

# **Why Should We Like Firms that Voluntarily Disclose?**

## **Evidence from Profit Warning Firms**

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### **Abstract**

The extant literature shows a significant negative stock market reaction to a large sample of profit warnings. In this study, I compare long-term stock market and operating performance of warning firms with non-warning matching firms. Not surprisingly, warning firms have lower stock performance in the first six months after the warning. Conversely, they have better stock performance from six months to two years after the warning and better operating performance from one year to four years after the warning. I find significant improvement in operating performance is consistent with the general pattern of shareholder returns.

**Keywords:** Profit Warnings, Analyst Forecasts, Stock Performance, Operating Performance, Insiders and Institutional ownership

**JEL Classifications:** G3, G14, G38

## **Why Should We Like Firms that Voluntarily Disclose?**

### **Evidence from Profit Warning Firms**

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 an increasing number of companies is choosing to *voluntarily* issue profit warning statements. However, given 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?

Several arguments have been suggested by previous researchers as to why management provides voluntary forecasts of earnings. Lang and Lundholm [2000] conduct research that examines whether voluntary disclosures represent an attempt to reduce information asymmetry between management, and shareholders and analysts. Firms warn in order to reduce earnings surprises. Typically, investors and analysts do not like negative earnings surprises and they discount firms that are not transparent about potential negative earnings. By not being candid about their future earnings, firms may tarnish their reputation with analysts and investors (e.g., King, Pownall, and Waymire [1990], Skinner [1994], and Frankel, McNicols, and Wilson [1995]).

Conversely, Skinner [1994, 1997] suggests that management voluntarily issues earnings estimates with negative implications in an attempt to avoid shareholder lawsuits over the failure to release of material information in a timely manner. On the other hand, Damodaran [1988, 1989], Mendenhall and Nichols [1988], and Chen and Mohan [1994] report management releases profit warnings in an effort to time bad news releases to minimize negative market reaction.

These arguments suggest that, in the long run, the market should value profit warning firms for their openness. Nevertheless, Kaznik and Lev [1995], Soffer, Thiagarajan, and Walther [2000], Ataise, Supattarakul, and Tse [2006], and Tucker [2007] show that warning firms have higher negative stock market reactions than non-warning firms given that both groups have the same level of price-deflated earnings surprise. Ataise et al. [2006] and Tucker [2007] also examine the

determinants of market reaction. The finding of negative market reaction during the event window is counterintuitive. Why does market react negatively to transparency? Tucker [2007] explains it occurs because announcing firms tend to have more bad news than non-warning firms. Applying a Heckman selection model to control for self-selection bias, she finds warning and non-warning firms have similar returns over a 3-month window.

If profit warnings receive negative market reaction, why have number of profit warning firms increased? I examine post-announcement stock and operating performance of profit warning firms in the long-term compared with non-warning matched firms. Non-warning matched firms in the sample have the comparable size and industry but choose not to warn.

My study is comprehensive as I include the profit warnings announced from 1997 to 2009. This empirical study shows the following evidence. First, I find warning firms have better stock performance than their non-warning matching firms. Warning firms underperform non-warning matching firms during the first six month after the announcement but outperform from the seventh month to two years. I investigate a period when investors receive a short run of earnings disappointments as a window of six to twelve months after the warning announcements and observe that purchasing stocks after such run of disappointing news and holding them for twelve months result in significant positive abnormal returns. I document that the abnormal returns are more significant for growth stocks than value stocks implying investors are more sensitive to earnings disappointments from growth stocks.

Furthermore, I examine various possible explanations for this pattern of returns including insider and institutional ownership and operating performance of warning firms. I find there is no change in insider and institutional ownership after warning announcement. On the other hand, there is an improvement in operating performance of warning firms including sales growth, cash flow returns on assets, Tobin-q, and sales per gross costs from one year to four years after the announcement, which is consistent with the general pattern of shareholder returns. Applying binary probit regression, I also find that warning firms are more likely to be focused on longer term

performance and have short-term challenges in operating performance compared to non-warning firms.

### **Data Sources and Methodologies**

The EPS profit warning announcements utilized in this research are for U.S. companies and are obtained from [www.briefing.com](http://www.briefing.com).<sup>i</sup> I collect warning announcements made from May 1, 1997 to December 31, 2009.<sup>ii</sup> I also identify any confounding events around the management warning announcement from *Dow Jones Interactive*.<sup>iii</sup> Some firms announce repeated warnings. One firm in my sample issue 15 warnings in less than three years. Throughout the paper, I analyze only the first time profit warning in all analyses as taking repeated warnings into account causes double counting returns of the same firm from overlapping multi-month returns, which bias statistical inference.

I generate the initial sample of 10,188 warning announcements from Briefing.com during the period May 1, 1997 through December 31, 2009 and omit 2,966 open interval or qualitative announcements. My sample period starts after the passage of the Private Securities Litigation Reform Act of 1995 expanding the safe-harbor protection to firms for issuing forward-looking information. The Act raises the bar for class action lawsuit and resulted in firms' legal and information environment.

In addition I exclude announcements by firms without DataStream share prices (250), confounding events in the three-day announcement window (218), incomplete information after the announcement period (115) and announcements dropped by SAS Eventus due to data limitations (264). I obtain accounting information Compustat and compile data not available from the financial reports on EDGAR. Forecast earnings data is collected from the I/B/E/S database and aftermarket price information is from the CRSP database. Finally, there are 6,375 remaining announcements from 4,568 firms.<sup>iv</sup> See an example of profit warning announcement in the Appendix A.

Exhibit 1 presents a summary statistics of warning and non-warning matching firm variables. First, all variables except the difference between analyst forecast and management forecast

earnings per share (EPSD), the ratio of intangible assets to total assets (INTANGR), and the ratio of EBIT to total asset (BEP) have the median smaller than mean.<sup>v</sup> 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. The summary information for the difference in days between the announcement day and the financial period end (DAYSD) shows that profit warnings are issued on average 2 weeks before the end of the reporting period.<sup>vi</sup> Warning firms have significant larger number of shares, depreciation, EBIT, long-term debt, current liability, intangible, leverage ratio, intangible ratio, and basic earning power (BEP) than their non-warning firms, which are matched on market capitalization and industry. I will describe the matching methodology in section IV. As expected, there is no significant difference in market capitalization, current asset, total assets, and Tobin's Q between warning and matching firms.

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Insert Exhibit 1 about here.

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## **Methods of Analysis and Empirical Results**

### *Profit Warnings and Long-Term Stock Performance*

The extant literature shows that market reacts negatively to the warning announcement during the announcement window. If so, why have the number of warning firms increased? In this section, I investigate the stock performance of warning firms in the long-term relative to that of non-warning matching firms.

It is not uncommon that firms issue profit warnings more than once. For instance, 29% of firms in my sample announce repeated profit warning. For such firms, the non-first time warning should create less pronounced market reaction and contain less information than the first time warning (Jackson and Madura [2007]). As a consequence, I measure long-term performance from the first time of profit warning.<sup>vii</sup> For robustness, I estimate long-term returns using a buy-and-hold abnormal return, a cumulative abnormal return, and a four-factor regression including

Fama/French, market, and momentum factors.

### *Calculating Buy-and-Hold Abnormal Returns (BHAR) and Cumulative Abnormal Returns (CAR)*

I calculate both BHAR and CAR to capture long-run stock performance. Based on Barber and Lyon [1997], BHARs are superior to CAR. First, BHARs represent returns earned over the long-term by the mean or median of the sample. If a firm is delisted during the period, the mean return reflects fewer firms in subsequent periods. An analysis of the delisted firms shows that their returns at the time of delisting are not significant outliers and thus do not bias my results.<sup>viii</sup> On the other hand, Fama [1998] argues that if researchers employ the wrong model for expected returns, BHARs will compound the problem. Taken together, I compute both BHAR and CAR.<sup>ix</sup> See Appendix B for the methodology of choosing matching firms I apply in this paper. To compute risk-adjusted long-term abnormal returns for warning firms, I subtract long-run returns of warning firms by those of matching firms. Note that my dataset includes warning announcements made from period May 1, 1997 through December 31, 2009. To compute long-run abnormal returns of firms that have no data for the whole holding period, I assume the return for the rest of the period equal to the beginning period. For instance, if the warning firm announced profit warning in 2008 and I want to compute three year return, I assume the annual return for the rest of two years equal to the first year return.<sup>x</sup>

### *Long-term Stock Performance based on BHARs and CARs*

From the unreported event study, I observe the stock price negative reaction from the announcement date to one day later [0,+1] is about 15.5% indicating an evidence of market disappointment in earnings outcomes that are lower than anticipated. In addition, I find the return during [+2, +90] window is about -5% and it is significant at 1% level.<sup>xi</sup> The negative stock market reaction during the event window is consistent with the finding of the extant literature. How long does negative stock reaction last? I compute BHAR and CAR of warning firms from the second day after the announcement to twelve successive months but will focus on BHAR, which receives

more supports from the extant literature. The results in Panel A of Exhibit 2 show BHARs in 12 windows are all negative but only those of holding periods from [2d,2m] to [2d,8m] are negatively significant. CARs are significantly negative from [2d,2m] to [2d,6m]. Why do the negative abnormal returns last so long? My results support Tucker [2007]'s evidence that warning firms typically issue a series of other bad news in addition to repeated warning, thereby further disappointing the market. Can investors make profit if they purchase warning stocks after the end of such market overreaction to this bad news or at the time when the good information arrives? How long will the good news last? There is no financial model to answer these questions but I can examine empirically by calculating long-run abnormal returns of warning firm from 6 months, 9 months, and 12 months after the announcement and hold that stock for 12 months. I choose to start holding a stock after the end of sixth month because Exhibit 2 Panel A shows that CAR and BHAR are both negatively significant during 6-month period and the significance disappears or reduces after that. Exhibit 2 Panel B.1 – D.1 shows the mean of long-run BHAR and CAR at various holding periods described above.

