The Bad, the boom and the bust: Profit warnings over the business cycle

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ABSTRACT

We examine the market reaction of profit warnings (PWs) over the business cycle in the U.S. during 1995–2012. The average PW is associated with a −13.38% abnormal return during the announcement day. This is substantially higher than the abnormal return of firms who announce a negative earnings surprise without previously warning about it. We also find that the PW stock market reactions are asymmetric during the business cycle. Negative stock market reactions are greater in magnitude during expansion periods than during contraction periods. Theory suggests that this is because bad news is not expected during good times, so when it is announced, investors have a greater update to their beliefs.

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1. Introduction

A firm's managers have more information about the expected profitability of the firm than investors. When that profitability falls short of analysts' expectations, managers can voluntarily choose to issue a profit warning (PW), typically about 3–4 weeks ahead of the formal earnings announcement. A PW differs from an earnings announcement in the sense that it occurs irregularly and unpredictably across firms and time. Kothari, Shu, and Wysocki (2009) argue that the large negative return generated from bad news that is unanticipated gives management an incentive to withhold bad news. PWs exhibit this negative reaction and the firm suffers a substantial decline in the stock price (Bulkley & Herrerias, 2005; Kasznik & Lev, 1995; Spohr, 2014; Tucker, 2007; Xu, 2008).

Mendenhall and Nichols (1988) and Chen and Mohan (1994) argue that when managers issue PWs they are striving to time the bad news release in order to minimize the negative market reaction. Previous research has also indicated that the interpretation of bad news is different over the business cycle (DeStefano, 2004). So some environments might be better than others for a voluntary disclosure. 3Com Corp issued a profit warning during the evening of December 4, 2000, near the top of a long bull market. When the market opened the next day, its price fell nearly 30 percent, an abnormal return of −32.5%. 3Com warned again nearly three months later. The market reaction in early March 2001 to this PW was a stock price decline of 21%, an abnormal return of −4.7%. While there are important differences between these two warnings themselves, the state of the market may have also been an important factor in the market reaction. The Dow Jones Industrial Average

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was still near its high during the first warning, which was at the end of the economic expansion period. The economy had just entered a recession during the second warning and the NASDAQ (where 3Com stock traded) was collapsing.

An asymmetric market response to bad news is predicted by several theoretical models. For example, the regime switching model of Veronesi (1999) explains the asymmetric impacts of bad news throughout the business cycle in terms of changing an investor's belief system. During good times, investors do not expect bad news. If bad news occurs during good times, investors are surprised and must drastically change their belief system (posterior). For scheduled disclosures, Conrad, Cornell, and Landsman (2002) examine the price response to bad and good earnings shocks. They find that the stock market response to negative earnings surprises increases as the relative level of the market rises. Our research builds on the study by Conrad et al. (2002) by examining the PW, a voluntary bad news disclosure, over the business cycle. We compare this impact to those firms that have negative earnings surprises, but choose not to warn shareholders.

The paper is organized as follows. In Section 2, we will motivate our study and discuss the literature. Section 3 contains our sample selection and research design. In Section 4, we discuss our empirical findings. An additional test and comments on the robustness of our results are covered in Section 5. Lastly, we conclude the paper in Section 6.

2. Related literature

Kasznik and Lev (1995) show that the market reaction to a profit warning is significantly more negative than for non-warning firms with bad earnings surprises. Tucker (2007) reports that firms with a large amount of bad news (not necessarily profit warnings) are worse off in the short-term for having warned than for being silent. A profit warning may take the form of a specific earnings revision forecast or may be more qualitative in nature. Church and Donker (2009) show that providing greater transparency in the profit warning disclosure dampens the negative market response. Spohr (2014) in their study of PWs in Finland, Sweden, Denmark and Iceland found the market response was larger for riskier firms. Jackson and Madura (2003) report that the announcement reaction is more severe for small firms, but there appears to be some anticipation of the warning for large firms. Lastly, the magnitude of the PW market reaction has attenuated after the implementation of the Regulation Fair Disclosure (Jackson & Madura, 2007), suggesting that more transparency leads to less surprise by the market.

Investors may interpret the signal provided by a PW differently over the business cycle. Barberis et al. (1998) describes investor sentiment as being overly optimistic at times and overly pessimistic at other times. Baker and Wurgler (2006, 2007) and Nofsinger (2012) have shown a link between investor sentiment and the business cycle. During an economic expansion, investors are predominately exposed to good news. Over an extended expansion, investors' extrapolation bias leads them to become optimistic and good news becomes the norm, thus it is expected. During this time, bad news is more of a surprise because it is out of the expected norm. On the other hand, during an economic contraction, investors predominately hear bad news. Investor sentiment changes and becomes more pessimistic. During these contraction times, bad news becomes the expected norm, and thus it is less of a surprise. Therefore, due to their sentiment, investors may react differently to bad news during economic expansion versus contraction periods.

