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Why warn? The impact of profit warnings on shareholder's equity

Abstract

Over the past five years, an increasing number of companies are choosing to voluntarily issue profit warning statements. However, given the fact that these profit warning announcements merely serve to presage the official report of lower earnings, one might question why firms bother to issue the warning at all? We aim to examine the motivations of firms that issue profit warnings. Our sample of profit warnings was made between May 1997 and December 2002. We use a large sample of data covering the periods before and after Regulation Fair Disclosure in 2000 and employ an event study to examine stock market reaction during the announcement. Multivariate regression is applied to test the hypotheses to ascertain why firms make these voluntary announcements. We find avoidance of shareholder lawsuits is an important motive. Conversely, announcement timing does not seem to be an attempt to delay market response. Factors portraying information asymmetry have a significant impact on market reaction. Our study helps managers that contemplate announcing warning better understand the effect of the announcement. Investors may develop a trading strategy by purchasing stocks of warning firms when the price declines and sell them when it reverts (see Table 3). Furthermore, investors can apply trading strategy to firms that have high information asymmetry and high litigation risk as they have high stock market reaction and are more likely to warn. Our research fills in the gap in the literature by studying the motives of profit warning firms.

Keywords: management profit warnings, analyst forecasts, information asymmetry.
JEL Classifications: G3, G14, G38.

Introduction

Conventional wisdom suggests that market participants, particularly shareholders and stock analysts, do not like to receive bad news, more especially when it comes as a surprise. Perhaps this explains why over the past five years an increasing number of companies are choosing to voluntarily issue profit warning statements. However, given the fact that these profit warning announcements merely serve to presage the later, official report of lower earnings, one might question why firms bother to issue the warning at all?

The spectrum of surprising investors, particularly disappointing them with large unexpected negative earnings, presents managers with a disclosure dilemma of whether to warn the market or not. In fact, the dilemma is considerably more complicated than this binary choice: warnings can take various forms (e.g., specific earnings forecast or a qualitative estimate), and can be communicated through alternative channels (for example, through a public announcement via the news wires or a conference call with analysts). Several studies (Penman, 1984, 1987; Chambers and Penman, 1984; and Kross and Schroeder, 1984) find that managers often tend to delay bad news, thus the conclusion was to not warn. More recently, Skinner (1994) concludes that legal liability creates an asymmetric incentive favoring timely management forecasts of bad results, suggesting that warnings should be made.

Researchers and practitioners have both discussed the merits of publishing management forecasts either on a voluntary or a mandatory basis. Previous research typically focuses on the comparative accu-

racy of management forecasts relative to analysts' or model forecasts in order to determine whether the former is potentially more informative. Skinner (1994, 1997), Kasznik and Lev (1995) and Baginski, Hassell and Kimbrough (2002) report that the legal environment in the United States encourages management's increased use of warning strategies for quarterly earnings. Jennings (1984), Waymire (1984, 1986), and Libby and Tan (1999) report that analysts revise their forecasts immediately after management provides an earnings forecast warning, suggesting informational value arising from management forecasts.

Our study makes several important contributions. First, we document the extent of the negative market reaction to profit warning announcements. Second, we examine evidence regarding management's apparent motive for making these voluntary announcements. The two specific motivations considered are: 1) management of market reaction by timing information releases around market closures, and 2) avoidance of shareholder lawsuits over failure to provide timely negative information. Finally, we examine firm characteristics to represent the information asymmetry between management and shareholders and to determine if these are significant determinants of management's decision to issue profit warnings.

Management proft warning announcements in the form of earnings per share (EPS) point projections and closed interval estimates are examined in this paper. A sample of 3,667 EPS warning announcements made by 2,393 firms listed on United States stock exchanges from May 1, 1997 to December 31, 2002 is collected (Dataset A). Further, accounting information about the firms, such as earnings before

interest and taxes (EBIT), long-term debt, total assets, etc. is found for 2,295 of these announcements (Dataset B) and these data are examined separately.

Our study is comprehensive as we include the profit warnings announced from 1997 to 2002 covering the periods before and after the Regulation FD implemented by the SEC on Oct 23, 2000[1]. We find the price reaction to profit warning announcements is negative as expected and it is both statistically and economically significant (a two-day return of -16.59%). Further, the degree of reaction is affected by the size of the difference between the consensus analyst forecast and management's warning forecast, firm size, and firm basic earnings power. Firms with higher information asymmetry factors face larger price drops following warning announcements. The hypothesized market timing strategy is not supported as a motive in this research. Factors used to represent the hypothesized avoidance of shareholder lawsuits motive, i.e., the interval between the announcement day and the end of the financial period and the order of announcements are found to be significant predictors of market reaction.

The remainder of this paper is organized as follows. Section 1 describes the types of profit warnings and the legal environment regarding management forecasts. The testable hypotheses are developed in Section 2. Section 3 describes the data collection procedure and the methods of analysis. The empirical results are contained in Section 4. Finally, the final section summarizes the research findings and draws conclusions.

1. What exactly is a management profit warning?

Profit warnings are defined as earnings forecasts made by management that warns of an expected earnings shortfall in relation to a relevant standard in this research. Management profit warnings may be released at any time prior to the announcement of actual earnings report. The earnings shortfalls may be in terms of net profits, sales, earnings before interest and taxes (EBIT), and earnings per share (EPS), etc. In this particular research, management warnings for EPS shortfalls compared to analysts' EPS forecasts are examined. These warnings are typically made around the end of a financial period, but prior to the required quarterly or annual earnings report. The forecast earnings may differ from the figures later disclosed in the formal earnings report. There are several forms of profit warning statements that management may choose to utilize. Point pro-

jection and closed interval estimates are the two types of profit warnings examined in this study. See the Appendix for details.

2. Development of testable hypotheses

2.1. Market reaction to the profit warning. Firm managers, who determine that it is necessary to issue a profit warning whether driven by concerns about shareholder lawsuits under SEC Rule 10b-5 or for other reasons, presumably do so because they believe this is material and important information (Skinner, 1994, 1997; and Kasznik and Lev, 1995). Thus, a voluntary warning that earnings will be less than those expected by previous analyst forecasts is clearly an announcement with negative implications from the market's perspective. Market reaction in this research is measured by cumulative average abnormal return (CAAR) over a two-day period based on the announcement day (t = 0, and t = +1). The preceding logic leads to the following hypothesis.