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Insert Exhibit 2 about here.

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The null hypothesis is that BHARs and CARs of warning and their matching firms are the same. To construct the test, I assume that the observations are independent; this allows the computation of t-statistics for both the mean BHARs and CARs. If a matching firm is delisted before the warning firm delisting date or the end date, it is replaced with another firm having similar characteristics. If this firm is also delisted, a third firm is substituted, and so on.

Overall, the results in Panel B.1, C.1, and D.1 show that BHARs are significantly positive implying buying a stock of warning firm after six, nine, and twelve months from the announcement date and holding this stock for twelve months yields abnormal returns of 6.82%, 6.19%, and 4.98%, respectively. A large body of literature shows small firms have such anomalies more apparent than large firms (e.g., Loughran and Ritter [1995] and Brav, Geczy, and Gompers [2000] in the case of IPOs; Bernard and Thomas [1989] in the case of earnings announcements.) Exhibit 2 Panel B.2,

C.2, and D.2 show the results from the sample separated into large and small quintiles measured by market capitalization as an average over five days before the announcement date. I show BHARs during the same holding period as those in Panel B.1, C.1, and D.1. The results show that BHARs are larger for small firms than large firms after holding for 12 months consistent with the finding of the extant literature that the anomalies are more evident for small firms than large ones. Nevertheless, the significance level of t-stat for largest minus smallest size is quite low and I am hesitant to draw any conclusion from these results. Note that such low significance level compared to the conventional level may be attributed to small number of observations in each size quintile. Overall, large warning firms that are hold for twelve months after six and nine months from the announcement produce abnormal returns of 3.81% and 2.69%, respectively; therefore, the results from the whole sample do not seem to be driven by small warning stocks.

Typically, the value of any stock lies in the future prospect or future growth of particular firm. The disappointment of earnings may be more pronounced on firms with higher growth and the investors' overreaction to the earnings disappointment of growth stocks may be more apparent than that of value stocks. Consequently, investors who buy growth stocks after the end of bad news and hold for a certain period of time should earn higher abnormal returns than those who invest in value stocks. I examine this conjecture by separating my sample into largest and smallest book-to-market quintiles or value and growth stocks.

The results show that market overreacts more to growth stocks than to value stocks starting nine and twelve months after the announcement. Investors who purchase a growth stock of warning firm in nine months after the announcement and hold it for twelve months gain 12.28% of abnormal return with 5% of significance level. In contrast, they gain only 1.29% of abnormal return if they hold a value stock. All in all, the results in this section show that warning firms underperform their matching firms during the first eight months and outperform them afterwards until two years after the announcement.

In this section, I apply the Eckbo and Norli's [2005] model and compute monthly risk-adjusted abnormal returns (as measured by the intercept term in the four-factor regression equation) for portfolios of warning, non-warning, and (warning – non-warning) stocks. I allot each firm in my sample and the matching sample to warning or non-warning portfolios and hold it from the second day until six month after the announcement date or from the seventh month until two years after the announcement. At the end of the holding period, the firm drops out of its portfolio. After all stocks are allocated in this fashion, I calculate both value-weighted and equally-weighted average returns across all stocks for each calendar month from the beginning of 1999 to the end of 2009. Fama [1998] demonstrates that much of the apparent overreaction and underreaction to information disappears when portfolios are value-weighted and after controlling for common factors such as size and book-to-market effects. Nevertheless, as noted by Loughran and Ritter [2000], when applied to event studies, value-weighted portfolios are likely to be dominated by a few large firms. An equally-weighted portfolio is also likely to be more consistent with the way an investor would implement a trading strategy based on the results presented in this study.

Abnormal returns are reported for time-series regressions of monthly returns with warning, non-warning matching, and (warning – non-warning) stock portfolios based on the market, SMB, HML and momentum (UMD) factors. The first three factors are provided by Kenneth French's website and the last one is constructed according to Eckbo and Norli [2005].<sup>xiii</sup>

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Insert Exhibit 3 about here.

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The left side of the exhibit presents results for the period from the second day to six months after the announcement. The right side of the exhibit provides results for the period after six month until two years after the issue. The key observation is the risk-adjusted abnormal returns differential between the warning and non-warning portfolios. During the six month after the announcement, warning firms earn a negative 5.28% return (0.44% times 12) for the value-weighted portfolio and a negative 4.92% (0.41% times 12) for the equally-weighted portfolio on an annualized basis, whereas non-warning matching firms earn a significant negative 2.28% per

annum (0.19% times 12) for the value-weighted portfolio and a negative 1.56% (0.13% times 12) for the equally-weighted portfolio. Thus, warning firms significantly *underperform* their matching firms by about 3.00% (0.25% times 12) for a value-weighted portfolio and 3.48% (0.29% times 12) for an equally-weighted portfolio on an annualized basis. Both risk-adjusted returns are significant at 5% level.

From the seventh month to the end of second year after the announcement, the risk-adjusted average abnormal return of warning firms is negative 1.92% (0.16% times 12) and 2.64% (0.22% times 12) for the value- and equally-weighted portfolio. Warning firms significantly *outperform* matching firms over this period (7.00% for value-weighted and 4.13% for equally-weighted indexes) at 1% and 5% level, respectively. Both warning and non-warning matching firms load positively on the SMB factor supporting the results in Exhibit 2 where BHARs of small size quintile are larger than those of large size quintile. There is not much difference in the market and SMB betas across warning and non-warning portfolios implying that the warning – non-warning portfolio is fairly well hedged in terms of market and small firm risks. In contrast, there is a difference in the sign of coefficients on the HML factor between warning and non-warning firms. Warning firms load negatively on HML while non-warning firms load negatively before the seventh month and positively thereafter. The loading factor of HML for warning firms is weakly significant only for equal-weighted index. This leads to a negative loading on the HML factor for the warning - non-warning portfolio, which is significant only for the second period, seventh month to two years after the announcement. The result is consistent with those shown in Exhibit 2 suggesting investors who purchase growth stocks of warning firms after the end of bad news and hold them for a certain time earn higher abnormal returns than those who invest in value warning stocks. There is not much significant difference in the momentum betas between warning and non-warning firms and the momentum factor cannot explain the variation in returns of any portfolio. Taken together, I conclude that warning firms underperform their non-warning matching firms from the second day to sixth month but outperform from the seventh month to two years after

the announcement.

## **What explain the results?**

### *Change in Ownership*

The pattern of stock returns I observe could be influenced by changes in ownership after the announcement date. For example, the announcement of profit warning may cause investors to sell or buy firm stock, which could impact price. I note that warning firms in my sample have average annual turning over of trading volume of 45% per week in the year before the announcement.<sup>xiv</sup> As a result, it might take some time for investors to execute their trading of large portion causing the observed pattern of stock returns. I investigate this hypothesis by obtaining detailed information on the stock ownership of profit warning firms in the sample.

The SEC has required institutions with more than \$100 million of securities under discretionary management to report common stock holdings of more than 10,000 shares or \$200,000 on a quarterly basis or at the end of March, June, September, and December.<sup>xv</sup> I obtain the institutional stock ownership from the CDA/Spectrum database that collects this data from 13F report. For each warning firm, I collect aggregated number of shares owned by institutions and define institutional ownership percentage as the number of shares owned by institutions divided by number of shares float. In addition, I collect percentage of common stock shares beneficially owned by all directors and executive officers as a group and by all investors beneficially owning more than 5% of firm common stock from proxy statement. Since smaller firms in term of number of shareholders are not required to file proxies with the Securities and Exchange Commission (SEC), I am not able to collect this information for all firms. Finally, I end up with 79% of the sample firms for this analysis.

The collective equity ownership of all executive officers and directors as a group and of individuals beneficially owning over 5% from the announcement year to four years later is surprisingly stable. On average the aggregate percentage ownership of this group is about 13.64%

per year. Similarly, institutional ownership does not show any pattern. Although such change is small, it implies institutional and individual investors do not get discouraged by profit warning announcements. The ownerships of these two groups are quite stable implying there are only a few changes in individual and institutional holdings of profit warning firms.<sup>xvi</sup>

Taken together, the stock performance pattern of warning firms does not seem to be explained by the aggregate percentage change of ownership by all executive officers, directors, large shareholders or institutions after warning announcement. Selling and buying around the announcement date do not show systematic pattern.

### *Operating Performance*

Another possible explanation of the observed pattern of stock performance is changes in operating performance. Firms that voluntarily issue warning of earnings surprise may use that as a motivation to improve their operations and not to further disappoint the market. Consequently, I compare operation performance such as sales growth, cash flow return on asset, sales per gross costs and Tobin-q between warning firms vs. their non-warning matching firms from the announcement year to 4 years after. Due to the skewness of accounting ratios, it is normal to report median values in studies examining operating performance.<sup>xvii</sup> While I report medians, I also find that the same patterns hold in means (unreported) winsorized by eliminating the top and bottom one percent of the observations.

