of other announcements made between earnings announcements for firm i

The variance model may be motivated by considering abnormal returns as a function of unexpected earnings and unexpected earnings as a function of news announcements. Then, through substitution, abnormal returns may be considered a function of news announcements. Squaring abnormal returns yields the variance model. News announcements that preempt earnings information are expected to have negative coefficients. However, positive

coefficients may be possible if the announcements are associated with an increase in the variance of earnings or provide reinforcing information about future earnings. Significance was determined using t-tests.

4.3.4 The proportion of abnormal return model News announcements that preempt earnings information may increase the proportion of the abnormal return associated with unexpected earnings that is realized before the earnings announcement (Freeman [1987] and Shores [1990]). In this study, the proportion of the return that is realized at the time of the earnings announcement, which is equal to one minus the proportion realized before the earnings announcement, was used in order to maintain the consistency of the expected signs of the coefficients. This approach utilized return information prior to the earnings announcement as well as return information from the announcement period.

The preemption of earnings was tested with the following regression model:

$$PAR_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \epsilon_i \quad (5)$$

where: PAR_i = absolute value of $[AR_i/(CAR_i+AR_i)]$

CAR_i = sum of abnormal returns during the period prior to the earnings announcement (days -50 through -3) for firm i

other terms same as in (4)

Preemptive announcements were expected to decrease the magnitude of the return at the time of the earnings announcement and to increase the magnitude of the return during the period prior to the earnings announcement. Therefore, news announcements that preempt earnings information were expected to have negative coefficients. Significance was determined using t-tests.

4.3.5 The forecast revision model News announcements that provide information regarding future earnings may be utilized by financial

analysts when earnings those forecasts are revised. In this sense, news announcements may provide analysts with the ability to make more accurate earnings forecasts, thus substituting for current earnings.

This study tested the incremental explanatory power of news announcements with respect to earnings forecast revisions by estimating the following regression model, which allowed both intercept and slope effects of news announcements:

$$REV_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \beta_6 UE_i + \beta_7 CHG_i UE_i + \beta_8 CON_i UE_i + \beta_9 FIN_i UE_i + \beta_{10} INV_i UE_i + \beta_{11} OTH_i UE_i + \epsilon_i \quad (6)$$

where: REV_i = absolute value of the analyst earnings forecast revision for firm i

CHG_i = the number of dividend changes announced between VLFs for firm i

CON_i = the number of constant dividends announced between VLFs for firm i

FIN_i = the number of financing announcements made between VLFs for firm i

INV_i = the number of investing announcements made between VLFs for firm i

OTH_i = the number of other announcements made between VLFs for firm i

UE_i = absolute value of unexpected earnings for firm i

The variables that adjust the intercept, such as CHG, measure whether the announcements directly provide information about future earnings. To illustrate, a significant coefficient on CHG implies that forecast revisions are adjusted before considering unexpected earnings and that, therefore, the news announcement is an alternative source of information that may substitute for earnings.

The interaction variables, such as FINUE, adjust the amount by which current unexpected earnings revise the forecast of future earnings. A

negative coefficient implies that unexpected earnings are less informative than otherwise and, combined with a corresponding significant intercept adjustment, is consistent with a substitution effect. A positive coefficient implies that unexpected earnings are more informative than usual.

Some information may be useful for forecasting current earnings and other information may be useful for forecasting long-term earnings. Therefore, revisions were measured using both the change in the next quarter's earnings forecast and the change in the long-term annual earnings forecast.

Due to the exploratory nature of this model, hypotheses of the signs of specific coefficients were not developed. However, some significant coefficients may be reasonable. Based on signalling, dividend increases may cause a positive earnings forecast revision and be associated with a positive coefficient, β_1. If the interaction effect found by Kane, Lee, and Marcus [1984] holds, the coefficient for the dividend interaction term, β_7, will be significantly positive.

Investigation of this model may aid in the interpretation of the results of the other models. For example, if a news announcement provides reinforcing information about future earnings, positive coefficients may result in the forecast revision model as well as the directional and variance models. Similarly, news announcements that substitute for earnings may decrease the market reaction to the earnings announcement and be useful for revising forecasts but not reduce the absolute forecast error. Use in the revision process may also be interpreted as additional evidence of the information with respect to earnings contained in news announcements.

4.4 Sensitivity Tests

A variety of other tests were also conducted. The purpose of these tests was to test the specification of the models and to provide assurance that the results of the models are not due to spurious relationships or noise.

4.4.1 Multiple announcements within the same category Since announcements may provide diminishing marginal information, various specifications of the models were tested to explore the role of multiple announcements within the same category. The specification used in the primary tests was linear in that the values assigned to the news variables are the number of announcements in each category for each firm. The linear specification assumes that subsequent news events have the same amount of information.

The second specification was similar to the linear specification except that the square root of the number of announcements was used. For example, if a firm has 4 OTH announcements and UE equals .03, OTH will equal 2 and OTHUE will equal .06. The square root specification assumes that subsequent news events have a diminishing amount of information relevant to evaluating earnings.

The third specification treated the categories as dummy variables, where the variable was one if there was at least one announcement and zero otherwise. In the example, OTH will equal 1 and OTHUE will equal .03. The dummy specification assumes that only the first news event in each category contains information relevant to evaluating earnings. Comparison of the three specifications permits an exploratory investigation into the marginal information of multiple related announcements.

4.4.2 Concurrent announcements Announcements concurrent with earnings may add noise to the abnormal returns if the market reacts to the announcements as well as earnings. Therefore, all firms with concurrent announcements were deleted and the directional, variance, and PAR models were reestimated using the remaining firms. In addition, independent variables that represent the concurrent announcements were added to the models. For example, the variance model became $U_i = \alpha + \beta_1 NEWS_i + \beta_2 CONNEWS_i + \epsilon_i$ (4'), where $NEWS_i$ ($CONNEWS_i$) is a vector representing (concurrent) announcements for firm i. The directional and PAR models were modified similarly.

4.4.3 Quantification of dividend changes Dividend changes are quantifiable. Quantification of dividend changes may provide incremental information regarding earnings. This assertion was tested by quantifying dividend changes and substituting the quantified variable for CHG in the models.

4.4.4 Definition of actual earnings The directional model used Value Line amounts for actual EPS. The source of the EPS used by the market is not clear. Use of the wrong source of EPS may add noise to the results. To test the sensitivity of results to the source of actual EPS, five other measures of EPS were considered: 1) the Wall Street Journal Index, 2) fully diluted including extraordinary items, 3) fully diluted excluding extraordinary items, 4) primary including extraordinary items, and 5) primary excluding extraordinary items. For each measure, a variable was created equal to the difference between actual EPS per Value Line and the measure. This approach permits unexpected earnings to remain computed on a basis consistent with the VLF while testing for the information content of the alternative earnings measure. This variable was then included in

the directional model as an additional independent variable. This variable should be significant if the market is relying on the related earnings measure instead of Value Line. Alternative definitions of actual earnings were not considered for the absolute forecast error or forecast revision models because these models rely only on Value Line's use of earnings and not on the market's use of earnings.

4.4.5 Timing of earnings announcement The Wall Street Journal may not report earnings on the first day that the market learns of earnings. To control for noise added by not measuring abnormal returns on the day the market reacts to earnings, the earnings announcement dates per the WSJI and COMPUSTAT were compared. Firms with dates that disagree by more than one trading day were dropped from the sample and the directional, variance, and PAR models were re-estimated.[7]

4.4.6 Systematic risk The systematic risk (Beta) of a firm may affect the magnitude of the market reaction to unexpected earnings even after controlling for the market return. In a manner similar to that used by Collins and Kothari [1989], the price reaction may be considered to be the change in the present value of expected future cash flows resulting from the earnings announcement. If so, the magnitude of the market reaction may be negatively related to systematic risk in a nonlinear fashion. Therefore, to control for such possible effects, the interaction between the natural logarithm of firm beta (BETA) and unexpected earnings was added as an independent variable to the directional model and BETA was

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[7] An alternative approach would be to lengthen the earnings announcement period over which abnormal returns are measured to include the dates per both sources. However, the benefits of this approach are questionnable because relatively few (<5%) firms are affected and lengthening the earnings announcement period would add noise to the return data.

added to the variance model. However, the effects of firm risk should roughly cancel in the dependent variable of the PAR model because the market reaction to unexpected earnings is in both the numerator and denominator and the other term in the denominator (CAR) may also include the earnings information that was preempted by the news announcements.

BETA was calculated using the market model and monthly returns from the five years prior to the test period, 1978 through 1982. A minimum of thirty observations was required for a firm to be included in the test.

Dimson [1979] argues that betas computed using daily returns are biased due to nonsynchronous trading. He demonstrates that the daily betas of infrequently traded securities are biased down and frequently traded securities are biased up. He proposes measuring betas by regressing daily firm returns against market contemporaneous, lead, and lag daily returns and aggregating the coefficients.

Reinganum [1982] measures average daily betas using the market model and aggregated coefficients[8] and betas using monthly returns for portfolios based on firm size:

	Average Beta		
Portfolio	Daily Market Model	Aggregated Coefficients	Monthly
MV1 (smallest)	.75	1.69	1.47
MV2	.87	1.64	1.45
MV3	.90	1.55	1.39
MV4	.96	1.50	1.38
MV5	.98	1.46	1.34
MV6	.97	1.39	1.29
MV7	.95	1.31	1.22
MV8	.97	1.24	1.20
MV9	.95	1.13	1.13
MV10 (largest)	.98	.97	.99

[8] "For the aggregated coefficients technique, the multiple regressions are run with contemporaneous, twenty lagged, and five leading market returns" (Reinganum [1982], p. 28).

As can be seen, using daily returns and the market model, betas generally increase with firm size. Betas decrease with firm size using the aggregated coefficients method. The average market model betas are biased down for all but the largest firms. Betas using monthly returns also decrease with firm size. Furthermore, the bias is not large relative to the aggregated coefficients method, particularly for larger firms. Therefore, BETA measured using monthly returns provides a reasonable measure of systematic firm risk throughout the test period with a reasonable amount of data.