The sentiment literature casts investors in different frames of mind and as having different expectations over the business cycle. Veronesi (1999) models different expectations in a regime switching model. While in 'good times,' the model predicts that stock prices will overreact to bad news. The bad news surprise forces investors to consider whether the regime has switched to 'bad times.' Conrad et al. (2002) empirically test the model with earnings surprises. They compare the stock price reaction between these scheduled announcements in high valuation stock markets (high P/E ratio) versus low valuation markets. They find that the negative reaction to poor earnings surprises is of higher magnitude during the high valuation market periods.

We examine the stock price reaction of voluntary earnings guidance warnings (PWs) by management over the business cycle.

3. Sample selection and research design

Our sample consists of U.S. firms listed on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ from 1995 to 2012. Profit warning announcements were hand collected for the 1995 to 2012 period utilizing LexisNexis Academics by searching the *Wall Street Journal*, *New York Times*, *Washington Post*, *Financial Times*, and newswires from the financial markets. The keywords searched were "profit warning" and "earnings warning." We do not extend our sample period to before 1995, since profit warnings were infrequently acknowledged in newspapers before 1995. This identification process garnered a sample of 1,961 observations of U.S. firms issuing profit warnings. The stock price data, adjusted for dividends and splits, was compiled from the Center for Research in Securities Prices (CRSP). Financial data were obtained from COMPUSTAT files. The event date ($t = 0$) was the announcement date from the newspaper in LexisNexis. Financial Analyst's earnings forecast data were collected from the Institutional Brokers' Estimate System (IBES). The National Bureau of Economic Research (NBER) provided information with respect to business cycles.

Fig. 1 reports the quarterly frequency distribution of the 1,961 profit warnings during 1995–2012. Note that many of the warnings were issued during the time of the technology bubble and subsequent market deflation. This also coincides with the September 11, 2001 terror attacks and subsequent economic contraction.
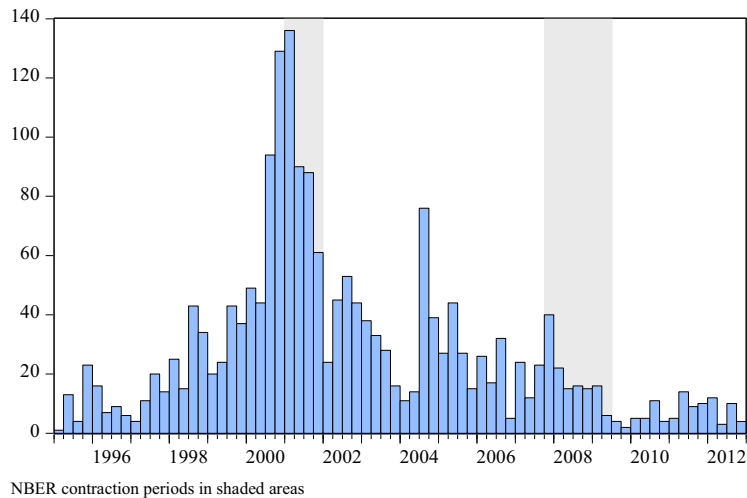
Fig. 1. Frequency of Profit Warnings in Each Quarter in the U.S. (1995–2012).　　　NBER contraction periods in shaded areas

The literature provides two directions for defining the business cycle; economic expansion/contraction and stock market bull/bear market. For example, Conrad et al. (2002) use the level of the stock market to indicate "good times" and "bad times" periods. However, it can be useful to separate the definition of the business cycle from the stock returns being used as dependent variables. To do this, scholars measure the business cycle using the phase of the economy. We follow DeStefano (2004) and others and use the National Bureau of Economic Research (NBER) definitions to determine the turning points of the business cycle. Economic expansion is the normal state of the economy. The NBER defines a recession (contraction) as a significant decline in activity spread across the economy, lasting more than a few months, visible in industrial production, employment, real income, and wholesale trade. In accordance with the NBER dating of economic contraction, the applicable periods of recession are from March 2001 to October 2001, and from December 2007 to May 2009. These periods are shaded in Fig. 1. We denote the variable business cycle (BC) is an indicator variable that takes a value of one during an expansion period and zero during contraction.