The four measures of operating performance are as follows: First is sales growth, a simple indicator of success. Sales growth may not matter much if profits are poor, so I consider two measures of profitability: sales per gross costs and cash flow return on assets. I do not apply a more commonly-used profit indicator, EBITDA in my study because many firms in my sample have negative earnings; this is not a problem with sales and gross costs, both of which are always positive.<sup>xviii</sup> Cash flow return on assets is cash flow from operations (CFO) divided by total assets. CFO is directly obtained from the statement of cash flows (Compustat item number 308 minus 124).

Lastly, I report Tobin's q (TQ), which is the ratio of the market value of assets to their replacement costs. Following Himmelberg, Hubbard, and Palia [1999], I calculate market value of assets as the market value of common equity plus the liquidation value of preferred equity plus the book value of total liabilities while replacement cost is the book value of total assets; thus, my measure of TQ is really the market/book ratio for total assets.<sup>xix</sup> This variable is frequently employed to capture the value of growth opportunities.

For each year, I compute the annual performance measure for each firm and report the median value across firms. Some firms are short-lived, so survivorship bias is a potential problem. To mitigate this problem, any firm that did not survive to the end of a calendar year was traced through its last surviving quarter and its performance measures were then grossed up to a full year. For example, if a firm vanished after the first quarter in year 1, four times its performance during the first quarter was used as its annual performance number. I include these firms' annual performance for the whole five years of my analysis.

I compare each warning firm's operating performance to a non-warning matching firm. As described earlier, the matched firms are in the same industry and have similar market capitalization. It is very important to note that matching firms control for characteristics that are likely to affect operating performance; e.g., firm size, market conditions, and industry peculiarities. Hence, the use of matching firms renders cross-sectional controls superfluous.

#### *Summary of Results and an Illustration*

Each figure of Exhibit 4 reports tests of statistical significance for my maintained hypothesis, which is warning firms have better operating performance than non-warning firms after the announcement date.

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Insert Exhibit 4 about here

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The adjusted performance results, which control for industry and size reveal that sales growth of warning firms is significantly lower than non-warning matching firms in the announcement year

(year 0). Although the sales growth of warning firms is lower than that of matching firms in the first year after the announcement but the difference is insignificant. From years 2 to 4, sales growth of warning firm is significantly higher than that of matching firms. Profitability, however, is altogether another question. Cash flow return on assets of warning firms is significantly lower than that of their matching firms in the announcement year but significantly improves from the first to fourth year. In a similar vein, sales per gross costs is generally worse for warning firms than for their matching firms in the announcement year; though, the difference is insignificant. Generally, the difference of profitability between these two groups shows a reversal from the first to fourth year. Reflecting the market's perception of growth opportunities, Tobin's q is slightly lower for warning firms in the announcement year. Tobin's q of warning firms shows improvement after the announcement and it is significantly higher than that of non-warning firms from the second year onward.

The operating performance measures are probably also interdependent. Consequently, though one must not be too aggressive in drawing sweeping conclusions from these results, the overall pattern is certainly consistent with the theory that warning firms use market's disappointment of their earnings expectation as a stimulus to ultimately improve their long-term stock and operating performance. There are many other ways to measure operating performance, but my findings suggest, on average, financial performance improves significantly after warning announcement. What extent does the improvement in operating performance explain a difference in stock outperformance of warning firms? Operating performance is normally observed as a snapshot; whereas, stock performance of warning firms compared to non-warning firms shows an improvement in six months after the announcement. Investors may receive higher frequency information from their financial advisors or analysts, which they may use to update their expectations of future firm performance before financial information for computing operating performance is published in financial statement. Furthermore, investors may value firms based on other performance measures, and I just present only four measures. My study shows the evidence

of an improvement of these operating performance measures after the announcement. The fact that investors use such improvement to gradually revise their expectation regarding valuation of warning firms may explain the observed pattern of stock outperformance. If such performance improvements became widely predictable and understood, the pattern of profit warning stock returns should flatten out and finally be captured on the announcement date.

Are firms that are more likely to be focused on longer term performance the ones that may have short-term changes in operating performance? Are they the ones that are more likely to be warning firms?<sup>xx</sup> To answer these questions, I apply the binary probit regression where the dependent variable is the probability of a firm announcing warning. A binary dependent variable takes on values of zero and one. It is one for a warning firm and zero for a matching non-warning firm. I regress the probability of announcing warning on firm's operating performance in the announcement year and on the average improvement of operating performance from the first to fourth year after the announcement. I hypothesize that warning firms are the ones that have the most difficulty in the operation performance at the announcement year but expect to have a turnaround in their performance in the long-term. Since many of warning firms in my sample have negative operating performance in the announcement year, I separate this independent variable into negative and positive numbers. Warning firms are expected to have more negative operating performance in the announcement year than non-warning firms. As such, the coefficient of negative and positive sign operating performance in the announcement year should be negative. On the other hand, warning firms should have more improvement in operating performance after the announcement year than non-warning firms.

Exhibits 2 and 3 show stock return reverts in seventh month after the announcement and Exhibit 4 shows the improvement of operating performance after warning announcement. Investors may anticipate the improvement of the warning firm's operating performance after a series of bad news; as such, there is a surge in stock price at that point. The control variables include BHARs over six month and from the 7<sup>th</sup> month to 2 years after the announcement. The other control variables are

cash flow return on assets in the announcement year (year 0) and one year later to capture the persistence of accounting ratios, logged market capitalization to control for size, book-to-market ratios to control for growth, surprise, year dummies, and industry dummies based on four-digit SIC codes.

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Insert Exhibit 5 about here.

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The results support my hypothesis. Warning firms have worse operating performance in the announcement year than their non-warning matched firms. On the other hand, they have better improvement in their operating performance from the first to the fourth year after the announcement. The results are consistent for all four measures of operating performance. Warning firms have worse BHAR during the first sixth month after the announcement but have a reversal in their performance from the 7<sup>th</sup> month to two years after the announcement. The coefficient of logged market cap is significant suggesting that warning firms are larger than non-warning firms. Logged market to book in the announcement year does not explain the probability of announcing profit warnings. Expectedly, warning firms have higher surprise than non-warning firms.

In October 23, 2000, the SEC implemented the Regulation Fair Disclosure (RFD) designed to prevent selective disclosure by public companies to large investors or analysts via phone calls or meetings. This rule enforces public firms to disclose their information to the analysts simultaneously to the public. Jackson and Madula [2007] show firms announce profit warning more frequent and the stock reaction to profit warning announcements is more attenuated after the implementation of RFD. I divide the sample to pre- and post-RFD periods and find the abnormal returns of warning firms after RFD is lower but still significant at 5% level. The main conclusion from the full sample remains intact in both subperiods.<sup>xxi</sup>

## **Discussion 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. Based on the sample of this study, I observe the same evidence that is shown by the extant literature, which is

highly negative short-term market reaction around the announcement. The magnitude of the negative reaction (-15.5% over the two-day announcement period) is both statistically and economically significant. Such an adverse short-term effect on shareholder welfare is intriguing. I examine the long-term stock and operating performance of warning firms. I investigate how long the bad news from a profit warning lasts and find that it lasts about six months. Why does it take some time for market to adjust to such bad news? According to Tucker [2007], warning firms normally have a larger amount of other bad news than non-warning firms. They do not only issue a profit warning but also provide a series of other bad news over the following months, thereby causing further disappointments. This suggests a trading strategy: Sell after a profit warning but then repurchase six months later. The results indicate that investors who hold stocks of warning firms for twelve months, after purchasing them in the seventh month, tenth month, and thirteenth month after the warning, earn positive abnormal returns. For instance buying stocks either six or nine months after a profit warning delivers abnormal returns of 6% over the following twelve months compared to a reference portfolio of firms matched by industry and size.

I document that the abnormal returns are more significant for growth stocks than value stocks implying investors are more sensitive to earnings disappointments from growth stocks. For example purchasing growth stocks nine months after a warning delivers an abnormal return of 12.28% over the next twelve months but value stocks deliver only 1.29% over the same period. The observed pattern is not driven by the sale and/or purchase of large blocks of shares by insiders or institutional investors.

There is more mean reversion in growth rates than the market expects. As such the stocks with poor recent earning growth become undervalued now but deliver good performance in the future. The results imply investors underestimate the potential recovery of firms that issue a series of disappointment. There is a mean reversion in earnings of these firms. At that reversal point, the market realizes last year's short in earnings should not have been extrapolated, and thus positive return follows.

I also observe the operating performance of warning firms improves after the warning. The steady increase in returns from the seventh month after the warning announcement lends a support to the claim that investors gradually learn about this improved operating performance and share prices respond accordingly. It is not totally surprising that the market did not anticipate the improvement in operating performance at the announcement time as the warning firms have improved operating performance over four years after the announcement. Once the market fully learns this improvement, the appearing reversal pattern of returns might disappear and the return on the announcement date might become positive. Notwithstanding the initial negative reaction, my results suggest that the management of the warning companies were not acting against the interests of their shareholders. The earnings fall short of the market expectation driving firms to issue profit warning stimulates firms to address the cause of earning disappointment. On average, the operating performance of warning companies significantly improves within one year and share prices had more than recover in the few months after the announcement date. Evidently, warning firms are better able to turn around operations and market values the greater degree of transparency, at least in the long term.