4.4.7 Firm size Firm size may affect the results of this study in several ways. Large firms may have more competing sources of information, which may tend to weaken the results for large firms because of the added noise. On the other hand, the Wall Street Journal may report a greater proportion of news for large firms, that are more "newsworthy," than for small firms. Such a tendency may create a better fit of the models for large firms.

Another concern is that the announcement variables may proxy for variables that drive the results even if the announcement variables have no direct effect. For example, large firms may have a smaller reaction to earnings announcements (Atiase [1985]) and more news announcements (Grant [1980]). Such a relation may create significant coefficients in the regressions even if the news announcements have no direct relation with the reaction to the earnings announcement.

Furthermore, size may proxy for risk (Chan, Chen, and Hsieh [1985]) and, as a result, be related to returns. Such a relation may shift the intercept in the abnormal returns/unexpected earnings relation. Size may also proxy for the amount of information available about a firm and shift

the slope of the relation. Thus, the risk and information effects of size may be concentrated in the intercept and slope, respectively. Both effects may be controlled for by including intercept and slope terms.

Therefore, two approaches were used. The sample firms were ranked by size, defined as the market value of equity. Two portfolios based on size were created. The models were examined for each portfolio, which means that only firms of similar size were compared. Also, each model was estimated using the entire sample with the natural logarithm of size and, if appropriate, the natural logarithm of size multiplied by unexpected earnings added as an independent variable.

4.4.8 Effects of news events in prior quarters To test the effects of news announcements in the prior quarters, the models were tested using the news announcements from throughout the year. In this case, unexpected earnings was scaled by the price at the end of the prior year. To control for the information contained in the quarterly earnings, the sum of the U-statistics for the interim earnings announcement periods was included as an independent variable. In addition, the directional model was tested using random walk for earnings expectations to test the sensitivity of the results to using Value Line forecasts. The use of a random walk model avoids the need to classify interim news events as before or after the earnings forecast. Thus, the directional model became:

$$AR_i = \alpha + \beta_0 UE_i + \beta_1 NEWS_i UE_i + \beta_2 U_i UE_i + \epsilon_i \qquad (3')$$

where:

UE_i = the change in annual earnings from the prior year for firm i

$NEWS_i$ = vector of variables representing news announcements made between annual earnings announcements for firm i

U_i = sum of U-statistics for interim earnings announcement periods for firm i

4.4.9 Definition of period prior to earnings announcement With the PAR model, the sum of the abnormal returns during the period prior to the earnings announcement (CAR) was defined as the sum of the prediction errors for days -50 through -3. This definition does not exactly coincide with the interim news period. Firms with interim news periods extending beyond day -50 may have some news not reflected in CAR, while firms with a period less than 50 days may have noise added from news and earnings from the prior quarter. Several sensitivity tests were conducted regarding this issue. The model was estimated using periods beginning at day -55 and day -60 to test for the effects of news not reflected in CAR. In addition, the model was estimated after deleting from the sample firms with periods less than 50 days to test for the effects of noise added from news and earnings from the prior quarter.

CHAPTER 5

ANALYSIS OF RESULTS

The purpose of this chapter is to discuss the results of this study. The results of the primary tests are discussed first. Then the results of the sensitivity tests are reviewed. Based on the absolute forecast error model, both dividend changes and constant dividends preempt earnings information. However, this result was limited to smaller firms. The market-based models did not support any of the hypotheses. Cash flow related announcements were generally useful in revising forecasts. These results were robust to the specification tests.

5.1 Distribution of Dependent Variables

The tests in this study used the following dependent variables: absolute forecast error (AFE), abnormal return (AR), variance (U), the proportion of abnormal return (PAR), and forecast revision (REV). Table 4 reports data on the distribution of these variables. Each dependent variable was subject to outliers. To control for the effects of outliers, each dependent variable was Winsorized to its first and ninety-ninth percentiles and most tests were repeated. The Winsorized results are reported. The results using the unadjusted data were similar except that noise seems to have been added by the outliers.

TABLE 4
DISTRIBUTION OF DEPENDENT VARIABLES

Variable	Qtr	Mean	Minimum	1st %ile	Median	99th %ile	Maximum
AFE[A]	1	.0074	.0000	.0000	.0024	.0922	.2400
	2	.0084	.0000	.0000	.0020	.1334	.9749
	3	.0074	.0000	.0000	.0022	.0794	.6266
	4	.0114	.0000	.0000	.0024	.1473	1.0109
AR[B]	1	.0029	-.2025	-.0976	.0002	.1344	.6547
	2	.0007	-.3406	-.1323	.0006	.1117	.2344
	3	-.0053	-.2487	-.1587	-.0017	.1282	.2513
	4	.0029	-.1580	-.1006	.0008	.1156	.7752
U[C]	1	2.7332	.0000	.0001	.5569	28.3921	241.2370
	2	2.5338	.0000	.0002	.5880	26.6679	143.5250
	3	3.7263	.0000	.0001	.7263	55.5540	176.3910
	4	3.0318	.0000	.0002	.7161	32.3513	328.1570
PAR[D]	1	2.3617	.0001	.0017	.2426	20.7019	616.8570
	2	2.5502	.0003	.0047	.2522	16.5173	1332.0000
	3	1.5811	.0000	.0035	.2587	20.8548	468.2500
	4	1.2731	.0002	.0030	.2295	9.2468	602.3750
STREV[E]	1	-.0014	-.2911	-.0721	.0000	.0400	.9500
	2	-.0022	-.1939	-.0538	.0000	.0314	.3051
	3	-.0033	-.2267	-.0597	-.0009	.0229	.2222
	4	-.0011	-.2651	-.0343	.0000	.0270	.1538
LTREV[F]	1	.0018	-1.0000	-.0888	.0000	.0759	.3390
	2	.0069	-.2644	-.1029	.0042	.0976	.8814
	3	-.0033	-1.8316	-.0882	.0000	.0575	.9195
	4	.0014	-.2308	-.0733	.0000	.0659	2.0615

Notes:

A. Absolute Forecast Error: Absolute value of difference between actual EPS per Value Line and Value Line forecast scaled by the price at the end of the prior quarter.

B. Abnormal Return: Sum of market model prediction errors for days -1 and 0, where day 0 is the day of the current quarter earnings announcement.

C. U-Statistic: Squared abnormal return divided by 2 times squared estimation period standard error.

D. Proportion of Abnormal Return: Absolute value of abnormal return divided by sum of abnormal return plus sum of prediction errors from days -50 through -3.

E. Short-Term Revision: Change in next quarter's earnings forecast scaled by price at the end of the prior quarter.

F. Long-Term Revision: Change in long-term annual earnings forecast scaled by price at the end of the prior quarter.

5.2 Basic Results

The results of estimating the models with the entire sample are reported in this section. The results of the absolute forecast error model were consistent with the first hypothesis. The other hypotheses were not supported by any model. The results of the forecast revision model suggest that cash flow related announcements were incorporated with earnings information to revise earnings forecasts.

5.2.1 The absolute forecast error model The results of the absolute forecast error model are presented in Table 5. The model was significant at less than the .075 level in each quarter. As expected, the intercept was significantly positive in each quarter.

The coefficient on dividend changes was significantly negative in each quarter except the second, in which it was only significant at the .101 level. This result was consistent with the first hypothesis. The coefficient on constant dividends was significantly negative in each quarter, which suggests that they preempt earnings information. This result was not expected given that constant dividends provide little information about earnings except, perhaps, that earnings have not changed.

In each quarter, the effects of financing announcements and investing announcements were either insignificant or positive. This result suggests that such announcements make earnings even more difficult to forecast, possibly due to an associated change in the earnings process of the firm. No evidence was found that financing or investing announcements provide information about current period earnings. The second and third hypotheses were not supported. Other announcements were not significant in any quarter.

TABLE 5
BASIC RESULTS: THE ABSOLUTE FORECAST ERROR MODEL

	Quarter			
	First	Second	Third	Fourth
Intercept	.0077 (12.47)***	.0084 (11.32)***	.0069 (14.69)***	.0128 (12.45)***
CHG	-.0040 (2.18)**	-.0030 (1.28)	-.0030 (1.83)**	-.0085 (3.44)***
CON	-.0020 (1.80)**	-.0047 (4.15)***	-.0022 (2.80)***	-.0056 (4.37)***
FIN	-.0005 (0.41)	.0034 (2.47)***	.0002 (0.20)	.0039 (2.52)***
INV	.0017 (1.50)*	.0008 (0.54)	-.0009 (0.88)	-.0004 (0.24)
OTH	-.0001 (0.94)	-.0001 (0.39)	.0000 (0.23)	-.0001 (0.70)
N	784	990	990	1001
F-STATISTIC	2.01*	4.70***	2.12*	6.30***
R-SQUARE	.0128	.0233	.0106	.0307
ADJ R-SQUARE	.0064	.0184	.0056	.0258

Model:

$$AFE_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \epsilon_i$$

where: AFE_i = absolute value of analysts' forecast error for firm i

CHG_i = dividend changes announced prior to VLF for firm i

CON_i = constant dividends announced prior to VLF for firm i

FIN_i = financing announcements made prior to VLF for firm i

INV_i = investing announcements made prior to VLF for firm i

OTH_i = other announcements made prior to VLF for firm i

(absolute t-statistics in parentheses)

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(one-tailed for coefficients)

5.2.2 The market-based models Table 6 presents the results of the directional model. Several unusual findings are evident. The coefficient on unexpected earnings was not significant in the first quarter. The coefficients on the cash flow announcements were, with one exception, insignificant or positive. Little evidence was found that cash flows provide information about current period earnings. These results were not consistent with the hypotheses. The coefficient on other announcements was always significant, but not always of the same sign. The differing effects of other announcements may be due to differences in the types of announcements made across quarters.

Table 7 presents the results of the variance model. Table 8 presents the results of the proportion of abnormal return model. The only marginally significant regression was the variance model for the second quarter, in which the coefficients on constant dividends, financing announcements, and investing announcements were negative. Otherwise, no evidence was found that cash flows provide information about current earnings. As a whole, these two models did not support the hypotheses.