Hypothesis 1: *A negative and significant stock price response (CAAR) is expected to be associated with management EPS warning announcements.*

Two variables are employed as proxies to test whether share price reaction is conditional on the degree of difference between consensus analyst forecast of EPS (AEPS) and management's EPS forecast (MEPS)[2]. The first variable is the dollar difference between the two earnings per share (EPSD$) forecasts (i.e., AEPS minus MEPS). Although this variable is a logical choice, it suffers from the deficiency that a $0.05 difference is effectively treated the same for a stock selling at $1.00 as for a $100 per share stock. The second variable (termed EPSD%) is equal to EPSD$ divided by the share price. Scaling the difference by the share price means that EPSD% represents a relative measure of the EPS differential (Baginski, Hassell, and Kimbrough (2002) and Kasznik and Lev (1995)).

2.2. Timing of Management announcements. Damodaran (1989), Mendenhall and Nichols (1988) and Chen and Mohan (1994) report that timing is a consideration for management announcements of earnings forecasts. If management potentially wishes to reduce the negative market response to profit warnings then it is conceivable that the announcements will be made at a time when market response is delayed. The expectation under this reasoning is that announcements made after Friday 4 p.m. will generate a different response than announcements made at Tuesday 10 a.m., for example. This logic implies that if market participants are unable to trade directly after the announcement due to the weekend, then when they return to work on Monday morning they will have had a longer period of time to digest the information contained in the profit warning and may react less negatively. Further, not

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[2] For interval estimates, the average of the interval is employed.

only Friday afternoons, but holidays, especially, three-day weekends and unexpected market closures (for example, September 11, 2001) may also provide similar timing advantages. This market timing hypothesis may be expressed as follows.

Hypothesis 2: A smaller share price change is expected for profit warning announcements made prior to weekends or holidays in comparison to normal weekday announcements[1].

In fact out of 2,295 announcements (Dataset B) only 21 occur on holidays, and several are not three-day weekend holidays. Thus, developing a variable to proxy holiday announcements seems impractical. However, approximately 12.4% of all announcements are made on Friday. Therefore, to provide a proxy for deliberate market timing, a dummy variable (DFRI-DAY) is employed that equals one for Friday announcements, and is zero otherwise.

2.3. Avoidance of shareholder lawsuits. As previously discussed, SEC Rule 10b-5 requires that firms disclose important information to investors as quickly as possible. Numerous studies (Skinner, 1994; Kasznik and Lev, 1995; and Frankel, McNichols, and Wilson, 1995) suggest that management releases material information, especially the one that is negative, to provide information to shareholders in a timely manner. Further, for firms that are subject to SEC accounting and enforcement actions, researchers (Griffin, Grundfest, and Perino, 2000; and Dechow, Sloan, and Sweeney, 1996) report a significant negative market reaction. Skinner (1997) finds that lower lawsuit settlements are related to more timely disclosure of adverse earnings information.

If the primary motivation for issuing profit warnings is to avoid shareholder lawsuits, then when management does in fact issue a profit warning, logic suggests that they should be perceived as acting ultimately to preserve shareholder value and leads to the following hypothesis.

Hypothesis 3: Profit warnings undertaken to minimize the possibility of shareholder class-action lawsuits are expected to generate less negative market reaction, in comparison to those issued for other reasons.

There are several aspects of a profit warning that may be posited as offering evidence of a greater desire to avoid shareholder lawsuits. Three characteristics of the profit warnings may be considered to provide evidence under the lawsuit avoidance hypothesis.

As noted above, management has an incentive to act in a preemptive manner, or equivalently, provide the earliest warning possible, to shorten the period of time during which investors may become members of the class-action lawsuit. The difference in days between the profit warning announcement date and the end-of-period date may be taken as indicating management's desire to provide evidence in a timely manner. To make the calculation of this variable as clear as possible, consider the following example depicted in Figure 1. Regulations require firms to report quarterly earnings within 45 days after the end of a quarter. Assume that management has a warning to be announced in regard to quarter-end June (30th), and they make the warning on May 20th. The last date on which management could make the quarterly earnings report would be August 14th. DAYSD is calculated as the difference between the end of the reporting period and the profit warning announcement date. Thus, warnings made prior to the period-end date are considered negative numbers, and those after are represented by a positive number of days. In the above example, the DAYSD variable would be - 41 days. The implication of this hypothesis is that the earlier the profit warning is made, the smaller (less negative) the market reaction will be. In other words, the relationship between DAYSD and the CAAR is expected to be negative[2].
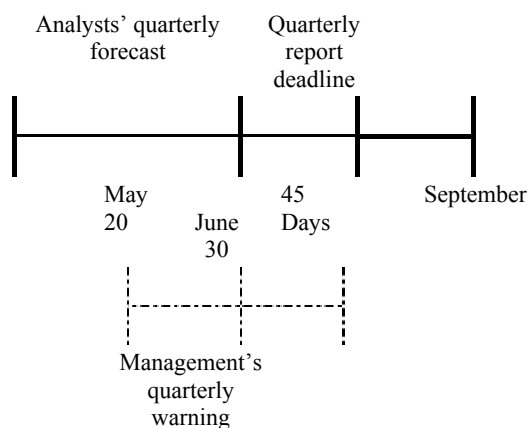

Fig. 1. Timeline for analyst forecasts, management's profit warnings and quarterly earnings report

Some firms in the sample made more than one warning announcement during the sample period. Firms that feel it necessary to make a second or third (or more) warning, would presumably be highly concerned about ensuring the release of material, negative information. A dummy variable representing the order of announcements is created that

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[1] There are six years in the sample period so the number of designated three-day weekends (i.e., Martin Luther King, Jr. Day, Washington's Birthday, Memorial Day and Labor Day), and other potential three-day weekends, due to New Year's Day, Good Friday, Independence Day, Thanksgiving and Christmas, in this sample is rather small.