Xu [2008] examines the research question similar to mine and finds warning firms significantly underperform non-warning firms over a size, market-to-book, and momentum return benchmark in the 1-year to 3-years after the event quarter. There are several explanations of the differences between our results. First, her long-term excess return is computed from the third day after the announcement, which covers the period when warning stocks underperform. As a result, her long-term excess return of warning firms is negative. Note that my study shows negative abnormal return of warning firm is significantly negative up to 6 months after the announcement, which is consistent with her result. In addition, she examines post-warning operating performance of warning firms only in term of earning and finds it is not significantly better than that of non-warning firms; while, I examine sales per gross costs, Tobin's q, cash flow return on assets, and sales growth. Another factor that is attributed to the difference in our results is the data. Her sample

is only from 1991 to 1994 whereas my sample is from 1997-2009, which is substantially larger hence providing more recent evidence and increasing statistical power. My result on the other hand is consistent with that of Tucker [2007], who finds the outperformance of warning stocks following the negative warning effect in the short-term window.

In addition, one of the motivations for my paper is to investigate why the number of firms warning has increased over time even though there is a negative reaction at the time of the announcement. The main reason is that the cost of not disclosing has gone up over time; therefore, firms have no alternative but to disclose.<sup>1</sup> I leave this investigation for the future research. Lastly, the abnormal returns I observe may not be inconsistent with market efficiency when I take transaction costs into account (Korajczyk and Sadka [2004]). An interesting extension would be to assess the market's reaction to the accuracy of the warning (i.e., compared to the later actual earnings report.) Furthermore, Imhoff [1978] concludes that management earnings forecasts (via profit warnings) may not be as accurate as forecasts that are required by law. Are there potential benefits from increased accuracy (or other factors) if all firms were required to publish warnings? I left these questions for future research.

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<sup>1</sup> I thank the referee for this comment.

## APPENDIX A. Samples of Earnings Warning Announcements<sup>xxii</sup>

In this study, I only include a point projection in the sample, which is a specific earnings estimate. One of the profit warning announcements in the sample is shown below.

**June 29, 1999, Tuesday, 09:25 ET**

Philip Morris Companies (MO) 41 Closed: They have a temporary earnings problem, but that 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 gotten away with it, at least short term. But in Briefing.com's view, the reaction may be in truth is 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.

## APPENDIX B: Choosing Matching Firms

Matching firms are firms that have comparable size and are in the same industry as warning firms but choose not to warn. For each profit warning firm in the sample, I select a matching firm that is in the same industry as the warning firm and is closest in terms of market capitalization at the time of announcement. Firms in the same industry are more likely to have similar operating risks, profitability, and growth prospects. Market capitalization is a proxy for size and calculated as the average market capitalization over the five-day period preceding the announcement.

My method is a balance between matching only on industry or size, and trying to match on too many financial variables. To choose an appropriate matching firm, I first consider all firm quarters in the First Call Company Issued Guidelines (CIG) database to identify the firm quarters in which the forthcoming earnings are lower than analyst consensus before the third fiscal month but the firms choose not to warn. According to the First Call, I delete any firm that issues negative guidance about sales, earnings growth, cash flows, or EBITDA from non-warning group. Then, I apply the same screening criteria that I use to select warning firms.

To obtain a matching firm, I first classify all remaining firms into industries based on their SIC codes obtained from CRSP as of the end of the prior calendar year. I group these firms into 48 industries using the updated industry specifications from Kenneth French's web site, which are groupings of various 4-digit SIC codes, and then assign the warning firm to its industry group.<sup>xxiii</sup> A matching firm in the same industry group as the warning firm is selected if it has the market capitalization closest to that of the warning firm.<sup>xxiv</sup> To calculate market capitalization of a matching firm, I subtract DAYS<sub>D</sub> (number of days between the announcement day and the financial period end of profit warning firms) to the end of a quarter and estimate an expected announcement date. I calculate market capitalization of a matching firm as an average over five days before the expected announcement date in the same way as I do for a warning firm. Each warning firm gets a unique matching firm that is closest in industry and market capitalization. I try to make sure that each warning firm gets a unique matching firm. Sometimes the matching firms are repeated in

subsequent years. Dropping these cases does not appreciably affect my finding.

## EXHIBIT 1. Summary Statistics of Warning and Non-Warning Firm Variables

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. SURPRISE is the difference between the forthcoming earning per share and the most recent analyst consensus before the warning. I collect both earnings from IBES. SURPRISE of non-warning matching firm is the difference between the forthcoming EPS and the last analyst consensus before the third fiscal month of the event quarter. 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 is long-term debt. INTANG is the value of intangible assets. CASSET (CLIAB) is current assets (liabilities). TASSET is total assets. 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], market value of assets 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. Non-warning matching firms are firms that have comparable industry and size to warning firms but choose not to warn. Size is measured as the average of market capitalization over five days before the announcement date. T-Test show t-statistics for equality in means and Wilcoxon Z shows Z-statistics for equality in medians between warning and non-warning matching firms. Each accounting variable is the average in four quarters before the event quarter.

Variables	Warning firms (4,568 firms)		Non-warning matching firms (4,568 firms)		Between-Group Test (Warning firms - Non-warning matching firms)	
	Mean	Median	Mean	Median	T-Test	Wilcoxon Z
AEPS (\$)	0.371	0.369	0.453	0.379	-0.917	-2.028**
MEPS (\$)	0.300	0.111				
EPSD\$ (\$)	0.106	0.178				
EPSD%	0.008	0.005				
EPSDMV (\$m)	7.928	4.770				
DAYSD	-16.779	-5.327				
SURPRISE	-0.018	-0.011	-0.012	-0.006	-0.941	-4.037***
SHARES (m)	68.133	18.461	53.660	25.779	1.938*	-0.984
MVE (\$m)	1,674.408	343.995	1,911.298	366.937	-1.302	-1.131
DEPRE (\$m)	166.522	33.262	167.236	31.838	-0.955	2.063**
EBIT (\$m)	443.139	54.962	207.514	72.630	2.521**	-1.467
LDEBT (\$m)	1,210.935	133.295	1,071.721	78.271	2.902***	2.578**
CLIAB (\$m)	904.173	107.612	925.643	154.767	-3.285***	-1.830*
INTANG (\$m)	1,451.583	118.365	840.299	113.016	4.985***	1.330
CASSET (\$m)	1,759.107	237.164	1,903.537	199.463	-1.374	1.367
TASSET (\$m)	5,467.452	571.111	5,659.631	732.391	-1.367	-0.848
LEVER	0.347	0.281	0.377	0.239	-2.843***	1.246
TQ	3.094	1.787	2.160	1.909	1.077	-0.291
INTANGR	0.160	0.231	0.125	0.209	4.666***	3.055***
BEP	0.068	0.116	0.036	0.138	2.399**	-1.870

\*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

## EXHIBIT 2. Abnormal Returns of Profit Warning Firms Adjusted by Returns of their Non-warning Matching Firms

This table shows cumulative abnormal returns (CARs) and buy-and-hold abnormal returns (BHARs) of profit warning firms adjusted by returns of their non-warning matching firms. Non-warning matching firms are firms that do not warn but have comparable industry and size to warning firms. Size is measured by the average of market capitalization over five days before the event date. I measure long-term performance from the first time of profit warning. In all Panels, CAR and BHAR are shown for twelve consecutive months with one month additional in each holding period. Panel A shows CAR and BHAR from the second day of the announcement (+2d) to the end of successive months. Panels B, C, and D show CARs and BHARs computed from the beginning of seventh, tenth, and thirteenth month to the end of subsequent month, respectively. Panels B.1, C.1, and D.1 show CARs and BHARs of all 4,568 profit warning firms in my sample. Panels B.2, C.2, and D.2 show BHARs of warning firms that are in the largest and smallest size quintiles. Panels B.3, C.3, and D.3 show BHARs of warning firms that are in the highest and lowest book-to-market quintiles. [T1,T2] indicates a holding period from the beginning of T1 to the end of T2. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

### PANEL A. Holding from the second day after the announcement

Holding period (From the beginning of T1, To the end of T2)	BHAR		CAR	
	Mean	T-stat	Mean	T-stat
[2 <sup>nd</sup> day,1m]	0.09%	0.150	0.01%	0.028
[2 <sup>nd</sup> day,2m]	-1.24%	-2.371**	-1.21%	-1.814*
[2 <sup>nd</sup> day,3m]	-3.58%	-4.564***	-4.24%	-5.098***
[2 <sup>nd</sup> day,4m]	-2.06%	-2.434**	-2.14%	-2.537**
[2 <sup>nd</sup> day,5m]	-3.35%	-1.910*	-2.27%	-3.257***
[2 <sup>nd</sup> day,6m]	-4.05%	-2.118**	-3.47%	-2.316**
[2 <sup>nd</sup> day,7m]	-2.63%	-1.758*	-1.77%	-1.309
[2 <sup>nd</sup> day,8m]	-2.86%	-1.921*	-2.83%	-1.420
[2 <sup>nd</sup> day,9m]	-3.11%	-1.301	-3.35%	-1.666
[2 <sup>nd</sup> day,10m]	-1.33%	-1.404	-2.72%	-1.895*
[2 <sup>nd</sup> day,11m]	-0.84%	-0.378	-2.60%	-1.993*
[2 <sup>nd</sup> day,12m]	-2.13%	-0.792	-3.07%	-1.592