5.2.3 The forecast revision model The results of the forecast revision model are presented in Table 9. Panel A presents the results using the revision of the next quarter's forecast (short-term revision). Panel B presents the results using the long-term annual forecast (long-term revision). As expected, the revision was significantly and positively related to unexpected earnings in all quarters for the short-term revision and in the first, third, and fourth quarters for the long-term revision.

Based on F-tests, the variables that adjust the intercept (CHG, CON, FIN, INV, OTH) were not significant as a group at the 10 percent level except for the long-term revision in the third quarter. Therefore, the

TABLE 6
BASIC RESULTS: THE DIRECTIONAL MODEL

	Quarter			
	First	Second	Third	Fourth
Intercept	.0019 (1.53)*	.0012 (1.11)	-.0049 (3.51)***	.0025 (2.16)**
UE	.0207 (0.27)	.0886 (2.63)***	.2686 (2.95)***	.0747 (1.77)**
CHGUE	-.3909 (0.44)	.5457 (2.17)**	-.1391 (0.91)	.3716 (1.01)
CONUE	.2983 (1.12)	.2197 (1.07)	.1728 (0.90)	.2813 (2.32)**
FINUE	-.1574 (1.33)*	.0555 (0.54)	.3263 (1.36)*	-.2242 (1.12)
INVUE	.3142 (0.79)	.0484 (0.26)	.1181 (0.54)	.0863 (0.63)
OTHUE	.0634 (2.74)***	.0465 (3.20)***	-.0495 (1.58)*	-.0157 (2.21)**
N	784	990	990	1001
F-STATISTIC	2.35**	8.34***	2.63**	2.65**
R-SQUARE	.0178	.0484	.0158	.0158
ADJ R-SQUARE	.0102	.0426	.0098	.0098

Model:

$$AR_i = \alpha + \beta_0 UE_i + \beta_1 CHG_i UE_i + \beta_2 CON_i UE_i + \beta_3 FIN_i UE_i + \beta_4 INV_i UE_i + \beta_5 OTH_i UE_i + \epsilon_i$$

where: AR_i = abnormal returns for firm i

UE_i = unexpected earnings for firm i

CHG_i = dividend changes announced after VLF for firm i

CON_i = constant dividends announced after VLF for firm i

FIN_i = financing announcements made after VLF for firm i

INV_i = investing announcements made after VLF for firm i

OTH_i = other announcements made after VLF for firm i

(absolute t-statistics in parentheses)

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(one-tailed for coefficients)

TABLE 7
BASIC RESULTS: THE VARIANCE MODEL

	Quarter			
	First	Second	Third	Fourth
Intercept	2.2625 (11.12)***	2.4205 (10.61)***	3.5992 (8.46)***	2.2754 (8.05)***
CHG	-.0345 (0.07)	.2677 (0.62)	-.1483 (0.16)	.3390 (0.81)
CON	-.1161 (0.42)	-.3764 (1.59)*	.0414 (0.09)	.1269 (0.49)
FIN	-.1193 (0.51)	-.2909 (1.32)*	-.6554 (1.49)*	-.0283 (0.11)
INV	-.2215 (0.83)	-.4367 (1.75)**	-.4216 (0.92)	.1172 (0.39)
OTH	.0307 (1.51)*	.0299 (1.63)*	-.0050 (0.15)	.0028 (0.14)
N	1006	1007	1007	1006
F-STATISTIC	0.51	1.88*	0.96	0.19
R-SQUARE	.0025	.0093	.0047	.0010
ADJ R-SQUARE	-.0025	.0043	-.0002	-.0040

Model:

$$U_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \epsilon_i$$

where: $U_i = (AR_i^2/2s_i^2)$

AR_i = abnormal returns for firm i

s_i = estimation period standard error for firm i

CHG_i = dividend changes announced between earnings announcements for firm i

CON_i = constant dividends announced between earnings announcements for firm i

FIN_i = financing announcements made between earnings announcements for firm i

INV_i = investing announcements made between earnings announcements for firm i

OTH_i = other announcements made between earnings announcements for firm i

(absolute t-statistics in parentheses)

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(one-tailed for coefficients)

TABLE 8
BASIC RESULTS: THE PROPORTION OF ABNORMAL RETURN MODEL

	Quarter			
	First	Second	Third	Fourth
Intercept	.7894 (6.38)***	.9434 (8.08)***	.8990 (6.46)***	.6411 (8.70)***
CHG	.4958 (1.65)**	.0367 (0.17)	-.0380 (0.13)	.0114 (0.10)
CON	.0275 (0.16)	-.1758 (1.45)*	-.1026 (0.65)	-.0628 (0.92)
FIN	.0414 (0.29)	-.1106 (0.98)	.1045 (0.73)	-.0475 (0.68)
INV	-.0330 (0.20)	-.1486 (1.17)	.0597 (0.40)	.0367 (0.47)
OTH	.0142 (1.15)	.0062 (0.66)	.0054 (0.51)	.0040 (0.74)
N	1006	1007	1007	1006
F-STATISTIC	0.93	0.98	0.44	0.47
R-SQUARE	.0046	.0049	.0022	.0024
ADJ R-SQUARE	-.0003	-.0001	-.0028	-.0026

Model:

$$PAR_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \epsilon_i$$

where: PAR_i = absolute value of $[AR_i/(CAR_i+AR_i)]$

AR_i = announcement period abnormal returns for firm i

CAR_i = sum of the abnormal returns during the period prior to the earnings announcement (days -50 through -3) for firm i

CHG_i = dividend changes announced between earnings announcements for firm i

CON_i = constant dividends announced between earnings announcements for firm i

FIN_i = financing announcements made between earnings announcements for firm i

INV_i = investing announcements made between earnings announcements for firm i

OTH_i = other announcements made between earnings announcements for firm i

(absolute t-statistics in parentheses)

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(one-tailed for coefficients)

TABLE 9
BASIC RESULTS: THE FORECAST REVISION MODEL

Panel A: Short-term revisions

	Quarter			
	First	Second	Third	Fourth
Intercept	-.0012	-.0021	-.0026	-.0009
	(3.46)***	(6.43)***	(7.73)***	(2.77)***
UE	.0697	.0724	.1408	.0492
	(3.00)***	(7.07)***	(4.89)***	(2.55)**
CHGUE	.1813	.3312	.0235	.5165
	(2.01)**	(5.50)***	(1.00)	(5.27)***
CONUE	.2160	.1342	.0873	.0373
	(6.34)***	(4.77)***	(2.52)**	(1.63)
FINUE	.0824	-.0470	.0484	.0873
	(3.25)***	(1.81)*	(1.57)	(2.76)***
INVUE	-.1576	-.1090	.1082	-.0206
	(4.75)***	(2.30)**	(4.00)***	(0.93)
OTHUE	.0190	-.0027	-.0161	-.0027
	(4.74)***	(0.89)	(3.09)***	(1.60)
N	769	971	986	628
F-STATISTIC	54.87***	25.85***	33.26***	11.65***
R-SQUARE	.3017	.1386	.1693	.1012
ADJ R-SQUARE	.2962	.1332	.1642	.0925

TABLE 9 (cont'd)

Panel B: Long-term revisions

	Quarter			
	First	Second	Third	Fourth
Intercept	.0039	.0060	-.0022	-.0014
	(5.00)***	(8.41)***	(3.64)***	(1.90)*
UE	.1922	.0333	.1681	.1246
	(3.74)***	(1.50)	(3.25)***	(2.98)***
CHGUE	-.1121	.3591	.0256	.7133
	(0.56)	(2.76)***	(0.60)	(3.36)***
CONUE	.0471	.2144	.2253	.0787
	(0.63)	(3.52)***	(3.62)***	(1.58)
FINUE	.0713	.1046	.1347	.2684
	(1.28)	(1.86)*	(2.43)**	(3.92)***
INVUE	-.2252	-.0272	.1365	.0072
	(3.07)***	(0.27)	(2.81)***	(0.15)
OTHUE	.0271	-.0048	-.0506	-.0091
	(3.07)***	(0.74)	(5.40)***	(2.45)**
N	769	971	986	628
F-STATISTIC	16.24***	7.97***	11.46***	10.59***
R-SQUARE	.1134	.0472	.0656	.0929
ADJ R-SQUARE	.1064	.0413	.0599	.0841

Model:

$$ST(LT)REV_i = \alpha + \beta_1 UE_i + \beta_2 CHG_i UE_i + \beta_3 CON_i UE_i + \beta_4 FIN_i UE_i + \beta_5 INV_i UE_i + \beta_6 OTH_i UE_i + \epsilon_i$$

where: REV_i = analyst earnings forecast revision for firm i (ST is change in next quarter's earnings forecast, LT is change in the long-term annual earnings forecast)

CHG_i = dividend changes announced between analyst forecasts for firm i

CON_i = constant dividends announced between analyst forecasts for firm i

FIN_i = financing announcements made between analyst forecasts for firm i

INV_i = investing announcements made between analyst forecasts for firm i

OTH_i = other announcements made between analyst forecasts for firm i

UE_i = unexpected earnings for firm i

(absolute t-statistics in parentheses)
* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(two-tailed for coefficients)

results of estimating forecast revisions using only the intercept, unexpected earnings, and the interaction terms are presented.

The results suggest that the interaction between cash flow announcements and unexpected earnings provided information useful in forecasting future earnings. However, few interactions were significantly negative and, thus, little evidence of substitution effects was provided.

This interaction was particularly strong in the cases of dividend changes and constant dividends. The interaction for dividend announcements was significantly positive in panel A in all cases except dividend changes in the third quarter and constant dividends in the fourth quarter. In panel B, they were each significantly positive twice. This finding implies that current earnings were generally more informative about future earnings when accompanied by dividend announcements.