[2] An alternative explanation that leads to the same expected negative relationship might be developed in regard to the quality/reliability of the profit warning. Warnings made later, particularly after the "books are closed" for the quarter, might be perceived as being more accurate. Thus, the more positive the DAYSD variable, the greater the reliability of the forecasted EPS shortfall, and the more negative the market reaction.

equals one for the first announcement and equals zero for those that are subsequent. Under the lawsuit avoidance hypothesis the market reaction should be most negative for the first announcement, and less negative for subsequent profit warnings[1]. We also add a dummy variable (DANNO1) to compare the impact differential of multiple warnings within *the same earnings period* as opposed to merely multiple warnings over *the full sample period* (DANNO). DANNO1 equals one for the subsequent announcements over the same earnings period. In the multivariate regression, the parameter estimate of DANNO is expected to be negative and significant. DANNO1 is expected to be positive because the first announcement in the same earnings period is supposed to get more negative reaction than the subsequent earnings.

Market reaction to profit warnings may also depend upon whether the earnings forecast applies to a quarterly period or to an annual period. By nature, an annual earnings report will only be made once per year, compared to potentially four quarterly earnings reports. However, an annual report will necessarily summarize the earnings for an entire year and may be taken as providing a greater amount of material information. On the other hand, a profit warning in regard to quarterly earnings is perhaps less important from a long-term perspective, but may possibly be somewhat more immediately relevant to shareholders. Avoidance of shareholder lawsuits, if focused on preserving firm value for the long term, suggests that profit warnings about annual earnings provide more relevant information. The lawsuit avoidance hypothesis predicts that profit warnings for annual earnings are expected to generate a smaller negative market reaction in comparison to quarterly earnings warnings. A dummy variable (DYRQR) is created to proxy for this effect equaling one for warnings about annual earnings and zero for quarterly earnings warnings. Given this variable's construction, it should be positively related to the market's price reaction.

2.4. Information asymmetry. The separation of firm ownership from firm control leads to different levels of information being possessed by management compared to shareholders and other market participants. This information asymmetry implies that management is better informed about some aspects of the firm's operations and future prospects for success than investors. For firms that are experiencing poor (or worse-than-expected) earnings the level of information asymmetry may have an impact on market reaction to management's profit warnings. Where information asymmetry is relatively greater, the revelation of expected earnings shortfalls seems likely to provide greater information content and this logic leads to the following hypothesis.

Hypothesis 4: The stock price response is expected to be more negative for firms with relatively higher levels of information asymmetry.

Four variables are employed to represent different levels of information asymmetry. First, Tobin's q (TQ) is calculated as the market value of equity divided by the book value of equity. This variable is frequently employed to capture the value of growth opportunities. Management should have the best information about growth potential, so the higher TQ, the greater the hypothesized degree of information asymmetry. Hence, investors are expected to react more negatively to profit warnings from firms with relatively larger values of TQ. Further, the parameter estimate for TQ in the regression employing market return as the dependent variable should be negative.

High-tech firms are generally thought to have large growth potential in comparison to firms in traditional industries. At the same time, their current share price is believed to reflect this greater potential, rather than being based on current earnings as may be truer for traditional firms. This difference suggests that the information gaps for high-tech firms are higher. Thus, profit warnings made by high-tech firms would be associated with more negative market reaction in comparison to non-high-tech firms and this variable should have a negative parameter estimate in the regression model[2]. A dummy variable (DHTECH) is created that equals one for high-tech firms and is zero otherwise.

Certain firms face more governmental regulation than do others. Greater regulatory control provides a means to reduce information asymmetry between management and outsiders. Hence, it is expected that price reaction for more highly-regulated firms will be less negative than for less-regulated firms. In this paper, highly-regulated firms are defined as firms with an SIC code that begins with either a four (transportation, communications, utilities and sanitary services) or a six (finance, insurance and real estate). The dummy variable (DREG) employed equals one for highly-regulated firms and is zero otherwise. Its expected sign in the regression should be positive under the information asymmetry hypothesis.

[1] Cliff M., D. Denis. Do Initial Public Offering Firms Purchase Analyst Coverage with Underpricing? // Journal of Finance, 2004. №59. – pp. 2871-2901.

[2] In this research, high-tech firms are defined as firms with an SIC code in the following ranges: Drugs (2833-2836), Computers (3570-3577), Electronics (3600-3674), Programming (7370–7379), and Research and Development Services (8730-8734).

Firms often include the value of intangible assets in their financial accounting statements. These intangible assets are typically firm-specific and often state a value for goodwill. By definition, intangible assets are not tangible, and as such their values are more subjective than physical assets. The greater the amount of intangible assets a firm claims, the higher the level of information asymmetry. The intangible asset ratio (INTANGR) is calculated as intangible assets divided by total assets. It is used as a proxy to test whether market price reaction for firms with a higher intangible ratio is more negative than that for low INTANGR firms. In the multivariate regression, its sign is expected to be negative.

2.5. Control variables. Firm size has been found to be an important variable in determining market reaction to firm earnings announcements by various researchers, including Cox (1985), Chopra, Lakonishok, and Ritter (1992) and Chen and Mohan (1994). Normally, investors might be thought to assume that larger firms will be safer than small ones and the market reaction should thereby be less negative. Firm total assets are most commonly used to represent firm size. We employ the natural logs of total assets (LNTA) to control for size, as these variables are typically skewed. Highly leveraged firms face more financial risks than firms with low levels of leverage, in general. This will become even truer when firms face earnings shortages as this could damage their ability to pay debt interest or have cash for dividends. The leverage (LEVER) ratio employed is calculated as long-term debt divided by the sum of long-term debt and the market value of equity[1]. If firms with higher levels of leverage are perceived as being riskier, it seems likely that market reaction to profit warnings for these firms will be more negative. The most basic rational frictionless model shows the degree to which fluctuations in operating performance are magnified in equity pay is a function of leverage. We study announcements of earnings net of interest; as such, the argument for magnification may be less relevant. For a firm that has a healthy financial performance and does not have high leverage, a given change in EBIAT should induce the same change in income regardless of leverage. Nevertheless, higher leverage should induce a larger percentage return impact.