**PANEL B. Holding from the seventh month after the announcement**

Holding period (From the Beginning of T1, To the end of T2)	Panel B.1				Panel B.2				Panel B.3				T-stat for (highest-lowest B/M)	
	BHAR		CAR		Largest size		Smallest size		Highest book-to-market		Lowest book-to-market			
	Mean	T-stat	Mean	T-stat	Mean BHAR	T-stat	Mean BHAR	T-stat	Mean BHAR	T-stat	Mean BHAR	T-stat		
[7,7]	1.94%	3.094***	1.45%	3.123***	1.51%	1.840*	0.36%	0.655	0.517	2.79%	1.060	1.62%	1.458	0.358
[7,8]	1.07%	1.882*	0.85%	1.552	0.96%	0.710	0.89%	0.483	0.071	3.51%	1.265	1.03%	0.850	0.564
[7,9]	1.05%	0.918	0.17%	0.598	0.89%	0.359	1.08%	0.356	-0.034	1.62%	0.540	1.15%	0.497	0.116
[7,10]	1.94%	1.976	0.37%	0.780	1.95%	0.550	0.03%	0.011	0.482	5.26%	0.505	1.79%	0.841	0.231
[7,11]	1.83%	1.051	0.24%	0.595	2.18%	0.431	-0.01%	0.000	0.407	5.12%	0.672	3.07%	0.610	0.311
[7,12]	1.62%	1.302	0.84%	0.752	2.03%	0.581	-0.15%	-0.069	0.513	3.28%	0.532	2.88%	1.228	0.205
[7,13]	1.36%	0.829	1.32%	0.889	2.06%	0.647	-1.16%	-0.417	0.565	6.35%	0.802	1.32%	0.519	0.240
[7,14]	2.35%	0.883	2.97%	1.564	3.22%	0.951	-1.40%	-0.265	0.998	6.30%	0.891	0.18%	0.058	0.698
[7,15]	3.25%	2.048**	2.53%	2.470**	1.14%	0.270	2.73%	0.770	-0.254	4.80%	0.972	2.54%	1.019	0.248
[7,16]	5.04%	1.866*	3.76%	1.980*	3.49%	0.753	4.95%	1.390	-0.037	5.81%	0.539	4.15%	0.969	0.318
[7,17]	5.58%	2.516**	6.01%	2.526**	4.98%	0.942	9.60%	0.710	-0.289	4.03%	0.582	3.94%	1.202	0.049
[7,18]	6.82%	2.046**	3.90%	2.416**	3.81%	0.958	8.28%	1.333	-0.297	4.28%	0.525	5.23%	1.260	-0.311

**PANEL C. Holding from the tenth month after the announcement**

Holding period (From the beginning of T1, To the end of T2)	Panel C.1				Panel C.2					Panel C.3				
	BHAR		CAR		Largest size		Smallest size		T-stat for (largest- smallest size)	Highest book-to-market		Lowest book-to-market		T-stat for (highest-lowest B/M)
	Mean	T-stat	Mean	T-stat	Mean BHAR	T-stat	Mean BHAR	T-stat		Mean BHAR	T-stat	Mean BHAR	T-stat	
[10,10]	0.25%	0.525	0.13%	0.496	-0.05%	-0.026	0.20%	0.177	-0.092	-1.45%	-0.606	1.73%	1.539	-0.801
[10,11]	0.63%	0.505	0.16%	0.714	0.25%	0.205	0.36%	0.200	-0.006	-0.18%	-0.089	1.62%	0.580	-0.275
[10,12]	0.25%	0.420	0.79%	0.554	0.36%	0.222	-0.38%	-0.268	0.276	0.84%	0.264	3.02%	2.319**	-0.282
[10,13]	0.38%	0.402	1.03%	1.311	0.54%	0.249	-1.46%	-0.639	0.469	2.54%	0.456	3.24%	1.937*	-0.030
[10,14]	0.89%	0.658	1.99%	1.905*	0.56%	0.405	-3.26%	-1.759*	0.856	1.97%	0.567	0.84%	0.568	0.229
[10,15]	2.92%	1.577	2.73%	1.534	0.38%	0.187	-2.20%	-0.477	0.595	1.30%	0.351	2.23%	1.185	-0.300
[10,16]	3.08%	1.940*	2.68%	3.105***	-0.83%	-0.288	0.69%	0.503	-0.314	1.29%	0.586	3.78%	1.765*	-0.361
[10,17]	5.85%	3.314***	3.96%	4.426***	1.97%	1.153	2.67%	0.406	-0.048	0.39%	0.113	7.33%	2.591**	-1.010
[10,18]	4.62%	3.818***	3.57%	1.981*	1.71%	0.303	3.06%	1.150	-0.240	1.28%	0.201	4.94%	2.529**	-0.754
[10,19]	5.95%	3.380***	5.07%	2.513**	3.19%	1.131	7.38%	3.403***	-0.419	2.26%	0.595	6.29%	1.739	-0.638
[10,20]	5.68%	3.153***	3.85%	4.209***	2.24%	0.926	7.33%	2.105**	-0.352	2.62%	0.792	9.70%	2.154**	-1.121
[10,21]	6.19%	3.315***	4.49%	2.132**	2.69%	0.625	4.28%	2.130**	-0.469	1.29%	0.070	12.28%	2.573**	-1.342

**PANEL D. Holding from the thirteenth month after the announcement**

Month (From the beginning of T1, To the end of T2)	Panel D.1				Panel D.2					Panel D.3				
	BHAR		CAR		Largest size		Smallest size		T-stat for (largest- smallest size)	Highest book-to-market		Lowest book-to-market		T-stat for (highest-lowest B/M)
	Mean	T-stat	Mean	T-stat	Mean BHAR	T-stat	Mean BHAR	T-stat		Mean BHAR	T-stat	Mean BHAR	T-stat	
[13,13]	0.93%	1.211	0.34%	0.517	-0.03%	-0.033	-0.05%	-0.049	0.010	0.38%	0.182	1.17%	1.334	-0.255
[13,14]	1.08%	0.934	1.55%	1.327	-0.29%	-0.230	-0.72%	-0.719	0.237	-0.36%	-0.126	0.96%	0.622	-0.238
[13,15]	2.36%	1.570	1.98%	1.312	-0.32%	-0.173	0.90%	0.357	-0.322	-0.92%	-0.498	2.80%	1.030	-0.407
[13,16]	1.65%	1.779*	2.45%	2.716**	0.53%	0.142	0.83%	0.380	-0.093	-1.12%	-0.180	3.27%	1.959*	-0.953
[13,17]	2.78%	3.156***	3.76%	3.044***	1.54%	1.233	1.55%	0.753	-0.041	-0.38%	-0.188	5.37%	2.320**	-1.196
[13,18]	4.11%	2.913***	3.65%	3.430***	2.00%	0.820	2.11%	0.885	-0.305	-1.31%	-0.336	5.40%	2.505**	-0.725
[13,19]	5.37%	3.579***	4.70%	2.298**	1.36%	0.544	4.30%	1.903*	-0.572	-0.20%	-0.048	6.25%	1.700	-1.069
[13,20]	7.46%	4.443***	2.57%	4.840***	1.20%	0.418	4.97%	1.407	-1.150	-0.04%	-0.011	11.69%	2.584**	-1.024
[13,21]	4.02%	4.070***	2.67%	2.140**	3.92%	0.291	7.39%	2.396**	-1.214	-2.32%	-0.940	7.31%	2.318**	-2.311**
[13,22]	7.80%	2.673**	1.74%	1.406	-1.40%	-0.306	7.73%	2.119**	-1.615	-2.95%	-0.456	6.08%	2.174**	-1.418
[13,23]	6.13%	2.512**	3.06%	1.707	-2.43%	-0.752	5.02%	2.949***	-1.439	-1.66%	-0.386	9.99%	1.319	-1.838*
[13,24]	4.98%	1.610	1.86%	1.455	-2.98%	-0.864	7.51%	3.346***	-1.015	-3.40%	-0.774	9.25%	1.281	-2.257**

### EXHIBIT 3. Four-Factor Time-Series Regressions

I provide results for four factor time-series regressions. Three regressions are performed: (1) for profit warning portfolio, (2) for their non-warning matching portfolio, and (3) for the difference between warning and non-warning matching portfolios. Non-warning matching firms are firms that have comparable industry and size to warning firms but choose not to warn. Size is measured by the average of market capitalization over five days before the event date. I measure long-term performance from the first time of profit warning. Following Fama and French [1993], the three factor model is:

$$R_{pt} - R_{ft} = C_p + B_p (R_{mt} - R_{ft}) + S_p (SMB_t) + H_p (HML_t) + U_p (UMD_t) + \varepsilon_t$$

where p is an index for the portfolio; t is month t;  $R_{pt}$  is the monthly return on the portfolio.  $R_{ft}$  is the monthly return on the one-month T-bill.  $R_{mt} - R_{ft}$  is the excess return on the NYSE/AMEX/NASDAQ value (equally)-weighted index presented in Panel A (B). SMB is the difference in the returns of a value (equally)-weighted portfolio of small stocks and big stocks. HML is the difference in the returns of a value (equally)-weighted portfolio of high book-to-market stocks and low book-to-market stocks. UMD is a momentum factor and is constructed as the return difference between the best- and worst-performing tercile of stocks based on CRSP performance over the past 12 months.  $C_p$  is the monthly risk-adjusted abnormal return in percent. The estimate of  $C_p$  provides a test of the null hypothesis that the mean monthly abnormal return is zero.  $B_p$ ,  $S_p$ ,  $H_p$ , and  $U_p$  are factor-loadings. To construct the portfolios in Panel A (B), I allocate firms to warnings and non-warning matching portfolios and hold them either from the second trading day until the end of the sixth month after the announcement or from the seventh month to the end of the second year after the announcement. When all firms are allocated in this manner, I compute value (equally)-weighted average returns across all stocks for each calendar month. T-test are White [1980] heteroscedasticity consistent t-statistics. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively, assuming normality and independence.