A similar relation held for financing announcements for all quarters except the first using long-term revisions and in the first and fourth quarters using short-term revisions. However, a marginally significant negative relation held in the second quarter of panel A. Likewise, investing announcements had one significantly positive and at least one significantly negative interaction in each panel. These results suggest that financing and investing announcements were useful in revising forecasts, but that they made current announcements more informative in some cases and less informative in others.[9]

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[9] The forecast revision model was also estimated substituting absolute revisions and absolute unexpected earnings for the signed variables. The results for the interaction terms were similar in the first, second, and fourth quarters in that all significant coefficients on the cash flow related interaction variables (16 of the 24) were positive for both short-term and long-term revisions. However, in the third quarter, six of the eight coefficients were significantly negative. The intercept-adjusting terms often had opposite signs compared to the results using the signed variables. This result may generally be due to the negative intercept

5.3 Sensitivity Tests

A variety of other tests were also conducted. The purpose of these tests was to test the specification of the models and to provide assurance that the results of the models were not due to spurious relationships or noise. The tests related to multiple announcements within the same category, concurrent announcements, quantification of dividend changes, definition of actual earnings, timing of earnings announcement, systematic risk, firm size, effects of news events in prior quarters, and definition of period prior to earnings announcement. In addition, a test for heteroskedasticity and tests of alternative explanations for the results of the absolute forecast error model were conducted.

5.3.1 Multiple announcements within the same category The tests for the effects of multiple similar announcements included using the square root of the number of announcements in each category and dummy variables that were one if there was at least one announcement and zero otherwise.

The qualitative results for the absolute forecast error model were very similar to those in the basic results. The coefficient on dividend changes was significantly negative in the second quarter using both alternative specifications, as well as in all other quarters. The qualitative results for constant dividends and investing announcements were the same as before using both specifications. Some differences arose in the case of financing announcements, however. Using the dummy specification, the coefficient on financing announcements was

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using the signed variables, which made interpretation of the results difficult. Therefore, the results using the signed variables were reported in this study.

significantly negative in the first quarter and not significant in the other quarters. Financing announcements were also not significant in the fourth quarter using the square root specification. This result supported the second hypothesis in the first quarter and suggests that financing announcements may not make earnings more difficult to forecast after all.

The qualitative results for the directional model were the same except that the coefficient on financing announcements was significantly positive in the second quarter using the dummy specification. This result did not support the hypothesis.

The qualitative results for the variance model were the same except that financing announcements were not significant in the second quarter using either specification. The results for the proportion of abnormal return model were the same in that none of the estimates achieved overall significance.

The square root and dummy specifications of the forecast revision model were only estimated with the unadjusted data. Some differences in significance levels were found, but the overall result that the interaction between cash flow related announcements and earnings is useful in forecasting future earnings was unaffected.

Overall, the alternative specifications had little effect on the results of this study. This finding may be due to there being too few firms with multiple announcements within the same cash flow related category included in this study.

5.3.2 Concurrent announcements The market-based models were also estimated after deleting observations with concurrent announcements. The

explanatory power of the models generally increased. However, none of the hypotheses were consistently supported.

In addition, the models were estimated after adding variables that represent concurrent announcements. Again, the explanatory power of the models increased but none of the hypotheses were consistently supported. Controlling for concurrent announcements in the market-based models did not change the results meaningfully.

5.3.3 Quantification of dividend changes Dividend changes were quantified by scaling the change by price. Each model was estimated substituting the quantified dividend change.

The only qualitative difference in the absolute forecast error model was that the coefficient on dividend changes was significantly negative in the second quarter but insignificantly positive in the fourth quarter. The results for the directional model were the same except that dividend changes were never significant.

The results for the variance model were qualitatively the same as the basic results. Likewise, no qualitative differences were found in the proportion of abnormal return model.

The primary differences in the short-term revision model were in the effects of dividend changes. In the fourth quarter, dividend changes were associated with a significant increase in the revision. This result was consistent with the other three quarters. The interaction between dividend changes and unexpected earnings was insignificant in the first and second quarters and significantly negative in the third quarter. Also, in the second quarter, the financing interaction was not significant while the investing interaction was significantly negative.

The long-term revision model also had changes in the effects of the dividend change interaction. The interaction was insignificant in the second quarter and significantly negative in the third. In the fourth quarter, the direct effect of dividend changes was significantly positive and the direct effects of constant dividends and investing activities were not significant.

Overall, the quantification of dividends did not seem to affect the results greatly. The explanatory power of most estimations decreased slightly, which suggests that noise may have been added.

5.3.4 Definition of actual earnings The source of EPS used by the market is not clear. Five other measures of EPS were considered in this study.

Table 10 presents the results of controlling for earnings reported in the Wall Street Journal. The variable WSJ is equal to the difference between actual EPS per Value Line and EPS gathered from the Wall Street Journal Index. Interesting observations may be drawn by comparing Table 10 to Table 6. In each quarter, controlling for WSJ increased explanatory power and the coefficient on unexpected earnings. In addition, though not statistically tested, the coefficient on unexpected earnings was considerably larger than the coefficient on WSJ. These results were consistent with the assertion that Value Line adjusts EPS to increase its usefulness to investors, but that the other earnings components must still be controlled. However, the results still did not support the hypotheses of the current study.

Similar tests were also conducted using primary and fully diluted EPS both including and excluding extraordinary items. This data was gathered from COMPUSTAT. None of the four earnings measures were significant in any quarter. In addition, the coefficient on unexpected

TABLE 10
DIRECTIONAL MODEL WITH CONTROL FOR
EARNINGS REPORTED IN THE WALL STREET JOURNAL

	Quarter			
	First	Second	Third	Fourth
Intercept	.0007	.0021	-.0041	.0027
	(0.54)	(1.80)**	(2.90)***	(2.32)**
UE	.7119	.3772	.5499	.7124
	(4.82)***	(4.45)***	(3.45)***	(6.66)***
CHGUE	-.9548	1.3584	2.1432	-.2803
	(1.11)	(1.94)**	(2.32)**	(0.77)
CONUE	1.0653	1.1240	.6088	.2993
	(2.07)**	(3.74)***	(1.50)*	(0.98)
FINUE	.6211	-.1041	-.2165	-.6311
	(1.52)*	(0.96)	(0.66)	(1.27)
INVUE	.8541	.0829	.1052	-.1734
	(1.41)*	(0.46)	(0.22)	(0.63)
OTHUE	-.0207	-.0179	-.0201	.0266
	(0.56)	(0.74)	(0.38)	(0.76)
WSJ	-.0047	.0051	.0046	.0007
	(1.36)*	(1.66)**	(1.24)	(0.28)
N	706	883	898	876
F-STATISTIC	7.36***	9.79***	4.82***	9.62***
R-SQUARE	.0687	.0726	.0366	.0720
ADJ R-SQUARE	.0594	.0652	.0290	.0645

Model:

$$AR_i = \alpha + \beta_0 UE_i + \beta_1 CHG_i UE_i + \beta_2 CON_i UE_i + \beta_3 FIN_i UE_i + \beta_4 INV_i UE_i + \beta_5 OTH_i UE_i + WSJ_i + \epsilon_i$$

where: AR_i = abnormal returns for firm i
UE_i = unexpected earnings for firm i
CHG_i = dividend changes announced after VLF for firm i
CON_i = constant dividends announced after VLF for firm i
FIN_i = financing announcements made after VLF for firm i
INV_i = investing announcements made after VLF for firm i
OTH_i = other announcements made after VLF for firm i
WSJ_i = difference between actual EPS per Value Line and Wall Street Journal Index

(absolute t-statistics in parentheses)

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(one-tailed for coefficients)

earnings and the explanatory power remained low. The only outcome consistent with the hypotheses was that, in the fourth quarter, financing announcements had a significantly negative coefficient in all four models. Controlling for the source of EPS used by the market did not affect the results of this study with respect to the information about earnings provided by cash flow related announcements.

5.3.5 Timing of earnings announcement The market-based models were estimated after deleting observations with earnings announcements per the WSJI and COMPUSTAT that disagreed by more than one trading day. The results for the directional model were qualitatively the same as those reported in the basic results. The results for the variance and PAR models were similarly unaffected.

5.3.6 Systematic risk The directional model was estimated with the interaction between the natural logarithm of firm beta and unexpected earnings added as an independent variable. As expected, the coefficient on this variable was significantly negative in each quarter. Of the cash flow related variables, only constant dividends in the first quarter had a significantly positive coefficient. The only result consistent with the hypotheses was that the coefficient on financing announcements was significantly negative in the first and fourth quarters.

The variance model was also estimated with the natural logarithm of firm beta added as an independent variable. The coefficient was significantly negative in the first quarter and insignificant in the other quarters. However, none of the quarters achieved overall significance. Controlling for systematic risk did not affect the results of this study.

5.3.7 Firm size Two approaches were used to control for firm size in this study. In the first approach, each model was estimated using the

entire sample with the natural logarithm of size and, if appropriate, the natural logarithm of size multiplied by unexpected earnings added as an independent variable. In the second approach, firms were ranked by size each quarter and assigned to either the large or small firm portfolio. The models were then examined for each portfolio.

For the absolute forecast error model, the coefficient on the natural logarithm of size was significantly negative in each quarter. This finding was consistent with Value Line forecasts being more accurate for larger firms than for smaller firms. However, the only qualitative change in the results of the cash flow variables was that the coefficient on investing was significantly positive in the second and fourth quarters. This result did not support the hypothesis.

For the directional model, independent variables representing size and the interaction between size and unexpected earnings were added. This approach seemed to add noise to the results. The coefficients on the new variables were not stable, both were positive twice and negative twice. The coefficient on unexpected earnings was significantly negative in the first and third quarters and insignificantly positive in the second quarter. The only qualitative changes in the cash flow related variables were that the coefficient on financing was insignificant in the first quarter and the one on dividend changes was significantly negative in the third quarter. The hypotheses were still not supported.

For the variance and proportion of abnormal return models, the coefficient on size was significantly positive in the third quarter and insignificant in the other quarters. The variance model achieved overall significance at the .009 level in the third quarter and the coefficients

on both financing and investing were marginally significantly negative. Otherwise, the results were similar to the basic results for both models.

Terms representing both size and the interaction of size and unexpected earnings were added to the forecast revision model. For the short-term revision, the coefficient on size was significantly positive three times and the interaction term twice. The terms were insignificant in the other quarters. The coefficient on unexpected earnings was insignificant each quarter. All interaction terms that were significantly positive in the basic results remained significantly positive. The general result that cash flow related announcements are useful in the revision process was unaffected.