Earnings power expresses the ability of firms to generate operating profits from the assets employed. A variable representing basic earnings power (BEP) is calculated as EBIT divided by total assets. Firms with greater basic earnings power are expected to suffer relatively less from profit warning an-

nouncements. Moreover, we add year dummies to control for time-series variation in market reactions to warning announcement. Jackson and Madura (2007) find the negative valuation effects of profit warnings are attenuated after the introduction of Regulation FD. Finally, to the extent that information asymmetry tends to be similar within industries, industry effects provide some control for cross-sectional variation in information asymmetry (Ljungqvist, Jenkinson, and Wilhelm, 2003). As a result, we include industry dummies in our regressions. Note that our industry partitions − 16 in total − are more refined than a binary dummy used in prior studies to distinguish firms in the technology sector from non high-tech firms (Cliff and Denis, 2004; Loughran and Ritter, 2004).

3. Data collection and method of analysis

3.1. Data sources and description. The EPS profit warning announcements utilized in this research are for U.S. companies and were obtained from www.briefing.com[2]. Sample profit warning announcements are provided in the Appendix. Briefing.com provides detailed earnings warning announcements starting in 1998. We collect warning announcements for the period of May 1997 to December 2002 from its daily Stock Short Stories sector. We obtain daily share prices and additional accounting information such as total assets, total debt; EBIT, etc. from DataStream and use *Dow Jones Interactive* to identify any confounding events around the management warning announcement (days t = -1 to t = +1).

The initial sample of 5,366 warning announcements is generated from Briefing.com during the period May 1, 1997 through December 31, 2002. We omit 1,323 open interval or qualitative announcements, announcements by firms without DataStream share prices (108), confounding events in the three-day announcement window (87), incomplete information after the announcement period (54), and announcements dropped by SAS Eventus due to data limitations (127). Of the remaining 3,667 warnings 2,295 have (generally) complete accounting information available from DataStream. To avoid losing information due to the data deletion process, we refer the total (3,667) sample without accounting information as Dataset A and the (2,295) sample with accounting information as Dataset B. For the

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[1] An alternative version of leverage (long-term debt divided by total assets) is also employed in tests not reported. The findings are all qualitatively similar to those reported here.

[2] Briefing.com provides details about the warning announcement, including the company name and ticker symbol, the exact date of the announcement, the analyst forecast prior to the announcement (the consensus estimate of analysts as reported by Zacks Investment Research, Inc. www.zacks.com), the relevant quarter or year, and management's earnings estimate. A profit warning is defined as "any earnings preannouncement in which a company reports that revenues or earnings will be below analysts' estimates. Only companies that are covered by at least one Wall Street analyst will be listed".

analysis that does not require the use of accounting information, the results employing Dataset A are shown.

A summary of basic information for all variables is provided in Table 1. Several points are noteworthy. First, for all variables, except BEP, EPSD$, EPSD%, DAYSD, INTANGR[1], the median is smaller than mean. For example, the majority of firms making warning announcements are firms with total assets less than $582 million, but some of them are quite large as the mean is over ten times larger. Second, examination of the minimum value for the earnings difference variable (EPSD$) shows

it to be zero. Normally, the profit warning estimate is smaller than the consensus analyst forecast; otherwise, there is no reason to warn. In this case, management's warning was for an interval EPS estimate and the resulting difference (based on the average MEPS) was zero. Looking at the summary information for DAYSD shows that profit warnings are issued on average more than 14 days before the end of the reporting period. One firm made the warning nearly one and one-half years early. At the other extreme, one firm made its warning about annual earnings just three days before the deadline to release its annual report.

Table 1. Summary statistics of warning and non-warning firm variables

Dataset A	N	Mean	Median	STD	Min	Max
AEPS ($)	3,667	0.373	0.319	0.59	-7.18	9.95
MEPS ($)	3,667	0.252	0.137	0.60	-7.65	8.00
EPSD$ ($)	3,667	0.120	0.183	0.23	0	4.76
EPSD%	3,667	0.40%	0.98%	0.05	0	1.93
EPSDMV ($m)	3,667	7.440	3.517	20.63	0.01	497.50
DAYSD	3,667	-14.038	-5.643	54.79	-564	87
SHARES (m)	3,667	61.895	19.261	160	0.41	3,385
MVE ($m)	3,667	1,873.648	359.967	7923	7.06	188,145
Dataset B						
DEPRE ($m)	2,230	194.164	39.007	962	0.1	15,949
EBIT ($m)	2,250	414.592	58.890	1,481	-1919	20,624
LDEBT ($m)	2,295	1,164.579	122.402	4,562	0	98,887
TDEBT ($m)	2,285	1,991.524	167.842	9,585	0	165,556
INTANG ($m)	1,784	936.695	122.076	6,347	0	96,325
CASSET ($m)	2,159	1,836.603	218.915	7,162	0.01	125,521
CLIAB ($m)	2,161	1,104.278	116.542	6,231	0.73	142,316
TASSET ($m)	2,295	7,046.565	581.658	29,903	7	642,191
BVPS ($)	2,292	11.923	7.807	19.84	-25.25	649.54
LEVER	2,295	0.483	0.351	0.28	0	0.97
TQ	2,230	2.539	2.394	7.84	-46.77	122.72
INTANGR	1,784	0.133	0.210	0.16	0	1.17
BEP	2,250	0.059	0.098	0.41	-6.36	1.89

Note: This table reports summary statistics for the variables used in the research. AEPS is the consensus analyst forecast of earnings per share (EPS). MEPS is the EPS estimate given in management's profit warning. EPSD$ is the difference between AEPS and MEPS. EPSD% equals EPSD$ divided by share price. EPSDMV equals EPSD$ times the total number of shares. DAYSD is the difference (in days) between the announcement day and the financial period's end. SHARES is the total number of shares outstanding five days before the announcement. MVE is the market value of equity averaged over the five days prior to the announcement. DEPRE is the value of depreciation reported in the firms' financial statement. EBIT is earnings before interest and taxes. LDEBT (TDEBT) is long-term (total) debt. INTANG is the value of intangible assets. CASSET (CLIAB) is current assets (liabilities). TASSET is total assets. BVPS is book value per share. Leverage (LEVER) equals long-term debt divided by the sum of long-term debt and market value of equity. Tobin's q (TQ) is the ratio of the market value of assets to their replacement costs. Following Himmelberg, Hubbard, and Palia (1999), firm value is the market value of common equity plus the liquidation value of preferred equity plus the book value of total liabilities; replacement cost is the book value of total assets, so TQ is really the market/book ratio for total assets. INTANGR is the intangible asset ratio which equals intangible assets divided by total assets. Basic earnings power (BEP) is the ratio of EBIT to total assets. Each accounting variable is the average in the four quarters before the event quarter.