In addition to the firms that warn of an upcoming earnings surprise, we also create a control sample of firms which experienced negative earnings news (actual earnings per share was lower than the market consensus) in the same period, but chose not to issue profit warnings. For the control sample, we selected a matching firm that had a bad earnings announcement at the same time as our PW firms, is of a similar size, and in a similar business.

In our analysis, we control for firm characteristics such as size, profitability, leverage, and growth. Larger firms typically are more diversified coupled with greater financial strength to sustain themselves through a stormy patch of profit disappointments. We expect the market response to a profit warning will be smaller for larger-size firms. The variable firm size (SIZE) is defined as the relative rank (scaled to [0,1]) of market capitalization of the firm before the announcement based on all firms listed on the NYSE, AMEX, and NASDAQ in the year of the announcement. Profitability is another factor that enables the company to be resilient in the midst of bad news brought by emitting a profit warning. We anticipate the market response to a profit warning will be smaller for firms with higher profitability. The variable return on assets (ROA) is defined as earnings before interest and taxes (EBIT) as a percentage of the book value of total assets. Financial risk contributes to the total risk of the organization. The higher the risk, the lower the ability of the entity is to withstand the fallout from the reaction to the profit warning. Therefore, we believe the market response to profit warnings will be more intense for firms with higher financial leverage. The variable leverage (LEV) is defined as total debt as a percentage of total assets. A profit warning would be viewed as a negative signal from the firm that is straining to maintain their high growth pattern. Thus, the variable market-to-book ratio (MTB) is defined as the market capitalization divided by the book value of total assets. Finally, market reaction might be related to the amount of trading, so we include the variable trading volume (VOL), which is defined as the trading volume of common shares divided by the average trading volume of each month during one to ten months before the profit warning announcement.

We also control for earnings related variations. For example, some firms provide multiple warnings in the sample. The variable multiple warnings (MULTI) is an indicator variable that equals one if a previous warning was announced within one calendar year and is zero otherwise. The variable analyst forecast dispersion (DISP) is defined as the standard deviation of analyst earnings per share forecasts. We include the variable negative earnings estimates (NEST), which is defined as the fraction of earnings estimates by analysts before the profit warning announcement that are less than zero. Lastly, we include an indicator variable that indicates when the period after Sarbanes-Oxley (SOX) legislation was enacted, July 30, 2002. Jackson and Madura (2007) find that because the SOX decreased the asymmetry in information between managers and shareholders through greater disclosure, PW reactions were dampened.

Table 1
Descriptive Statistics.

	SIZE	ROA	LEV	MTB	VOL	NEST	DISP
Mean	0.822	0.072	0.514	4.031	1.685	0.758	0.224
Median	0.916	0.079	0.521	2.683	1.371	0.882	0.050
St. Deviation (σ)	0.208	0.152	0.225	4.492	1.248	0.331	1.826

This table reports descriptive statistics of the main variables of our PW sample firms during the period 1995–2012. The statistics are cross-sectional means, averaged every year. The PW cohort contains firms listed on NYSE, AMEX, and NASDAQ. Data on analyst forecasts dispersion and estimates are from the IBES file. Data on firm size, return on assets, and leverage are from CRSP/COMPUSTAT merged database. The variable firm size (SIZE) is defined as the relative rank of market capitalization based on all firms listed on NYSE, AMEX, and NASDAQ in the year of the announcement. The variable is scaled in the range [0,1]. The variable return on assets (ROA) is defined as earnings before interest and taxes (EBIT) over the book value of total assets. The variable leverage (LEV) is defined as total debt divided by total assets. The market-to-book ratio (MTB) is defined as the market capitalization divided by the book value of equity. The variable trading volume (VOL) is defined as the trading volume of common shares divided by the average trading volume of each month during one to ten months before the profit warning announcement. The variable negative earnings estimates (NEST) is defined as the fraction of negative earnings estimates before the profit warning announcement. The variable analyst forecast dispersion (DISP) is defined as the standard deviation of analyst earnings forecasts.

Table 2
Average Abnormal Returns for Selected Windows in Response to Profit Warnings and Unanticipated Earnings Surprises during Earnings Announcements.