For the long-term revision, the effects of the size terms varied across quarters. The coefficient on unexpected earnings was insignificant in the third and fourth quarters. However, the general result that cash flow related announcements are useful in the revision process was again unaffected.

Table 11 presents the results of the absolute forecast error model by firm size portfolio. The Chow test found that the differences between the two portfolios were significant at less than the 5 percent level in each quarter. The explanatory power of the model was considerably greater for small firms than for large firms. Similar to the basic results, dividend changes and constant dividends were associated with a reduced absolute forecast error for small firms. For large firms, no relation was found between forecast accuracy and cash flow related announcements.

For the directional model, the Chow test found that the differences between the two portfolios were significant for the first and second quarters. However, the results still did not generally support any of the

TABLE 11
THE ABSOLUTE FORECAST ERROR MODEL
BY FIRM SIZE PORTFOLIO

Panel A: Small firms

	Quarter			
	First	Second	Third	Fourth
Intercept	.0114 (9.61)***	.0105 (8.31)***	.0094 (11.96)***	.0183 (9.95)***
CHG	-.0078 (1.99)**	-.0020 (0.38)	-.0082 (2.95)***	-.0147 (3.16)***
CON	-.0032 (1.45)*	-.0093 (4.67)***	-.0042 (3.26)***	-.0107 (4.83)***
FIN	-.0021 (0.77)	.0069 (2.35)***	.0019 (0.76)	.0050 (1.67)**
INV	.0211 (3.54)***	.0138 (2.74)***	-.0039 (0.64)	.0070 (1.02)
OTH	-.0007 (0.83)	.0032 (3.91)***	.0016 (4.27)***	.0030 (4.90)***
N	343	492	495	503
F-STATISTIC	3.94***	10.43***	6.85***	13.00***
R-SQUARE	.0552	.0969	.0654	.1157
ADJ R-SQUARE	.0411	.0876	.0559	.1068

TABLE 11 (cont'd)

Panel B: Large firms

	Quarter			
	First	Second	Third	Fourth
Intercept	.0039	.0034	.0031	.0043
	(7.64)***	(6.01)***	(7.31)***	(6.53)***
CHG	-.0008	-.0019	.0018	-.0024
	(0.60)	(1.33)*	(1.27)	(1.65)**
CON	-.0003	-.0003	-.0001	-.0002
	(0.30)	(0.35)	(0.19)	(0.27)
FIN	-.0001	.0014	-.0004	.0005
	(0.11)	(1.59)*	(0.49)	(0.54)
INV	.0007	-.0002	.0002	.0006
	(1.05)	(0.21)	(0.29)	(0.79)
OTH	.0001	.0001	.0000	.0000
	(1.34)*	(0.73)	(0.84)	(0.25)
N	441	498	495	498
F-STATISTIC	1.03	1.16	0.57	0.89
R-SQUARE	.0117	.0116	.0058	.0089
ADJ R-SQUARE	.0004	.0016	-.0044	-.0011

Model:

$$AFE_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \epsilon_i$$

where: AFE_i = absolute value of analysts' forecast error for firm i

CHG_i = dividend changes announced prior to VLF for firm i

CON_i = constant dividends announced prior to VLF for firm i

FIN_i = financing announcements made prior to VLF for firm i

INV_i = investing announcements made prior to VLF for firm i

OTH_i = other announcements made prior to VLF for firm i

Note: Firms were ranked by size each quarter and assigned to either the large or small firm portfolio.

(absolute t-statistics in parentheses)

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(one-tailed for coefficients)

hypotheses. Likewise, the results of the variance and proportion of abnormal return models estimated by size portfolio did not support any of the hypotheses.

Table 12 presents the results of the forecast revision model by firm size portfolio. The Chow test found that the differences between the two portfolios were significant at less than the 5 percent level in each quarter. Based on F-tests, the variables that adjust the intercept were significant as a group at the 10 percent level in 7 of the 16 cases. Therefore, the results of estimating the forecast revision model as specified in equation (6) are reported. However, 6 of the 7 cases of significance related to smaller firms, suggesting that cash flow related announcements directly provide information about future earnings for smaller firms but not for larger firms. For smaller firms, financing announcements significantly reduced the revision in the first, third, and fourth quarters. The most striking difference may have been in the use of constant dividends in the revision process. The interaction between constant dividends and unexpected earnings was generally positive for small firms and negative for large firms. Another interesting result was that the news announcements were used in the revision process for large firms but did not result in a reduction of absolute forecast errors. The general result that cash flow announcements significantly influence forecast revisions remained.

The coefficient on unexpected earnings and the explanatory power of the forecast revision model differ by firm size. These differences may be due to greater measurement error in unexpected earnings and the cash flow variables for smaller firms than for larger firms. Alternatively, earnings for the larger firm subsample may exhibit greater persistence and

TABLE 12
THE FORECAST REVISION MODEL BY FIRM SIZE PORTFOLIO

Panel A: Short-term revision, small firms

	Quarter			
	First	Second[A]	Third[A]	Fourth[A]
Intercept	-.0009	-.0017	-.0042	-.0007
	(0.56)	(1.61)	(4.19)***	(0.47)
CHG	.0029	.0021	.0031	-.0006
	(1.01)	(1.06)	(1.79)*	(0.26)
CON	-.0002	-.0006	.0011	.0002
	(0.14)	(0.51)	(1.27)	(0.18)
FIN	-.0029	-.0002	-.0017	-.0031
	(2.02)**	(0.15)	(1.80)*	(1.79)*
INV	-.0046	-.0075	.0028	.0128
	(1.42)	(1.95)*	(1.28)	(4.34)***
OTH	-.0000	-.0007	-.0003	-.0004
	(0.07)	(3.04)***	(1.50)	(1.02)
UE	-.0079	.0927	.0890	.0371
	(0.17)	(7.01)***	(2.36)**	(1.07)
CHGUE	-.0599	.1551	.5072	.3235
	(0.37)	(1.87)*	(4.82)***	(0.97)
CONUE	.3759	.1682	.1246	.0539
	(5.71)***	(4.38)***	(2.66)***	(1.44)
FINUE	.0998	-.1431	.0680	.1047
	(2.02)**	(3.64)***	(1.70)*	(1.58)
INVUE	-.2777	-.2976	.1573	-.0275
	(3.93)***	(4.03)***	(3.88)***	(0.80)
OTHUE	.0336	-.0088	-.0177	-.0022
	(2.46)**	(2.00)**	(2.26)**	(0.70)
N	333	480	492	278
F-STATISTIC	13.59***	10.93***	15.55***	3.58***
R-SQUARE	.3176	.2044	.2627	.1290
ADJ R-SQUARE	.2943	.1857	.2458	.0930

TABLE 12 (cont'd)

Panel B: Short-term revision, large firms

	Quarter			
	First	Second	Third	Fourth
Intercept	-.0015	-.0015	-.0008	-.0004
	(2.17)**	(2.40)**	(0.99)	(0.58)
CHG	.0012	.0011	-.0002	.0003
	(1.43)	(1.22)	(0.23)	(0.49)
CON	.0007	.0003	-.0004	-.0005
	(1.11)	(0.42)	(0.51)	(0.85)
FIN	.0003	.0004	.0003	.0002
	(0.87)	(1.00)	(0.57)	(0.50)
INV	.0001	-.0003	-.0007	.0001
	(.369)	(.212)	(.061)	(.347)
OTH	-.0000	-.0000	-.0000	-.0000
	(1.02)	(0.10)	(0.01)	(1.01)
UE	.5576	.1038	1.0960	.4980
	(6.40)***	(1.77)*	(5.86)***	(9.84)***
CHGUE	.2032	1.0042	-.4707	.1507
	(2.15)**	(9.64)***	(5.29)***	(2.09)**
CONUE	-.0838	.3751	-.4727	-.3899
	(1.47)	(6.20)***	(2.89)***	(7.52)***
FINUE	.0065	-.0672	-.0774	.0123
	(0.25)	(2.14)**	(0.89)	(0.38)
INVUE	-.0413	.0986	-.1639	.0319
	(1.20)	(1.75)*	(3.19)***	(0.77)
OTHUE	.0075	-.0036	-.0204	-.0008
	(2.35)**	(0.86)	(2.14)**	(0.25)
N	436	491	494	350
F-STATISTIC	45.33***	31.18***	8.47***	24.09***
R-SQUARE	.5404	.4172	.1620	.4395
ADJ R-SQUARE	.5285	.4039	.1429	.4212

TABLE 12 (cont'd)

Panel C: Long-term revision, small firms

	Quarter			
	First[A]	Second	Third[A]	Fourth[A]
Intercept	-.0060 (1.83)*	.0043 (1.76)*	-.0046 (2.57)**	.0061 (2.29)**
CHG	.0061 (1.03)	.0032 (0.75)	.0060 (1.97)**	-.0071 (1.69)*
CON	.0095 (2.96)***	.0018 (0.74)	.0020 (1.38)	-.0052 (1.97)**
FIN	.0051 (1.75)*	-.0063 (2.10)**	.0003 (0.20)	-.0063 (1.89)*
INV	.0082 (1.25)	.0080 (0.93)	-.0049 (1.25)	.0007 (0.12)
OTH	.0014 (2.42)**	-.0002 (0.41)	-.0008 (2.67)***	-.0007 (0.93)
UE	.2025 (2.13)**	.0571 (1.95)*	.1808 (2.68)***	.1144 (1.71)*
CHGUE	-.0512 (0.16)	.1067 (0.58)	.5948 (3.16)***	.1778 (0.28)
CONUE	.1003 (0.76)	.3137 (3.68)***	.4428 (5.29)***	.0102 (0.14)
FINUE	.0683 (0.69)	.1452 (1.66)*	.2334 (3.27)***	.3181 (2.49)**
INVUE	-.2356 (1.65)*	.0473 (0.29)	.1675 (2.31)**	.0216 (0.32)
OTHUE	.0270 (0.98)	-.0198 (2.03)**	-.0923 (6.57)***	-.0081 (1.35)
N	333	480	492	278
F-STATISTIC	5.95***	3.29***	8.81***	2.92***
R-SQUARE	.1693	.0719	.1679	.1076
ADJ R-SQUARE	.1408	.0500	.1489	.0707