#### PANEL A. Value-Weighted Index

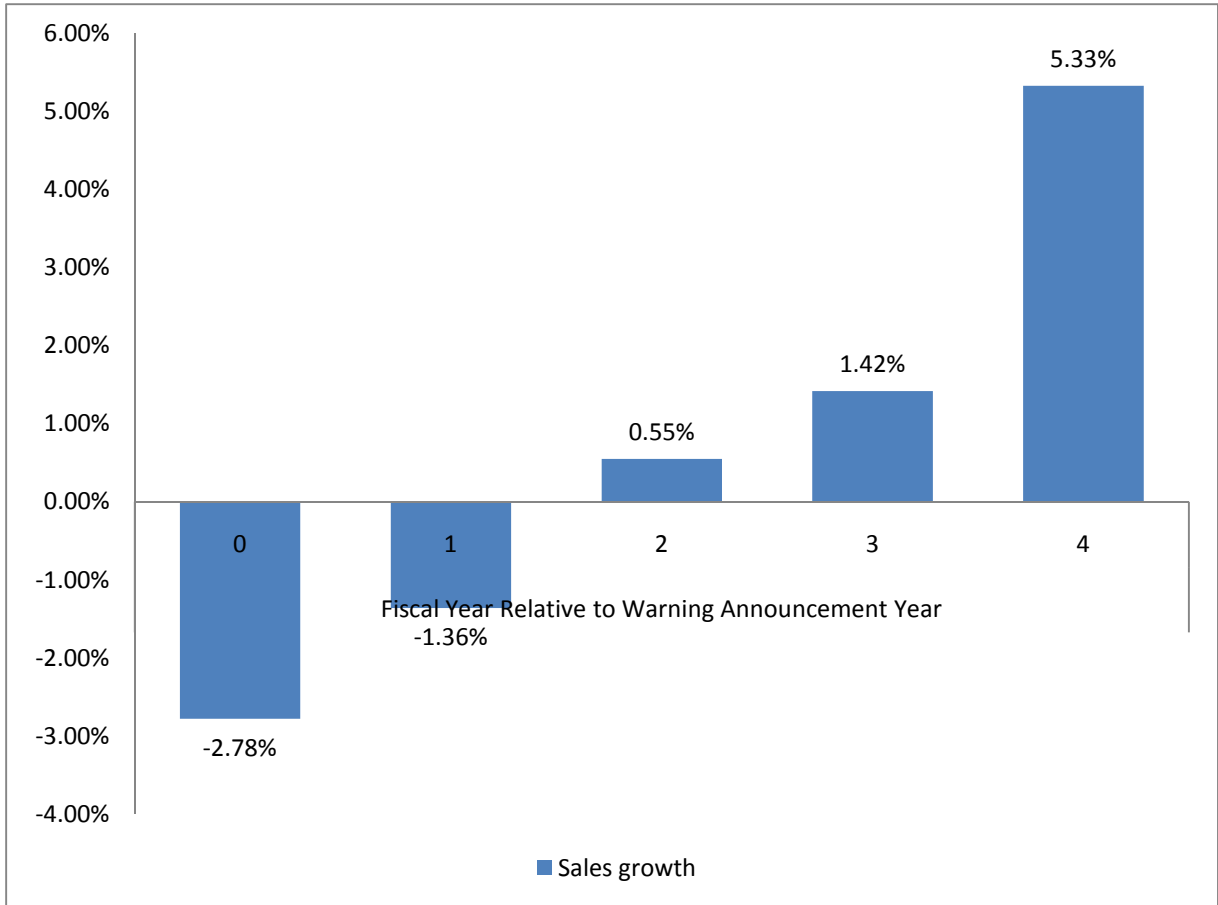
Independent Variables	From the second trading day until the end of the sixth month after the announcement			From the seventh month to the end of the second year after the announcement		
	Warning firms	Non-warning matching firms	Warning firms– Non-warning firms	Warning firms	Non-warning matching firms	Warning firms– Non-warning firms
Intercept	-0.438 -1.676	-0.192 -1.066	-0.247 -2.120**	-0.162 -1.268	-0.745 -1.351	0.583 2.350**
$R_m - R_f$	1.908 19.860***	1.145 7.853***	0.764 0.398	1.442 10.849***	1.258 8.556***	0.184 0.208
SMB	1.097 11.062***	1.001 10.713***	0.096 0.624	1.170 11.046***	1.199 10.674***	-0.028 -0.110
HML	-0.170 -1.661	-0.095 -1.367	-0.075 -1.494	-0.234 -1.604	0.113 1.248	-0.347 -2.303**
UMD	-0.113 -1.612	-0.143 -1.985*	0.031 0.655	-0.153 -0.805	-0.154 -1.782*	0.001 0.564
Adjusted R <sup>2</sup>	67.49%	71.24%	16.13%	44.65%	82.64%	12.74%