Table 2 indicates that there are 2,393 firms in Dataset A and 1,424 firms in Dataset B which issued at least one profit warning. For both data-

sets, about 35% of all firms have made multiple announcements, although very few firms made more than four warnings.

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[1] Because of the total asset mean is about 10 times bigger than its median, the median of BEP is larger than the mean of BEP.

Table 2. Frequency distribution of the number of announcements per firm

No. of announcements (ANNO)	Dataset A			Dataset B		
	N	N*ANNO	% of firms	N	N*ANNO	% of firms
1	1,545	1,545	64.56	870	870	61.10
2	551	1,102	23.03	350	700	24.57
3	204	612	8.52	133	399	9.34
4	70	280	2.92	54	216	3.79
5	13	65	0.54	13	65	0.90
6	8	48	0.33	5	30	0.34
7	1	7	0.04	1	7	0.07
8	1	8	0.04	1	8	0.07
Total Firms	2,393	3667	100	1,424	2295	100

Note: This table reports the number of announcements (ANNO) made by each firm in the sample. N is the number of firms. N*ANNO (% of firms) then represents how many total (the percentage of the total) announcements for which a given subset accounts.

3.2. Methods of analysis. This study uses two different methods of analysis: First, SAS Eventus employs a market model to estimate the abnormal security returns associated with profit warning announcements. The slope and intercept terms used in the market model are estimated over a 160-day period (from day t = -250 to day t = -90, relative to the announcement day t = 0). Following Patell (1976), the standardized abnormal return approach is used to generate test statistics. Several studies use the same procedure, for example, Linn and McConnell (1983), and Schipper and Smith (1983). The generalized sign Z (GSZ) test is used to test for the fraction of positive and negative average abnormal returns. The null hypothesis for the GSZ is that the fraction of positive returns is the same as that of negative returns in the estimation period. Cowan (1992) provides examples of the GSZ. We employ a multivariate regression model to develop evidence on the hypotheses developed earlier. In these regressions the dependent variable is the two-day CAAR from day t = 0 to day t = +1 (CAAR2)[1]. The first regression model used to simultaneously test the market timing, lawsuit avoidance, and

information asymmetry hypotheses is given in equation (1) below[2]. In this model, the variable representing the EPS forecast difference is EPSD$ and the independent variables have been previously defined. It may be noted that the variable associated with the DFRIDAY variable is to test the market timing hypothesis, β_2-β_4 are the lawsuit avoidance variables, β_5-β_8 are the information asymmetry variables, and β_9-β_{14} are the control variables,

$$CAAR2 = \alpha + \beta_1 DFRIDAY + \beta_2 DAYSD$$

$$+ \beta_3 DANNO + \beta_4 DYRQR + \beta_5 TQ + \beta_6 DHTECH$$

$$+ \beta_7 DREG + \beta_8 INTANGR + \beta_9 EPSD\$$$

$$+ \beta_{10} LNTA + \beta_{11} LEVER + \beta_{12} BEP$$

$$+ \beta_{13} DINDUSTRY + \beta_{14} DYEAR + \varepsilon, \qquad (1)$$

where ε is the regression error term. The second model employed is identical to the model above except that the relative earnings difference (EPSD%) is employed instead of EPSD$.

4. Empirical results

4.1. Market-model adjusted returns. Table 3 presents the event study output using Dataset A for the period of 90 days before, to 90 days after, the announcement day. Mean Abnormal Return, Median Abnormal Return, the number of positive versus negative (Pos:Neg) abnormal returns, the Z-statistic (Z-stat) for the average abnormal return and the generalized sign Z (G Sign Z) are reported in the table. The largest average abnormal return occurs on t = 0 (-9.01%), followed by t = +1 (-7.58%). The two-day event window cumulative average abnormal return (CAAR2) is -16.59%[3]. The Z-statistic is -34.671 which is statistically significant at the 0.01% level and the generalized sign Z-statistic (518 positive returns to 3,149 negative returns) of -39.531 is similarly significant. These highly negative market-model results are consistent with the expectation that share prices will drop following a management earnings warning as has been maintained throughout this study.

Table 3. Warning announcement period returns (Dataset A)

Day	N	Mean AR	Median AR	Positive	Negative	Z-Stat	G Sign Z
-90	3,667	0,01%	-0,14%	1,754	1,913	0,478	0,298
-70	3,667	-0,22%	-0,27%	1,686	1,981	-2,502*	-1,703
-50	3,667	-0,11%	-0,25%	1,714	1,953	-1,174	-0,803
-30	3,667	-0,09%	-0,25%	1,683	1,984	-1,511	-1,619
-25	3,667	-0,12%	-0,20%	1,711	1,956	-2,174*	-0,855

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[1] We also employ univariate tests for significant differences in CAARs between groups split on the basis of the variables previously described to provide evidence on the hypotheses of interest. Due to limited space, the results are not reported here but available upon request.
[2] In the analysis that is not reported here due to space considerations, three separate regressions are also estimated to test the hypotheses individually. All three models include the four control variables. The information asymmetry model adds INTANGR, TQ, DREG and DHTECH. The lawsuit avoidance model adds DAYSD, DANNO and DYRQR. Finally, the market timing model adds DFRIDAY. The results of this analysis are qualitatively similar, both in terms of parameter estimate signs and significance, to that reported in the text and are available from the authors upon request.
[3] Similarly negative returns are found for Dataset B. In all ways, these results are consistent and as such, are not reported.