TABLE 12 (cont'd)

Panel D: Long-term revision, large firms

	Quarter			
	First	Second	Third[A]	Fourth
Intercept	.0041	.0051	-.0004	-.0018
	(1.89)*	(3.18)***	(0.27)	(0.83)
CHG	-.0016	.0027	.0024	-.0001
	(0.57)	(1.24)	(1.30)	(0.06)
CON	-.0015	.0013	.0008	-.0019
	(0.77)	(0.86)	(0.62)	(0.88)
FIN	.0000	.0012	.0017	.0000
	(0.03)	(1.28)	(1.86)*	(0.04)
INV	-.0017	-.0015	-.0013	-.0005
	(1.33)	(1.67)*	(1.73)*	(0.45)
OTH	.0001	.0001	-.0001	.0001
	(1.18)	(1.24)	(1.41)	(1.63)
UE	.7077	.1912	1.2966	.2221
	(2.56)**	(1.30)	(3.82)***	(1.29)
CHGUE	-.3745	1.5570	-.6032	.7738
	(1.25)	(5.95)***	(3.74)***	(3.15)***
CONUE	-.3971	-.2204	-.5854	.2276
	(2.19)**	(1.45)	(1.97)**	(1.29)
FINUE	.2821	.1564	.1995	.1846
	(3.41)***	(1.98)**	(1.26)	(1.69)*
INVUE	.0113	-.1619	-.2792	-.0186
	(0.10)	(1.15)	(3.00)***	(0.13)
OTHUE	.0056	-.0210	-.0189	-.0137
	(0.55)	(1.98)**	(1.09)	(1.28)
N	436	491	494	350
F-STATISTIC	6.23***	7.25***	3.46***	7.17***
R-SQUARE	.1391	.1428	.0731	.1893
ADJ R-SQUARE	.1167	.1231	.0520	.1629

TABLE 12 (cont'd)

Model:

$$ST(LT)REV_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \beta_6 UE_i + \beta_7 CHG_i UE_i + \beta_8 CON_i UE_i + \beta_9 FIN_i UE_i + \beta_{10} INV_i UE_i + \beta_{11} OTH_i UE_i + \epsilon_i$$

where: REV_i = analyst earnings forecast revision for firm i (ST is change in next quarter's earnings forecast, LT is change in the long-term annual earnings forecast)

CHG_i = dividend changes announced between analyst forecasts for firm i

CON_i = constant dividends announced between analyst forecasts for firm i

FIN_i = financing announcements made between analyst forecasts for firm i

INV_i = investing announcements made between analyst forecasts for firm i

OTH_i = other announcements made between analyst forecasts for firm i

UE_i = unexpected earnings for firm i

Note: Firms were ranked by size each quarter and assigned to either the large or small firm portfolio.

(absolute t-statistics in parentheses)

* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level
(two-tailed for coefficients)

A. F-test indicates that variables that adjust the intercept (CHG, CON, FIN, INV, OTH) are significant as a group at the 10 % level

predictability (Lipe [1990]). For smaller firms, the explanatory power tends to decline as the year progresses. For larger firms, the explanatory power tends to decline for the first three quarters and then increase in the fourth quarter. This increase may be due to the audit process and the greater tendency for managers of larger firms to smooth interim earnings and delay announcement of bad news until the fourth quarter (Mendenhall and Nichols [1988]).

5.3.8 Effects of news events in prior quarters To test the effects of news announcements in prior quarters, the models were estimated using the fourth quarter earnings and news announcements from throughout the year. The results are reported in Table 13. To control for the information contained in the quarterly earnings, the sum of the U-statistics for the interim earnings announcement periods was included as an independent variable in each of the models. This control variable was generally not significant. The directional model based earnings expectations on the random walk model. The coefficient on unexpected earnings was not significant.

The general results were similar to those reported in the basic results. Based on the absolute forecast error model, dividend changes and constant dividends preempt earnings information. The market-based models generally did not support any of the hypotheses. Most cash flow announcements were useful in the earnings forecast revision process.

5.3.9 Definition of period prior to earnings announcement The proportion of abnormal return model accumulated abnormal returns from days -50 through -3 for the period prior to the earnings announcement. This period does not exactly coincide with the interim news period. To test the sensitivity of the results, the model was also estimated using periods

TABLE 13
RESULTS OF MODELS ESTIMATED USING NEWS ANNOUNCEMENTS FROM THROUGHOUT THE YEAR

Dep. var.	AFE[A]	AR[A]	U[A]	PAR[A]	STREV[B]	LTREV[B]
Intercept	.0225	.0029	1.6952	.5896	.0005	.0020
	(12.50)@	(2.23)#	(4.06)@	(4.95)@	(0.60)	(0.78)
CHG	-.0066		.5666	.0570	-.0002	.0013
	(5.47)@		(2.24)#	(0.79)	(0.43)	(1.05)
CON	-.0043		.1348	-.0373	-.0004	-.0015
	(7.45)@		(1.13)	(1.09)	(1.62)	(2.21)#
FIN	.0013		-.0369	-.0331	-.0001	-.0004
	(2.56)@		(0.35)	(1.11)	(0.33)	(0.88)
INV	-.0000		.0284	-.0317	-.0001	-.0003
	(0.03)		(0.29)	(1.15)	(0.79)	(0.71)
OTH	-.0000		-.0001	.0035	.0000	.0000
	(1.26)		(0.02)	(2.05)#	(0.36)	(1.39)
U13	.0000		.0068	.0003	-.0000	.0001
	(0.19)		(0.75)	(0.12)	(0.03)	(1.33)
UE		.0185			.0058	.0692
		(0.98)			(0.35)	(1.45)
CHGUE		-.0728			.0827	.0353
		(1.23)			(2.01)#	(0.30)
CONUE		.0377			.0133	.0525
		(2.56)@			(2.31)#	(3.21)@
FINUE		-.0121			-.0097	.0036
		(1.47)*			(2.01)#	(0.27)
INVUE		.0711			-.0108	.0137
		(3.36)@			(0.88)	(0.39)
OTHUE		-.0022			.0018	-.0014
		(1.29)*			(1.79)*	(0.47)
U13UE		.0004			.0021	-.0023
		(0.26)			(2.98)@	(1.13)
N	990	790	980	980	622	622
F-STATISTIC	14.30@	2.89@	1.09	1.11	6.41@	4.09@
R-SQUARE	.0803	.0252	.0067	.0068	.1205	.0805
ADJ R-SQUARE	.0747	.0165	.0005	.0007	.1017	.0608

TABLE 13 (cont'd)

Models:

$$AFE_i = \alpha + \beta_1 CHG^B_i + \beta_2 CON^B_i + \beta_3 FIN^B_i + \beta_4 INV^B_i + \beta_5 OTH^B_i + U13_i + \epsilon_i$$

$$AR_i = \alpha + \beta_0 UE^{RW}_i + \beta_1 CHG_i UE^{RW}_i + \beta_2 CON_i UE^{RW}_i + \beta_3 FIN_i UE^{RW}_i + \beta_4 INV_i UE^{RW}_i + \beta_5 OTH_i UE^{RW}_i + \beta_6 U13_i UE^{RW}_i + \epsilon_i$$

$$U_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \beta_6 U13_i + \epsilon_i$$

$$PAR_i = \alpha + \beta_1 CHG_i + \beta_2 CON_i + \beta_3 FIN_i + \beta_4 INV_i + \beta_5 OTH_i + \beta_6 U13_i + \epsilon_i$$

$$ST(LT)REV_i = \alpha + \beta_1 CHG^R_i + \beta_2 CON^R_i + \beta_3 FIN^R_i + \beta_4 INV^R_i + \beta_5 OTH^R_i + \beta_6 UE_i + \beta_7 CHG^R_i UE_i + \beta_8 CON^R_i UE_i + \beta_9 FIN^R_i UE_i + \beta_{10} INV^R_i UE_i + \beta_{11} OTH^R_i UE_i + \epsilon_i$$

where: AFE_i = absolute value of analysts' forecast error for firm i

AR_i = announcement period abnormal returns for firm i

U_i = $(AR_i^2/2s_i^2)$

s_i = estimation period standard error for firm i

PAR_i = absolute value of $[AR_i/(CAR_i+AR_i)]$

CAR_i = sum of the abnormal returns during the periods prior to the interim and annual earnings announcements (days -50 through -3) for firm i

REV_i = analyst earnings forecast revision for firm i (ST is change in next quarter's earnings forecast, LT is change in the long-term annual earnings forecast)

CHG_i = dividend changes announced between annual earnings announcements for firm i

CON_i = constant dividends announced between annual earnings announcements for firm i

FIN_i = financing announcements made between annual earnings announcements for firm i

INV_i = investing announcements made between annual earnings announcements for firm i

OTH_i = other announcements made between annual earnings announcements for firm i

(Note: The superscript B indicates that the announcement was made after the prior annual earnings announcement and before the VLF. The superscript R indicates that the announcement was made between the first analyst forecasts that follow annual earnings announcements.)

UE^{RW}_i = change in annual earnings for firm i

UE_i = unexpected earnings for firm i

$U13_i$ = sum of the U-statistics for the interim earnings announcement periods for firm i

(absolute t-statistics in parentheses)

* significant at the 10% level
\# significant at the 5% level
@ significant at the 1% level

A. one-tailed for coefficients
B. two-tailed for coefficients

beginning at day -55 and day -60 and it was also estimated after deleting firms with periods less than 50 days from the sample. The first two sensitivity tests used the unadjusted data. The only estimations that achieved overall significance were those that used periods beginning at day -60 for the second and fourth quarters. However, in these two cases, all significant coefficients were positive. None of the hypotheses were supported.