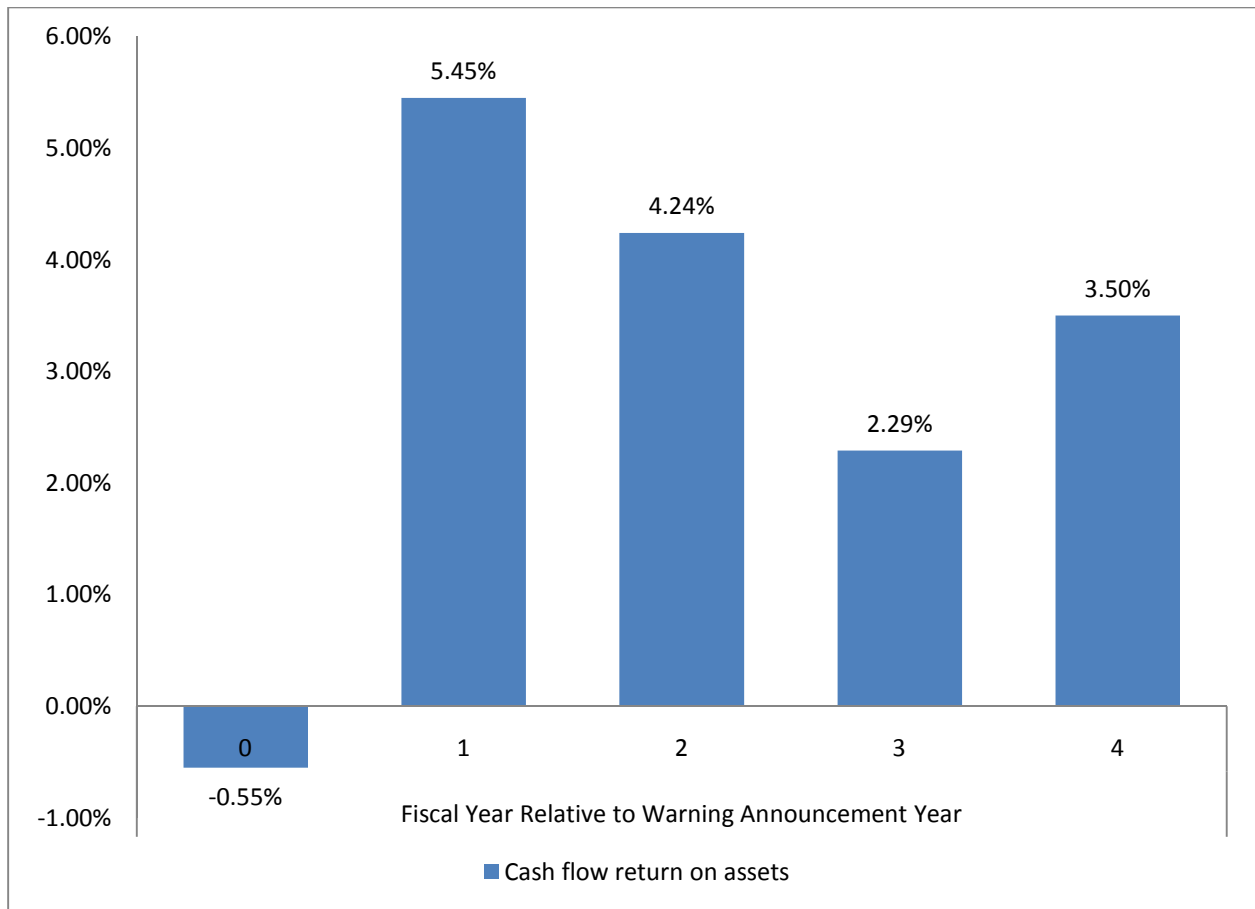
#### PANEL B. Equally-Weighted Index

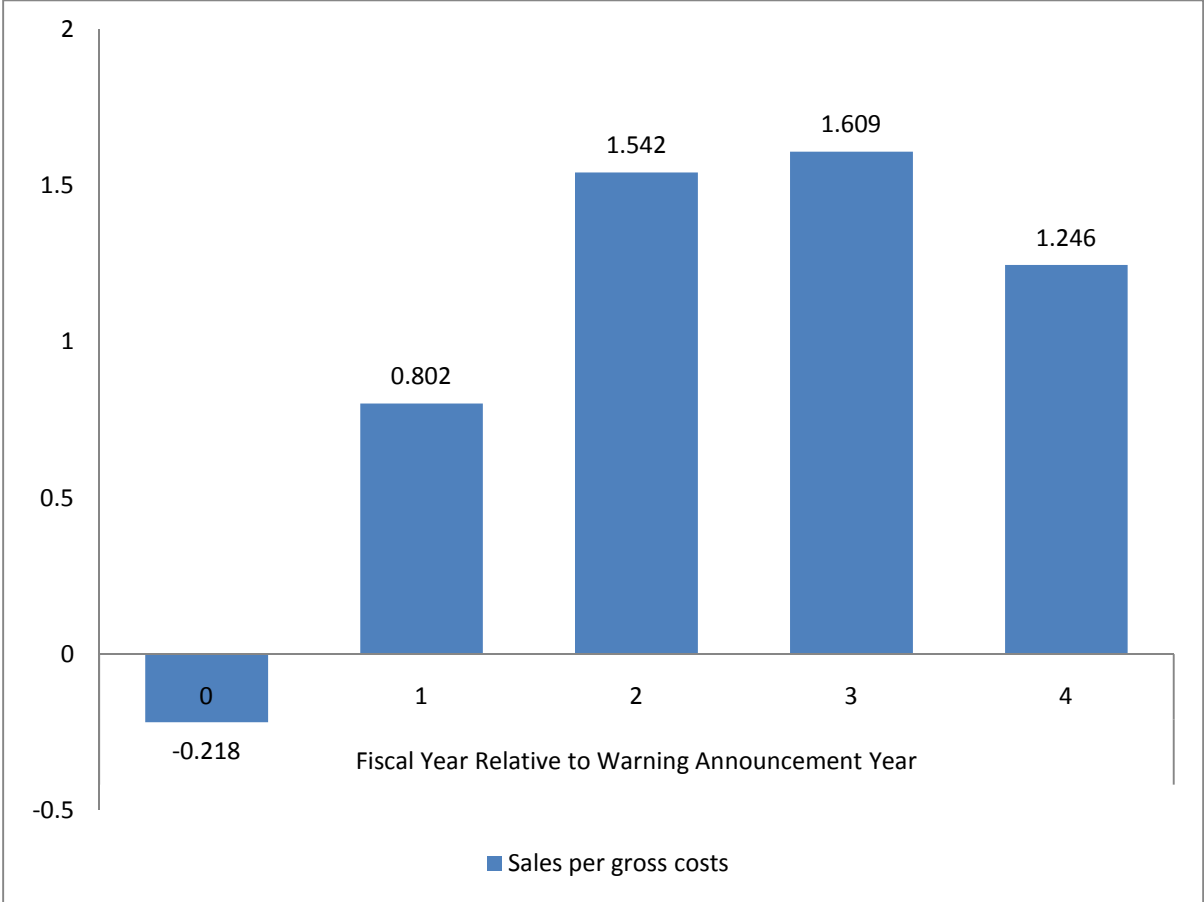
Independent Variables	From the second trading day until the end of the sixth month after the announcement			From the seventh month to the end of the second year after the announcement		
	Warning firms	Non-warning matching firms	Warning firms– Non-warning firms	Warning firms	Non-warning matching firms	Warning firms– Non-warning firms
Intercept	-0.412 -0.727	-0.126 -0.775	-0.286 -2.020**	-0.216 -1.017	-0.560 -0.759	0.344 2.132**
$R_m - R_f$	0.888 10.080***	1.193 8.759***	-0.306 -0.258	1.333 10.817***	1.530 9.689***	-0.197 -0.216
SMB	0.921 15.234***	1.285 15.283***	-0.363 -1.027	0.926 6.534***	0.840 6.790***	0.086 0.470
HML	-0.207 -1.892*	-0.165 -1.376	-0.042 -1.048	-0.170 -1.868*	0.159 1.788*	-0.329 -2.230**
UMD	-0.087 -1.374	-0.093 -1.598	0.006 0.622	-0.092 -0.769	-0.198 -1.895*	0.106 0.472
Adjusted R <sup>2</sup>	62.78%	48.13%	26.83%	69.55%	52.05%	14.71%

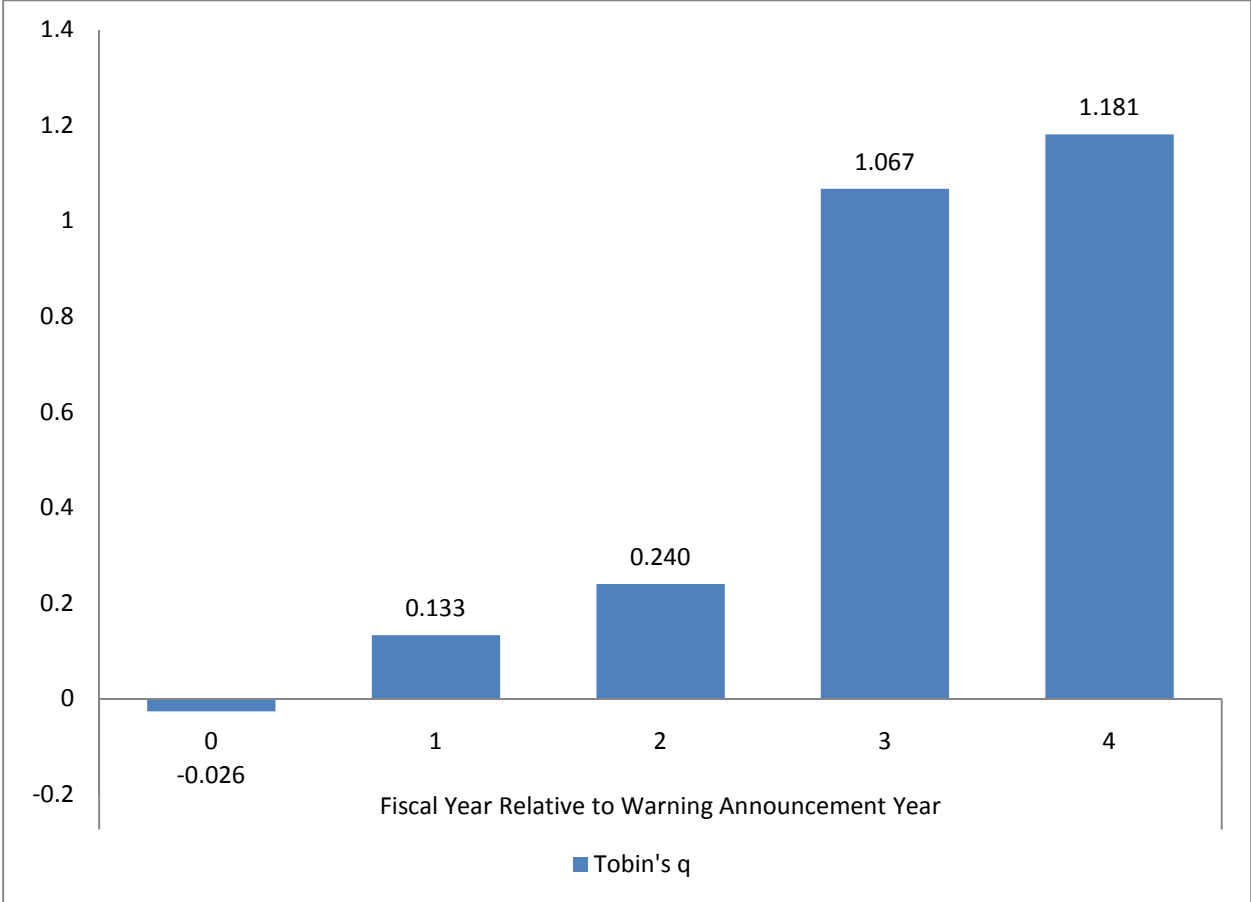
**EXHIBIT 4. Operating Performance for 4,568 Profit-Warning Companies and 4,568 Non-Warning Matching Companies during 1997-2009**

These exhibits show median sales growth rates, profitability measures and other measures of operating performance for profit warning and their non-warning matching firms. Non-warning matching firms are firms that are in the same industry and have comparable size to warning firms but choose not to warn. Size is measured by the average of market capitalization over five days before the announcement date. I measure operating performance from the first time of profit warning. Following Yr 0, 1, 2, 3, and 4 denote performance in year 0, 1, 2, 3, and 4 after the announcement date i.e., Yr 0 is the fiscal year in which the firm announced warning. Cash flow return on assets is cash flow from operations (CFO) divided by total assets; CFO is directly obtained from the statement of cash flows (Compustat item 308 minus 124). Tobin's q (TQ) is the ratio of the market value of assets to their replacement costs. Following Himmelberg et al. [1999], market value of assets 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. All accounting data represent the average in four quarters over the event quarter and are collected from Compustat or hand-collected from proxy statements. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively, assuming normality and independence.









## EXHIBIT 5. Regressions of Probability of Warning Announcement on Operating Performance

This table presents binary probit regression on operating performance. The dependent variable is the probability of a firm announcing warning. A binary dependent variable takes on values of zero and one. It is one for a warning firm and zero for a matching non-warning firm. There are 4,568 profit-warning companies that announced profit warnings during 1997 to 2009 and 4,568 matching non-warning firms. Operating performance measures include sales growth, cash flow return on assets, sales per gross costs, and Tobin's. These operating performance measures are adjusted by that of non-warning matching firms, which are the firms that have comparable industry and size to warning firms but choose not to warn. Size is measured by the average of market capitalization over five days before the event date. Cash flow return on asset is cash flow from operations divided by total assets. Yr 0, 1, and 2 denote performance in year 0, 1, and 2 after the announcement date i.e., Yr 0 is the fiscal year in which the firm announced warning. All accounting data represent the average in four quarters over the event quarter and are collected from Compustat or hand-collected from proxy statements. Logged market cap is log of the average of market capitalization over five days before the announcement date. BHAR is buy-and-hold abnormal return adjusted by returns of their non-warning matching firms. I measure long-term performance from the first time of profit warning. SURPRISE is the difference between the forthcoming earning per share and the most recent analyst consensus before the warning. I collect both earnings from IBES. SURPRISE of non-warning matching firm is the difference between the forthcoming EPS and the last analyst consensus before the third fiscal month of the event quarter. T-test are White [1980] heteroscedasticity consistent t-statistics. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively, assuming normality and independence.