Table 3 (cont.). Warning announcement period returns (Dataset A)

| Day	N	Mean AR	Median AR	Positive	Negative	Z-Stat	G Sign Z
-20	3,667	-0,36%	-0,30%	1,614	2,053	-3,878***	-2,719*
-15	3,667	-0,22%	-0,26%	1,681	1,986	-3,478**	-1,671
-10	3,667	-0,35%	-0,34%	1,644	2,023	-4,328***	-3,113**
-5	3,667	-0,47%	-0,61%	1,518	2,149	-5,952***	-5,350***
-4	3,667	-0,73%	-0,43%	1,534	2,133	-8,444***	-5,697***
-3	3,667	-0,56%	-0,52%	1,534	2,133	-7,267***	-5,358***
-2	3,667	-0,70%	-0,50%	1,475	2,192	-7,025***	-8,401***
-1	3,667	-1,26%	-0,64%	1,457	2,210	-6,662***	-8,699***
0	3,667	-9,01%	-4,89%	932	2,735	-26,192***	19,270***
1	3,667	-7,48%	-3,83%	1,080	2,587	-27,936***	18,829***
2	3,667	0,15%	-0,19%	1,738	1,929	2,407*	-0,021
3	3,667	0,11%	-0,29%	1,722	1,945	0,127	-0,419
4	3,667	0,07%	-0,17%	1,708	1,959	0,021	-0,748
5	3,667	-0,05%	-0,33%	1,673	1,994	-1,149	-2,017*
10	3,667	0,03%	-0,17%	1,738	1,924	0,464	-0,725
20	3,662	0,10%	-0,10%	1,734	1,797	1,367	0,363
30	3,531	-0,13%	-0,15%	1,668	1,747	-0,554	0,443
50	3,415	-0,08%	-0,10%	1,558	1,820	-0,549	0,282
70	3,378	-0,01%	-0,18%	1,585	1,651	-0,144	0,022
90	2,919	0,10%	-0,11%	1,347	1,572	0,455	0,978
Days	N	Mean CAR	Median CAR	Positive	Negative	Z-Stat	G Sign
(-1.0)	3,667	-10,27%	-4,15%	948	2,719	-28,076***	-18,326***
(0,+1)	3,667	-16,59%	-13,42%	518	3,149	-34,671***	-39,531***
(-1,+1)	3,667	-17,84%	-16,01%	514	3,153	-50,457***	-36,850***
(-2,+2)	3,667	-18,40%	-13,38%	586	3,081	-42,879***	-31,291***
(-10,+10)	3,667	-22,53%	-19,75%	703	2,964	-36,608***	-25,702***
(-20,+20)	3,667	-21,84%	-17,64%	802	2,865	-32,860***	-29,245***
(-90,-2)	3,667	-18,30%	-16,75%	1,285	2,382	-14,825***	-10,107***
(+2,+90)	3,667	4,09%	3,84%	2,050	1,617	7,101***	9,048***
(-90,+90)	3,667	-32,05%	-25,32%	1,256	2,411	-20,631***	-13,390***

Notes: Mean and Median Abnormal Returns (AR) are from the Market Model using the Standardized Residual Method for 3,667 announcements. N is the number of firm returns for a given day. Pos:Neg shows how many of the firm returns are positive or negative on a given day. Z-Stat is the parametric statistic testing for a significant difference of the average abnormal return from zero. Generalized Sign Z (G Sign Z) is the non-parametric test statistic for a significant difference from zero that considers the ratio of positive to negative returns. CAR denotes cumulative abnormal returns. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

One can also hardly fail to note that on many of the days prior to the announcement, there are significant and negative AARs. Although the exact reason for this occurrence is beyond the scope of this research, it may be speculated that investors have identified these firms with poorer-than-expected-earnings and have started to downgrade market prices prior to the profit warning, as efficient-market arguments would suggest. There is some inferential support for this notion as this decline is relatively gentle on a day-by-day basis in comparison to the large declines on both day t = 0 and t = +1. It is also possible that there exists information leakage with regard to the possibility of a profit warning being made by management. Figure 2 provides a clear visual depiction of the pattern of average and cumulative abnormal returns.

As proposed above, it appears that in the days prior to the profit warning the market starts a downward anticipatory movement (as shown by the AAR trend line). There is then a steep drop during the two-day announcement window in the AAR and thereafter, there is a gradual recovery as shown by the CAAR.

A final point regarding this analysis is that the only daily AAR that is significant after the two-day announcement period is the positive return (+0.15%) for day t+2, suggesting some small overreaction. Interestingly, the CAAR for the post-event period (t+2 to t+90) is +4.09%, which is positive and significant at the 0.1% level. This might be consistent with the idea that management makes the profit warning to "cushion the blow" for investors in advance of the actual, lower earnings report.

AAR and CAAR
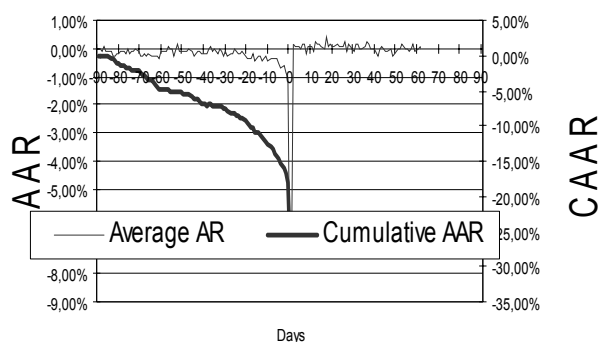
Note: The Figure shows the relation between Days (X axis) relative to the profit warning announcement and Average Abnormal Return (Left Y axis) and to the Cumulative Average Abnormal Return (Right Y axis).

**Fig. 2. Average abnormal returns and cumulative average abnormal returns
for profit warning announcements**

4.2. Regression analysis. Fourteen independent variables are used to explain the market reaction to profit warnings and provide evidence on the four hypotheses previously developed. The two-day CAAR is the dependent variable and the regression results are shown in Table 4. The regression models depicted are the same with the exception that the EPSD$ variable is used to provide evidence on Hypothesis 1 in the left-hand side results (Model 1) and EPSD% is employed in the right-hand side (Model 2). As the two models provide very similar results, the discussion focuses on Model 1 and any relevant differences will be noted. Table 4 provides the White test statistic, which uses standard errors corrected for heteroscedasticity.