5.3.10 Test for heteroskedasticity The White [1980] test for heteroskedasticity, which can result in biased t-statistics, was performed for each model. The test statistics were significant for one or two quarters of the basic results for each model except the directional model. However, in each case, several of the specifications used in the sensitivity tests had insignificant tests for heteroskedasticity while maintaining the general results found in the basic models. Therefore, the results of this study did not seem sensitive to the presence of heteroskedasticity.

5.3.11 Further analysis of the absolute forecast error model An alternative explanation for the results of the absolute forecast error model involves the relative variability of earnings of firms that pay dividends versus firms that do not pay dividends. Dividends may signal that future earnings will be great enough to maintain the dividend. Therefore, firms that pay dividends may have less variable earnings, which make earnings easier to forecast. Together, CHG and CON tend to identify those firms that pay dividends. The negative coefficients on both variables may reflect the self-selection of firms with lower earnings variability.

To test whether dividend changes provide information about earnings beyond that provided by the existence of a dividend, firms that did not pay dividends throughout the test periods were deleted from the sample. The absolute forecast error model was re-estimated excluding the CON variable. In each quarter, the model failed to achieve overall significance. The coefficients on FIN, INV, and OTH were never significant. However, the coefficient on CHG was significantly negative in the first, third, and fourth quarters and insignificant in the second quarter. Therefore, the model was repeated using only CHG as an independent variable, which remained significant in all but the second quarter. The results were consistent with the hypothesis that dividend changes preempt earnings information.

No evidence was found that financing announcements provide information about current earnings in the absolute forecast error model. However, as reported in Panel A of Table 12, financing announcements may provide information about next quarter's earnings for small firms. A possible explanation of these results is that financing announcements may provide information about earnings with a lag, perhaps due to delays between the announcement and completion of financing transactions. To test this explanation, the absolute forecast error model was tested for the entire sample with the addition of a variable representing the number of financing announcements made in the prior quarter. The coefficient on the lagged financing variable was insignificant in each of the four quarters. The results of the other variables were similar to the basic results except that the coefficient on investing activities was insignificant in the first quarter. Therefore, no further investigation of this explanation was conducted.

CHAPTER 6

SUMMARY, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

The purpose of this chapter is to summarize this study, to draw conclusions from the results, to discuss the limitations of this study, and to provide recommendations for further research.

6.1 Summary

Prior research suggests that the market reaction to earnings announcements decreases as more information is available about the firm. Other research suggests that announcements related to firm cash flows may signal information about earnings. This study tested whether such announcements preempt earnings information.

This study classified news announcements as dividend changes, constant dividends, financing, investing, or other. Announcements related to dividend changes, financing, and investing were hypothesized to preempt earnings information.

Preemption was measured using both analyst forecasts and market returns. News announcements that preempt earnings information were expected to decrease absolute forecast errors, the relation between abnormal returns and unexpected earnings, the earnings announcement period return variance, and the proportion of the abnormal return associated with unexpected earnings that is realized at the time of the earnings announcement. In addition, earnings forecast revisions were examined to determine if news announcements provide information about future earnings.

A random sample of 203 manufacturing firms continuously covered by Value Line and CRSP from 1983 through 1987 was studied. The news announcements were gathered from the Wall Street Journal Index.

The results of the absolute forecast error model suggest that announcements of dividend changes and constant dividends preempt earnings information. However, the coefficients on financing and investing announcements were never significantly negative. The market-based models are the directional model, the variance model, and the proportion of abnormal return model. In general, these models did not support any of the hypotheses.

The forecast revision model examined both short-term and long-term earnings forecast revisions. In both cases, revisions were positively related to unexpected earnings. The interaction between cash flow variables and unexpected earnings significantly influenced revisions in many cases. In the case of dividend changes and constant dividends, the significant interactions were positive. Financing and investing announcements had both positive and negative interactions. The results suggest that cash flow related announcements provide information about future earnings.

A variety of specification tests were also conducted. The results were generally robust. The primary differences involved analyst forecasts and firm size. The results for the absolute forecast error model held only for small firms. The results for large firms were insignificant. The forecast revision model also had significant differences between large and small firms. For smaller firms, cash flow announcements, particularly financing, directly provide information about future earnings. Perhaps the most striking difference is in the interaction between constant

dividends and unexpected earnings. The interaction was positive for small firms and negative for large firms. The general result that cash flow related announcements significantly influence forecast revisions was unaffected.

6.2 Conclusions

Several conclusions may be drawn from the results of this study. Based on forecast errors, both dividend changes and constant dividends provide information about current earnings. Furthermore, the interaction between unexpected earnings and dividend, financing, and investing announcements generally provides information about future earnings, as demonstrated by forecast revisions.

The market-based models may have provided insignificant results because dividends provide information about both current and future earnings. If dividends provide information about current earnings, then the market reaction to the earnings announcement would be expected to decrease. However, if dividends make current earnings more informative about future earnings, then the market reaction to the earnings announcement may increase. Considering both effects together, the market reaction to the earnings announcement is indeterminate.

In particular, the variance model, except for the second quarter, did not find a significantly negative relation between the U-statistic and announcements in the Wall Street Journal Index. This finding was unexpected given the results of Grant [1980]. However, in the current study, the earnings announcement period return variance may have been increased because the interaction effect resulted in "disclosures which provide information about cash flows beyond the current period's earnings" (Holthausen and Verrecchia [1988], p. 104). Thus, an assumption of the

variance model seems to have been violated. Information provided about future earnings may also explain why the directional model did not find a significantly negative relation between the market reaction to unexpected earnings and announcements in the WSJI as expected given the results of Kross and Schroeder [1989].

Studies such as Brown et. al. [1987a], Brown, Richardson, and Schwager [1987], and Kross, Ro, and Schroeder [1990] conclude that the superiority of analyst forecasts over time-series forecasts is due, in part, to the use of information released after the most recent earnings announcement. The source of this information is not known. In addition to other sources not tested in this study, the results of the absolute forecast error model suggest that some of this information is announcements of dividend changes and constant dividends. However, there is a size effect in that dividends do not provide information about current earnings for large firms. For large firms, it seems that analysts use sources of information other than dividends.

Other conclusions may be drawn regarding the cash flow related variables. Based on absolute forecast errors, dividend changes provide information about current earnings. This finding is consistent with the signalling hypothesis and complements such studies as Ahorony and Swary [1980], Asquith and Mullins [1983], and Healy and Palepu [1988]. In addition, this preemption effect was only found for small firms. This size effect is similar to that found by Brown, Choi, and Kim [1989], who found that dividend changes reduce the subsequent market reaction to unexpected earnings for small firms but not for larger firms. In many cases a positive interaction between dividend changes and unexpected

earnings was found in forecast revisions. This interaction may explain the interaction effect in returns found by Kane, Lee, and Marcus [1984].

Constant dividends have similar preemption and interaction effects. Such results have not generally been found in the literature, which has generally focused on returns and earnings changes instead of earnings forecasts.

The results with respect to constant dividends may be due to differences in the earnings variability of firms that pay dividends versus firms that do not pay dividends. Dividends may signal that future earnings will be great enough to maintain the dividend in order to avoid any negative returns associated with dividend cuts. Therefore, firms that pay dividends may have less variable earnings, which make their earnings easier to forecast. In this case, the negative coefficient on constant dividends in the absolute forecast error model may be due to self-selection in that firms that pay dividends have lower earnings variability. The relation between earnings variability and dividend policy will be examined in subsequent research.

Verrecchia [1983] provides a model that may be used to explain the results with respect to constant dividends. Verrecchia models costly disclosures and concludes that voluntary disclosures are made when the information observed by the manager is better than some threshold. For purposes of this study, assume that the information relates to earnings. Dividend changes may be considered a voluntary disclosure. Constant dividends may be considered a nondisclosure (a decision to not disclose a dividend change) with some threshold x_c. For firms that do not pay dividends, maintaining no dividends is a nondisclosure with some threshold x_n. Assuming that it is costlier to implement a dividend than to change

an existing dividend, x_n is greater than x_c by Verrecchia's Corollary. The variance of earnings given nondisclosure is then less in the case of announcement of constant dividends than in the case of maintaining no dividends by his Lemma 3. A constant dividend implies that not only are earnings less than x_n, but they are also less than x_c. This result implies that constant dividends preempt earnings information.

Little evidence was found that cash flow announcements substitute for earnings information. In the case of forecast revisions, the positive interaction between dividends and unexpected earnings suggests that dividends complement earnings. The relations for financing and investing announcements are less clear.

There was no evidence that financing and investing announcements provide information about current earnings. However, these announcements seem to provide information about future earnings.

6.3 Limitations

The firms in this study were identified from sources that include primarily large firms. Furthermore, requiring the firms to be covered by Value Line and CRSP for five years may have introduced a survival bias. Therefore, the results of this study may not generalize to other firms.

All other sources of public information were ignored. Other sources of public information include other forms of the business press, trade journals, government reports, analyst reports, or news not reported in the Wall Street Journal. These other sources may provide news that preempts earnings information. Ignoring these sources may weaken the results of this study.

The results of this study depend on the use of proper categories of news announcements. An implicit assumption exists that the categories

used capture the relevant news and that all news within the same categories has the same effect. Furthermore, subjectivity is required to classify news announcements into the proper categories. While efforts, such as carefully defining the categories, were made to reduce subjectivity, different researchers may have chosen different categories and classifications. Limitations such as these stress the need for replication.

The information content of news depends on expectations, which are very difficult to measure. Efforts in this study to control for expectations included considering multiple announcements within the same category and quantifying dividend changes, neither of which greatly influenced the results. Better control for expectations may strengthen the results.

6.4 Recommendations

Several tests in this study raised issues that should be further investigated. The coefficient on the announcements classified as other was significant at least some of the time in most models, suggesting that there may be other types of news announcements that allow investors to anticipate earnings. Other information may include announcements that relate to management forecasts, operating activities, or stock splits, among other items. The relations between other types of news and earnings should be investigated further.

This study found that, in terms of absolute forecast errors, Value Line was significantly more accurate in forecasting the earnings for larger firms than for smaller firms. Yet forecasts for larger firms do not seem to rely on cash flow related announcements. This result suggests that Value Line uses other sources of information to forecast earnings for

larger firms. Further research needs to be conducted to determine the leading sources of information about the earnings of larger firms.