Panel A Profit Warnings CAARs Event windows	FF3 Excess Returns (%)	Generalized Sign Z test	Positive: Negative %
AAR [0]	−13.38	−38.37***	5:95
CAAR [−1,0, +1]	−14.27	−33.13***	11:89
CAAR [−3, +3]	−14.87	−30.19***	14:86
CAAR [−5, +5]	−15.56	−29.74***	15:85
CAAR [−30, +30]	−20.57	−22.10***	23:77
CAAR [−30, −2]	−5.27	−8.91***	38:62
CAAR [+2, +30]	−1.03	2.07*	51:49

Panel B Unanticipated Earnings Surprises during Earnings Announcements CAARs Event windows	FF3 Excess Returns (%)	Generalized Sign Z test	Positive: Negative %
AAR [0]	−1.17	−3.99***	43:57
CAAR [−1,0, +1]	−2.84	−7.11***	40:60
CAAR [−3, +3]	−3.14	−4.85***	42:58
CAAR [−5, +5]	−3.22	−5.71***	42:58
CAAR [−30, +30]	−3.60	−1.69*	46:54
CAAR [−30, −2]	−1.23	0.37	48:52
CAAR [+2, +30]	0.47	2.11*	50:50

This table reports the cumulative average abnormal returns using the Fama-French three factor model (1993). The generalized sign test compares the percentage of negative returns in the event window is the same as in the estimation period. The generalized sign test (nonparametric event study test) compares the proportion of positive abnormal returns from the event window to the proportion of positive abnormal returns from the estimation period using a binomial distribution (Cowan, 1992). The sample contains n = 1,961 observations and covers the period from 1995 through 2012.
*, **, *** Significance at the 10, 5, 1% level respectively.

In Table 1, we provide an overview of the financial parameters of our cohort of PW firms. The sample is skewed towards large firms (size) as the average relative size is 0.822 and the median is 0.916. The return on assets (ROA) has experienced marked variation with the average return being around 7.2% and the standard deviation being 15.2%. Most of the PW firms have high leverage (LEV), averaging 51.4%. The market-to-book value (MTB) was highly variable with an average of 4.031 and a standard deviation of 4.492. Similarly, the trading volume was also highly variable; the average trading volume was 1.685 coupled with a marked declining trend along with a standard deviation of 1.248. The analysts' fraction of negative earnings estimates (NEST) before the profit warnings is 0.758, with a median of 0.882 of and a standard deviation of 0.331. The average dispersion in analyst forecast, at 0.224, is highly skewed with high dispersion, as noted by comparison to the median of 0.050 and the standard deviation of 1.826.[1]

4. Empirical results

To begin our tests, we compute announcement event average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) using the Fama-French three-factor model. Panel A of Table 2 reports the market response to our sample of profit warnings. On the announcement day, the stock response to unscheduled warning is an AAR of −13.38%. Ninety-five percent of the announcements are negative returns. For the three days surrounding the announcement, event window (−1,

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[1] We also performed a multicollinearity check for all independent variables. The variance inflation factors for most variables are below 2. Since the variance inflation factors are substantially below 5, multicollinearity does not appear to be a problem.

Table 3
Abnormal Returns over the Business Cycle.

	FF3 AAR [0] %	FF3 CAAR [-1,0,+1] %
Entire period	−13.38*** (p = 0.00)	−14.27*** (p = 0.00)
Expansion	−14.02*** (p = 0.00)	−14.95*** (p = 0.00)
Contraction	−10.72*** (p = 0.00)	−11.42*** (p = 0.00)
Difference in Means (E − C)	−3.30*** (p = 0.00)	−3.53*** (p = 0.00)

This table reports average abnormal returns AAR [0] and cumulative average abnormal returns CAAR[−1, 0, +1] for the entire sample, economic expansion, and contraction using the Fama-French three factor model (1993). The p-values are shown in parentheses.
*, **, ***Significance at the 10, 5, 1% level respectively two-sided test.

0, +1), the CAAR is −14.27%. These results are similar to those obtained by earlier studies.[2] These values are both highly statistically significant and economically large. Other important event windows reveal that pre-announcement CAAR [−30, −2] returns are −5.27%. Furthermore, 62% of stocks generated a negative CAAR, suggesting either information leakage or market anticipation, or both.

We next compare these warning returns to the matching sample of firms with negative earnings surprises that did not warn shareholders. Panel B of Table 2 shows that the AAR market reaction to scheduled earnings surprises is −1.17% on the announcement day and −2.84% over the 3-day event window [−1, 0, +1]. These results are similar to the findings of Kasznik and Lev (1995). Note that the market reaction to profit warnings is far more negative compared to the earnings surprises of firms that did not warn. These results suggest that profit warning firms are treated more harshly than those firms that do not voluntarily disclose the upcoming bad news.