The EPS difference variables both yield negative parameter estimates as predicted by Hypothesis 1. However, EPSD% is not a significant explanatory variable, whereas the EPSD$ variable is significant at the 0.1% level. This finding is interesting because it suggests that investors focus on the absolute dollar value of the difference between the analyst forecast and management's EPS forecast, rather than the relative difference as a percentage of share prices. We also estimate the difference between consensus analyst earnings per share forecast and the profit warning forecast as a percentage of expected earnings (EPSE) or of previous earnings (EPSP). The latter is based on the fact that firm value is based partially on growth rate and earnings revisions cause reassessments of growth rate. We find the coefficient of the EPSE is significant whereas the coefficient of EPSP is insignificant. The significance level of EPSE is on the same level as that of EPSD in Model 1 of Table 4, which is at 1%. For the sake of brevity, the results are not reported here but are available upon request.

The coefficient for the DFRIDAY variable used to test whether there is an association between market reaction and profit warnings made on Friday is positive as expected under the market timing hypothesis, however it is not significant. This finding suggests that there is no support for the contention that managers attempt to release bad news at a time which will delay market reaction.

The profit warning release date variable's (DAYSD) coefficient has a negative sign as expected under the lawsuit avoidance hypothesis. The parameter estimate is significant at the 10% level. As mentioned in footnote 2 (p. 166), another possible explanation is that earlier warnings could be less precise and, therefore, less informative, thereby explaining a reduced impact on share prices during [0,+1]. We test this possibility by applying event study to the announcements that are released before and after the end of the financial reporting period. We find warning released before the end of financial reporting period has more of a negative drift in the period leading up (-90,-3) and less negative in the period (-2,+1). The sign of the parameter estimates for the number of announcements variable (DANNO) is also negative as expected under Hypothesis 3 and is significant at the 1% level. DANNO1 is positively significant at 10% level only in Model 1 but is insignificant in Model 2. The market reacts most negatively to the first announcement over *the full sample period*. The first announcement over the same earnings period gets more negative reaction than subsequent announcements. The variable employed to denote whether the profit warning relates to an annual or quarterly report (DYRQR) has the expected positive sign, but the test statistics are insignificant. These regression findings provide support for the implications of the lawsuit avoidance hypothesis as developed in this research.

Four variables are employed to examine the implications of the information asymmetry hypothesis.

All of them have parameter estimates with a negative sign. This is expected for the Tobin's q (TQ), high-tech (DHTECH) and intangible asset ratio (INTANGR) variables; however, the sign of the regulated (DREG) firm's variable is expected to be positive. The INTANGR and DHTECH variables are found to be significant in both regression models. Overall, the regression results suggest that market reaction is affected by factors that represent a greater knowledge gap between management and investors[1].

Two of the control variables (firm size as represented by total assets and basic earnings power) have both the expected signs and are significant in both models. Leverage is expected to have a negative association with market reaction, but its coefficient is positive, albeit insignificant. The non-significance of leverage may be explained by the fact that announced earnings are net of interest, which already takes leverage into account. The F-tests for the model's overall explanatory ability are significant at the 0.1% level in both cases. The adjusted R-square measures suggest a modest degree of goodness-of-fit for the models.

Table 4. Cross-sectional multivariate regression model results (Dataset B)

Variables	Model 1		Model 2	
	Coefficient	t-test	Coefficient	t-test
Intercept	-0.145	-6.698***	-0.252	-7.712***
Market timing hypothesis				
DFRIDAY	0.022	0.805	0.013	1.278
Lawsuit avoidance hypothesis				
DAYSD	-0.003	-1.975$	0.000	-1.984$
DANNO	-0.025	-3.459**	-0.020	-2.680*
DANNO1	0.018	1.915$	0.016	1.321
DYRQR	0.007	0.451	0.005	0.279
Information asymmetry hypothesis				
TQ	0.000	-0.409	0.000	-0.304
DHTECH	-0.028	-2.614*	-0.044	-2.990**
DREG	-0.001	-0.159	-0.013	-0.450
INTANGR	-0.103	-3.684**	-0.056	-3.841**
Control variables				
ESPD	-0.156	-7.117***	0.497	1.336
LNTA	0.022	4.103***	0.024	2.621*
LEVER	0.035	1.389	0.024	1.333
BEP	0.068	2.684*	0.055	6.451***
Industry dummies	Included		Included	
Year dummies	Included		Included	
F-value	11.40***		8.38***	
Adj R-squared	12.94%		9.61%	
N	2,295		2,295	

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[1] We also find the highly consistent univariate findings. The results can be requested from the authors.

Notes: ***, **, *, and $ indicate significance at the 0.1%, 1%, 5%, and 10% levels, respectively. This table reports results from running two cross-sectional multivariate regressions that attempt to explain the cumulative average abnormal returns of warning firms from the announcement date to one day after. DFRIDAY is a dummy variable (DV) equal to one if the announcement is made on Friday and zero otherwise. DAYSD is the difference (in days) between the announcement day and the financial period's end. DANNO is a DV that equals one for a firm's first warning announcement and is zero for subsequent announcements over *the full sample period*. DANNO1 is a DV that equals one for a firm's subsequent warning announcement and is zero for first announcement over *the same earnings period*. DYRQR is a DV equal to one if the warning concerns an annual earnings report and is zero for quarterly report warnings. Tobin's q (TQ) is the ratio of the market value of assets to their replacement costs. Following Himmelberg et al. (1999), firm value is the market value of common equity plus the liquidation value of preferred equity plus the book value of total liabilities; replacement cost is the book value of total assets, so TQ is really the market/book ratio for total assets. DHTECH is a DV equal to one if the firm is a high-tech firm and zero otherwise. DREG is a dummy variable (DV) equal to one if the firm is highly regulated and is zero otherwise. INTANGR is the intangible asset ratio equaling intangible assets divided by total assets. In Model 1, EPSD is the difference between consensus analyst earnings per share forecast and the profit warning forecast. In Model 2, EPSD equals EPSD in Model 1 divided by share price. LNTA is the natural log of total assets. Leverage (LEVER) equals long-term debt divided by the sum of long-term debt and market value of equity. Basic earnings power (BEP) is the ratio of EBIT to total assets. All accounting information is the average in the four quarters before the event quarter. N is the number of observations. T-test shows White (1980) heteroscedasticity consistent t-statistics.