Further research could investigate the differences between large and small firms in the forecast revision process. In both revision models, the coefficient on unexpected earnings was always greater for larger firms than for smaller firms. Could this result be due to the greater variance in the earnings of smaller firms? Another interesting question is why is the interaction between constant dividends and unexpected earnings generally positive for smaller firms and negative for larger firms?

There are several cases throughout this study where variables are significantly positive in some quarters and significantly negative in others. This event is particularly common in the announcements classified as other and in the forecast revision model. A possible explanation is that there are contextual factors not taken into consideration in this study. Investigation of other factors that affect the relation between news and earnings may improve our understanding of how earnings are used by investors and analysts. This investigation could also include a more detailed analysis of the dividend policies of firms and differences among various financing and investing announcements.

Future research into the information environment of firms may investigate the relations among other sources of information and current and future earnings. As demonstrated in this study, more meaningful results may be found using analysts' earnings forecast errors and revisions rather than capital market reactions. Greater use of analysts may also result in an improved understanding of their decision making process (Schipper [1991]).

Further research into the information environment in which earnings compete should consider the information about current and future earnings contained in cash flow related news. This study found that dividend changes provide information about current and future earnings and that financing and investing activities provide information about future earnings.

APPENDICES

APPENDIX A

SAMPLE FIRMS

This appendix lists the sample firms used in this study and their two-digit SIC codes.

Firm	SIC
Alcan Aluminum Ltd	33
Allegheny International Inc	33
Allied Products Corp	35
Allis Chalmers Corp	35
Aluminum Company of America	33
American Maize Products Co	20
American Standard Inc	35
Ampco-Pittsburgh Corp	33
Anheuser Busch Companies Inc	20
Armada Corp	20
Armco Inc	33
Athlone Industries Inc	33
Atlantic Richfield Co	29
Aydin Corp	36
Ball Corp	32
Bally Manufacturing Corp	39
Bandag Inc	30
Bard C R Inc	38
Barry Wright Corp	35
Bausch & Lomb Inc	38
Baxter International Inc	28
Belding Heminway Inc	22
Bemis Inc	26
Bethlehem Steel Corp	33
BIC Corp	39
Boeing Co	37
Boise Cascade Corp	26
Borden Inc	20
Brunswick Corp	35
Brush Wellman Inc	33
C T S Corp	36
Carlisle Companies	30
Caterpillar Inc	35
Champion International Corp	24
Champion Spark Plug Co	36
Chevron Corp	29

Chrysler Corp	37
Cincinnati Milacron Inc	35
Clark Equipment Co	35
Coca Cola Co	20
Coleman Inc	23
Colgate Palmolive Co	28
Colt Industries Inc	35
Computervision Corp	35
Constar International Inc	30
Cooper Tire & Rubber Co	30
Corning Glass Works	32
Crane Co	34
Cray Research Inc	35
Crompton & Knowles Corp	28
Culbro Corp	21
Cummins Engine Inc	35
Curtiss Wright Corp	37
Dallas Corp	24
De Soto Inc	28
Diebold Inc	34
Domtar Inc	26
Donnelley R R & Sons Co	27
Dow Chemical Co	28
Dow Jones & Co Inc	27
Du Pont E I De Nemours & Co	28
Dynamics Corp of America	36
Elgin National Industries Inc	38
Emhart Corp	34
Exxon Corp	29
Fairchild Industries Inc	37
Federal Mogul Corp	35
Ferro Corp	28
Fieldcrest Cannon Inc	22
Fort Howard Corp	26
Foxboro Co	38
Fuqua Industries Inc	37
G A F Corp	28
Gannett Inc	27
General Electric Co	36
General Housewares Corp	34
General Signal Corp	36
Genrad Inc	38
Giant Group Ltd	32
Gillette Co	34
Goodyear Tire & Rubber Co	30
Gould Inc	36
Great Lakes Chemical Corp	28
Great Northern Nekoosa Corp	26
Grolier Inc	27
Harland John H Co	27
Hershey Foods Corp	20
Hexcel Corp	22
High Voltage Engineering Corp	36
Honeywell Inc	34

Houghton Mifflin Co	27
I T T Corp	36
Illinois Tool Works Inc	34
Imperial Oil Ltd	29
Ingersoll Rand Co	35
Ingredient Technology Corp	20
Inland Steel Industries Inc	33
Insilco Corp	39
Interlake Corp	33
International Banknote Inc	27
International Business Machines	35
International Flavors & Fragrances	28
Johnson & Johnson	38
Knight Ridder Inc	27
Kollmorgen Corp	38
Kraft Inc	20
Kysor Industrial Corp	35
Leggett & Platt Inc	25
Lockheed Corp	37
Lukens Inc	33
MEI Diversified Inc	20
Manville Corp	14
Martin Marietta Corp	37
Masco Corp	34
Maytag Corp	36
Media General Inc	27
Melville Corp	31
Merck & Co Inc	28
Milton Roy Co	35
Minnesota Mining & Manufacturing Co	26
Mohasco Corp	22
Monarch Machine Tool Co	35
Monsanto Co	28
Moore Corp Ltd	27
Motorola Inc	36
N L Industries Inc	13
Nalco Chemical Co	28
New York Times Co	27
Northern Telecom Ltd	36
Northrop Corp	37
Nucor Corp	34
Oakite Products Inc	28
Ogden Corp	33
Olin Corp	28
P P G Industries Inc	32
Pennwalt Corp	28
Pepsico Inc	20
Pfizer Inc	28
Phillips Petroleum Co	29
Pittway Corp	34
Polaroid Corp	38
Prime Computer Inc	35
Primerica Corp	34
Quaker State Corp	29

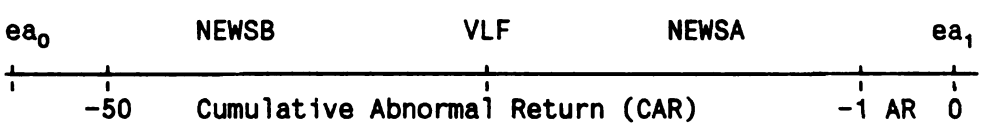
Quantum Chemical Corp	20
R T E Corp	36
Raytech Corp	32
Raytheon Co	36
Reece Corp	36
Robins A H Inc	28
Rogers Corp	30
Rohm & Haas Co	28
Rubbermaid Inc	30
Russell Corp	23
S P S Technologies Inc	34
S P X Corp	35
Safeguard Scientifics Inc	27
Schering Plough Corp	28
Scott Paper Co	26
Sealed Air Corp	30
Sherwin Williams Co	28
Singer Co	36
Snap On Tools Corp	34
Springs Industries Inc	22
Square D Co	36
Standard Motor Products Inc	36
Stanwood Corp	23
Stewart Warner Corp	37
Stone Container Corp	26
Storage Technology Corp	35
Sundstrand Corp	35
Swank Inc	31
T R W Inc	37
Teledyne Inc	36
Teleflex Inc	37
Teradyne Inc	38
Texaco Canada Inc	29
Texaco Inc	29
Textron Inc	37
Thermo Electron Corp	36
Thomas Industries Inc	36
Time Inc	27
Times Mirror Co	27
Titan Corp	36
Tonka Corp	39
Tootsie Roll Industries Inc	20
Tosco Corp	29
Total Petroleum North America Ltd	29
Triangle Corp	34
Trinova Corp	30
U S T Inc	21
U N C Inc	34
Union Camp Corp	26
United Industrial Corp	38
V F Corp	23
Varco International Inc	35
Vermont American Corp	34
Washington Post Co	27

Westinghouse Electric Corp	36
Weyerhaeuser Co	26
Whirlpool Corp	36
Witco Corp	28
Wolverine World Wide Inc	31

APPENDIX B

TIME LINES OF MODELS

The purpose of this appendix is to present time lines displaying variables used in the models of this study. The first time line represents the absolute forecast error, directional, and variance models:

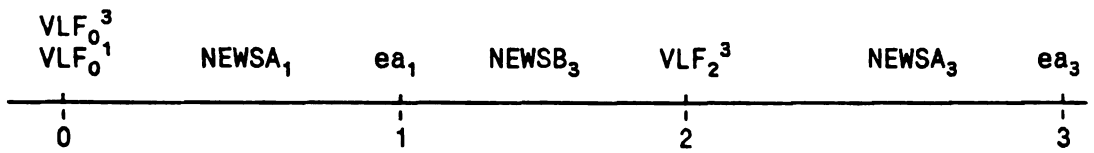


The current period earnings announcement, ea_1, is day 0. Unexpected earnings is equal to the difference between the current period earnings and the Value Line forecast (UE = ea_1 - VLF). The absolute forecast error is the absolute value of unexpected earnings. AR is equal to the sum of the market model prediction errors for days -1 and 0. NEWSB represents announcements made between the prior earnings announcement (ea_0) and the VLF. NEWSA represents announcements made between the VLF and the current period earnings announcement.

The absolute forecast error model uses the absolute forecast error as the dependent variable and NEWSB as the independent variables. The directional model uses AR as the dependent variable and UE and the interaction of UE and NEWSA as independent variables. The variance model uses the U-statistic, which is a function of AR, as the dependent variable and NEWSB + NEWSA as independent variables. The proportion of abnormal

return model uses the absolute value of AR/(CAR+AR) as the dependent variable and NEWB + NEWSA as independent variables.

The second time line represents the forecast revision model:



At time 0, Value Line forecasts time 1 earnings (VLF_0^1) and time 3 earnings (VLF_0^3). At time 1, current period earnings are announced. At time 2, Value Line again forecasts time 3 earnings (VLF_2^3). At time 3, future period earnings are announced. The news announcements between forecasts are $NEWSA_1$ for the current period and $NEWSB_3$ for the future period. The forecast revision is $VLF_2^3 - VLF_0^3$. Unexpected earnings is $ea_1 - VLF_0^1$. The forecast revision model uses the forecast revision as the dependent variable and unexpected earnings, the news announcements between forecasts, and the interaction between unexpected earnings and the news announcements as independent variables.

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