Binary Probit Regression				
Operating performance measures	Sales growth	Cash flow return on assets	Sales per gross costs	Tobin's q
Intercept	0.039 0.210	0.029 0.283	0.028 0.234	0.036 0.298
(Minus sign) operating performance in the announcement year	-0.318 -2.541**	-0.349 -1.999*	-0.341 -2.404**	-0.257 -2.811** *
(Positive sign) operating performance in the announcement year	-0.277 -2.490**	-0.250 -3.074** *	-0.245 -2.203**	-0.274 -3.202** *
Average growth of operating performance	0.225 2.865***	0.212 2.675**	0.240 2.326**	0.187 1.947*
Logged market cap in year 0	0.642 2.389**	0.092 1.520	0.094 1.032	0.674 2.348**
Logged market to book in year 0	0.002 0.130	0.002 0.122	0.002 0.141	0.002 0.108
BHAR [2 <sup>nd</sup> day , 6 months]	-0.379 -2.001**	-0.200 -2.204**	-0.157 -1.475	-0.134 -1.546
BHAR [2 <sup>nd</sup> day , 1 year]	0.417 2.542**	0.383 3.303***	0.369 2.589**	0.176 1.914*
Surprise	0.369 2.484**	0.357 2.016**	0.299 1.972*	0.315 2.544**
Year dummies	Included	Include d	Include d	Include d
Industry dummies	Included	Include d	Include d	Include d
Adjusted R <sup>2</sup>	25.86%	32.14%	32.75%	29.98%

## Endnotes

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- <sup>i</sup> 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](http://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." In this study, I include only earning, not revenue announcement.
- <http://www.briefing.com/GeneralInfo/Investor/Features/AboutOurPages/EarningsGuidanceCalendarInvestor.htm>
- <http://www.briefing.com/Investor/Private/Calendars/EarningsGuidanceCalendar.htm>
- <sup>ii</sup> Briefing.com provides detailed earnings warning announcements starting in 1998. I collect warning announcements for the period of May 1997 to December 1997 from its daily Stock Short Stories sector and verify some of them against new sources such as bigcharts.com.
- <sup>iii</sup> The confounding events include a release of financial, operating, and merger and acquisition information. Financial and operating information include information on major contracts, dividend changes, asset write-offs, joint ventures, and stock repurchases besides sales and earnings forecasts.
- <sup>iv</sup> 1.23%, 7.85%, 9.16%, 8.04%, 9.36%, 7.66%, 5.94%, 8.23%, 10.21%, 10.64%, 5.65%, 8.16%, and 7.87% of all announcements were issued in 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, and 2009 respectively.
- <sup>v</sup> For EPSD, it is because the median of management forecasted EPS denoted as MEPS is smaller than the mean of MEPS. For BEP and INTANGR, it is because the total asset mean is over 10 times bigger than its median. The majority of firms making warning announcements are firms with total assets less than \$537 million, but some of them are quite large as the mean is nearly ten times larger. Due to limited space, I do not report min and max of each variable but will point out some noteworthy points. For instance, the minimum value for the earnings difference variable (EPSD\$) is zero.
- <sup>vi</sup> One firm in my sample makes the warning nearly one and one-half years early. At the other extreme, one firm makes its warning about annual earnings just two days before the deadline to release its annual report.
- <sup>vii</sup> The results remain intact when I exclude firms that announce repeated profit warnings from the sample.
- <sup>viii</sup> I also adjust for survivorship bias as follows. Assume that we want to calculate two-year buy-and-hold returns and  $r_{11}$  is the return of warning firm 1 for the first year. Also, assume that warning firm 1 is delisted one year after the announcement. I invest its first-year return into a Treasury bill. Hence, the two-year return of warning firm 1 is  $(1+r_{11})(1+r_f)$  where  $r_f$  is the return on Treasury Bills and my results are unchanged. Krigman, Shaw, and Womack [1999], and Purnanandam and Swaminathan [2004] also use the delisting date as the cutoff time when they compute BHAR as I do in this study.
- <sup>ix</sup> Loughran and Ritter [1995], Brav and Gompers [1997], Krigman et al. [1999], Michaely and Womack [1999], and Purnanandam and Swaminathan [2004] use BHARs to compute long-run returns. Loughran and Ritter [2000] document pros and cons of BHARs vs. CARs. Gompers and Lerner [2003] compare differences in long-term IPO performance when the latter is measured with BHARs versus CARs.
- <sup>x</sup> As a robustness test, I include the warning firms that have the data available only for the whole holding return period. The overall results remain intact. I thank Richard Roll for his advice.
- <sup>xi</sup> Results are available upon request.
- <sup>xii</sup> There are a number of reasons why this method is preferable to using BHAR. First, it

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diminishes the autocorrelation problems that are present when using overlapping long-run buy-and-hold returns, and controls for the cross-correlation among returns across events. Second, a factor model has the same qualities as average abnormal return (AAR) approach; thus, it has fewer misspecification problems than BHAR method. Third, according to Lyon, Barber, and Tsai [1997], by using calendar time portfolios to estimate long-run abnormal performance, a factor model controls for the non-independence of returns over time, size and book-to-market (B/M) effects, and avoids the problem of drawing inferences on skewed, long-horizon returns. Lastly, it can control for B/M effects better than the comparable firm approach. Book value of warning firms and their matching firms may vary, so its effect may be difficult to capture. Nevertheless, Barber and Lyon [1997], and Loughran and Ritter [2000, 2004] argue that this approach has a lower power to reject the null hypothesis of no abnormal returns when they are in fact present, especially when the samples consist of small stocks.

<sup>xiii</sup> I follow Eckbo and Norli [2005] by constructing a momentum factor based on the difference in prior 12-month returns of a high- and low-return portfolio. They construct the momentum factor somewhat differently from Carhart [1997], the originator. I follow them and construct six value-weighted portfolios, two size based groups each divided further into three groups based on the prior 12-month return. The momentum cutoff points are the 30<sup>th</sup> and 70<sup>th</sup> NYSE percentiles for the prior 12-month returns. The momentum factor, UMD, is the equally-weighted average return on the two high prior return portfolios minus the average return on the two low prior return portfolios.

<sup>xiv</sup> For comparison, Campbell, Ramadorai, and Schwartz [2009] show trading volume to market capitalization of smallest and largest quintile stock is 55% and 92%, respectively.

<sup>xv</sup> This requirement has been enforced since 1978. Many times, institutions report their ownership level; even though, it is below the minimum requirements.

<sup>xvi</sup> Due to limited space, the result is available upon request.

<sup>xvii</sup> DeAngelo [1988], Kaplan [1989], Healy and Palepu [1990], DeGeorge and Zeckhauser [1993], Jain and Kini [1994], McLaughlin, Safieddine, and Vasudevan [1996], Mikkelsen, Partch, and Shah [1997], and Loughran and Ritter [1997], among others, all report median values.

<sup>xviii</sup> I compute sales per gross costs to capture gross profits. I prefer gross profit to other measures of profitability, which can be influenced by accounting conventions on amortization, non-cash items or all sorts of provisions.

<sup>xix</sup> Since I do not have the market value of debt, my measure of Tobin's q is more precisely the market value of equity plus the book value of debt divided by the book value of assets.

<sup>xx</sup> I thank the referee for raising these questions.

<sup>xxi</sup> For instance, the results from 4-factors model for the post-RFD shows during the six month after the announcement, warning firms earn a negative 6.01% return for the value-weighted portfolio and a negative 3.45% for the equally-weighted portfolio on an annualized basis, whereas non-warning matching firms earn a significant negative 2.49% per annum for the value-weighted portfolio and a negative 1.58% for the equally-weighted portfolio. Thus, warning firms significantly *underperform* their matching firms by about 3.04% for a value-weighted portfolio and 2.16% for an equally-weighted portfolio on an annualized basis. Both risk-adjusted returns are significant at 5%. From the seventh month to the end of second year after the announcement, the risk-adjusted average abnormal returns of warning firms is negative 2.49% and 2.96% for the value- and equally-weighted portfolio. Non-warning matching stocks again earn negative abnormal returns. Warning firms significantly *outperform* matching firms over this period (4.83% for value-weighted and 3.72% for equally-weighted indexes) at 5% level.

<sup>xxii</sup> The profit warning announcement sample was collected from the Story Stock Section at [www.briefing.com](http://www.briefing.com).

<sup>xxiii</sup> [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

<sup>xxiv</sup> I also choose matching firms based on two other criteria. The first one is based on industry

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and sales. Sales capture size. I choose matching firms that have sales closest to the sales of the warning firm, which is calculated over the fiscal year before the announcement date. The second is based on industry, market capitalizations, and book-to-market ratios where book value of equity is for the fiscal year before the announcement date. Market capitalization is computed as described in the text. My results are not sensitive to the choice of matching criteria.