Summary and conclusions

Profit warnings are a voluntary announcement made by firms disclosing management's expectation that earnings will be less than those forecasted by investment analysts. This research documents that market reaction to these announcements is highly negative as one would expect from news that market participants will presumably interpret as being bad. The magnitude of this negative reaction (-16.59% over the two-day announcement period) suggests that this event is not only statistically, but economically significant as well. Given such an adverse effect on shareholder welfare, this research attempts to develop evidence of why firms voluntarily release these earnings forecast in advance of their federally-required earnings reports.

One hypothesis tested is that management may be trying to manage market reaction by selectively timing when they make these announcements. This idea is termed the market timing hypothesis and leads to the expectation that profit warnings might be announced at times when investors are unable to react immediately, like on Fridays after the market closes. Contrary to this expectation, Friday is the least popular day to make a profit warning and the cumulative average abnormal return is not significantly less negative as compared to other days.

Management may also make profit warnings to provide material information in a timely manner in an attempt to avoid shareholder lawsuits. Multivariate evidence that is consistent with this concept is developed and is found to be significant. Namely, market reaction is less negative when management makes the warning relatively earlier and when management has made more than one warning.

The extent of the information asymmetry between managers and investors is also considered to be a factor for predicting which announcements generate a more negative market reaction. Firms engaging in high-tech operations and having high levels of intangible assets are found to experience significantly more negative returns. In addition, larger firms with greater basic earnings power and relatively lower difference between consensus analyst EPS forecast and the profit warning forecast suffer less from making a profit warning.

An assessment of market reaction on the basis of how accurate management's earnings forecast via the profit warning is as compared to the actual earnings report when it is eventually made would be an interesting extension to this research. It would also be quite interesting to compare the impact on share price reaction to the actual earnings report for firms that do warn, to firms with similarly negative earnings that do not issue the warnings. In addition, Imhoff (1978) concludes that management earnings forecasts (via profit warnings) may not be representative of the forecast accuracy which non-forecasting firms might report if forecasts were required by law. In essence, is there a benefit from increased accuracy (or other factors) if all firms were required to publish warnings? Lastly, profit warnings may induce a change in return variance and beta, which implies underperformance is stronger than simply cumulative abnormal return estimated from event study. Future study may investigate these issues.

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Appendix. Samples of earnings warning announcements

These sample announcements come from the Story Stock Section at www.briefing.com.

June 18, 1997, Wednesday, 08:50 ET (General statement)

SEAGATE TECHNOLOGY INC. (SEG) 41 1/2 CLOSED: If once is not enough, maybe a second *warning* in two weeks will get the message across that demand for disk drives is weak. Last night, the company announced that due to continued weakness in customer demand, primarily for its higher performance products, 4th qtr revenues, gross margins and earnings per share are not expected to be achieved. Back on June 2, the company issued its first *warning* about market conditions and demand for its high-end products. In its latest *warning*, the company said that 4th qtr revenues are now anticipated to be between $2.0 billion and $2.1 billion with a significant impact on earnings for the quarter. Prior to the *warning*, the company was projected to generate revenues of 6% to 10% below the $2.5 billion reported in the fiscal 3rd qtr when it had operating earnings of $1.01 a share. This latest *warnings* will certainly cause the stock to open lower and put additional pressure on the sector as this issue is already called to open between $35 and $38 a share.

January 7, 2000, Friday, 12:04 ET (Open interval)

W.W. Grainger Inc. (GWW) 43 1/16-2: In the case of this distributor of maintenance, repair, and operating supplies, shares of Grainger did not have a smooth run for much of last year, thus shareholders' expectations have been more conservative to begin with so that today's profit warning is only having a limited impact. Hence, the price retreat of 4.4% today is not very severe, considering by how much earnings are underperforming expectations. The Q4 earnings warning marks the second time in the past three periods that this company has experienced a shortfall in profits due to higher costs and service interruptions related to new systems installations. In the latest case, downward adjustments to inventory related to the installation of a new enterprise resource planning system is causing Q4 earnings to fall shy of market expectations by as much as 45%. Given that the First Call consensus was for a net profit of $0.54 per share, Grainger could realize earnings of as low as $0.30 per share.

June 29, 1999, Tuesday, 09:25 ET (Point projection)

Philip Morris Companies (MO) 41 Closed: They have a temporary earnings problem, but isn't the real problem. After the close Monday, tobacco and food company Philip Morris (MO) met with analysts, and they presented some bad news. MO said that international tobacco sales were weak, due to weak overseas economic conditions. The unit experienced a decline of 11% in the first quarter, and is expected to produce a 6% decline in the second quarter. Partly as a result of this, MO is "aiming for" 1999 earnings of $3.30 a share, which would be slightly lower than the current consensus estimate of $3.32 per share. So, this has to be considered bad news, and MO was trading down a couple of points on Instinet. However, MO wrapped the bad news in a number of upbeat statements. MO it preferred to accelerate the stock buyback program when possible, and that the dividend would be raised in line with earnings growth. (MO currently pays $0.44 per quarter in dividends per share, which comes out to a solid 4.3% yield that is important to investors in this stock.) MO also said that long-term prospects are good, and that it is "a powerful company, poised for

growth". The press release starts off by saying the company "Sees Earnings Per Share Growth of 11-13% for 2000 Through 2003". So, after having not met with analysts for years, the company attempts to spin the bad news around the good. They haven't got away with it, at least short term. But in Briefing.com's view, the reaction may be in truth a bit overdone. Longer term, overseas tobacco sales are not the problem for this company – the litigation issues are. MO is probably right that international problems will turn around. And, if the company manages to keep earnings raising near the 11% to 13% it projects and raises its dividend, the stock clearly has value at its current price/earnings multiple of 12 based on the 1999 earnings estimate of $3.30 per share.

December 14, 2000, Thursday, 18:08 ET (Closed interval)

Microsoft (MSFT) 52 1/8-2 3/8: Warns for Q2 which is not too surprising numerous warning from pc sector; now expects earnings of $0.46-0.47 vs. estimate of $0.49. Revenue expected at $6.4-6.5 bln vs. previous estimate of $6.785 bln. Targets $1.80-1.82 for FY01 vs. consensus of $1.90. Company cited worldwide economic conditions and slowing of corporate IT spending. Suggests long-term outlook still looks encouraging.