It appears that providing a voluntary warning to disclose the upcoming earnings miss elicits a very negative reaction. However, we now ask whether warning during expansion periods elicits a better or worse response than during contraction periods. Table 3 reports the mean announcement abnormal returns over the business cycle. The first column shows the AAR [0] for the entire period and for the two expansion/contraction periods. As previously reported, the AAR [0] for the entire sample is −13.38%. This compares to an −14.02% for the expansion periods and only −10.72% during the contraction periods. The difference in means test shows that the difference in returns of −3.30% is highly statistically significant and economically important. We also return the three-day event abnormal returns, CAAR [−1, 0, +1]. The results are very similar. The expansion period abnormal return of −14.95% and the contraction period abnormal return of −11.42% results in a statistically significant −3.53% difference. Investors do not expect negative news during periods of expansion and thus have stronger reactions.

Lastly, we examine the different announcement reactions over the business cycle using multivariate analysis. Specifically, we run an OLS regression of the Fama-French three-factor model abnormal returns on the event day, AAR [0], on the firm and announcement control variables. The pooled regression with estimated coefficients is:

$$AR(0)_{it} = -23.67 - 1.88BC_{it} + 5.08SOX_{-it} - 4.39VOL_{-it} - 0.30DISP_{it} - 0.03NEST_{it}$$

$$(2.12)^{***}(0.74)^{***}(0.61)^{***}(0.75)^{***}(0.09)^{***}(0.01)^{***}$$

$$+1.86MULTI_{it} + 0.18SIZE_{it} + 0.09ROA_{it} + 0.06LEV_{it} - 0.03MTB_{it} + \varepsilon_{it} \qquad (1)$$

$$(0.58)^{***}(0.02)^{***}(0.03)^{***}(0.01)^{***}(0.03)^{*}$$

Note that all the independent variables are statistically significant at the 1% level except the market-to-book ratio. Newey-West heteroskedastic and autocorrelation consistent estimators are used in the regression. Thus, after controlling for regulatory environment, earnings, and firm specific characteristics, the business cycle variable coefficient is significantly negative. This indicates that warning announcements in expansion periods illicit a stronger reaction than in contraction periods. The SOX variable coefficient of 5.08 testifies that financial regulation has reduced the market response to PWs. The volume coefficient of −4.39 shows that PWs trigger increased trading volume. Analysts' negative earnings estimates prior to PWs and its dispersion has a negative impact on abnormal returns. However, the magnitude of the coefficient of negative earnings estimate (NEST) is very small at −0.03 whereas the DISP factor is −0.30. Nonetheless, the evidence from these 2 variables corroborates the notion that negative and widely dispersed financial analysts' stock market recommendations

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[2] For example, Jackson and Madura (2003) study 245 PWs in the U.S. during 1998 to 2000 using the market model and find a −17.55 percent return during the event window (−1, 0, +1).

are associated with negative stock returns when firms announce PWs. Multiple warnings also have a positive impact on abnormal returns by a factor of 1.86. The overall fit of the equation judged by adjusted-R^2 is quite good at 41.67%. Similarly, the F-statistic which is a joint test of the statistical significance of all independent variables is significant at the 1% level and very high at 138.61.

In summary, we find that issuing a voluntary profit warning disclosure elicits a very strong negative market response. The reaction is much larger in magnitude than for firms issuing negative earnings surprises without issuing a warning. Lastly, the market reaction to PWs vary over the business cycle, with expansion periods experiencing more negative responses.

5. Additional test and robustness

5.1. Additional test

Here we report on an extension to our primary focus of PWs in expansion versus contraction periods. DeStefano (2004) classifies the economic expansion into three stages: recovery, growth, and boom. The NBER only defines peak and trough dates and does not date these individual stages within the expansion. Following DeStefano (2004), we implement these stages in chronological order and in equal time intervals from the trough-to-peak time periods. The purpose of the 3 stages is simply to break expansion periods into the recovery, growth, and boom stage so the effects within stage can be analyzed. Recall from Table 3 that the overall AAR [0] from the expansion period is −14.02%. Subdividing the expansion period results in AAR [0] of −12.10% in the recovery, −11.92% in the growth stage, and −15.95% during the boom. Note that the boom stage is the last stage of the expansion phase of the economy. This means that investment sentiment would have been building through the recovery and growth stages to reach a high level of optimism in the boom stage. Since investors are expecting good news during the boom, a PW comes as an especially bad surprise, creating an especially negative market reaction. Therefore, these results are consistent with our hypothesis.

5.2. Alternative specifications

We repeated the analysis with different empirical specifications, though the results are not tabulated to conserve space. First, we used Carhart's (1997) four factor model to compute abnormal returns. This model uses the Fama-French three factors and then adds a momentum factor. The event abnormal returns using the four factor model are nearly identical to the ones reported using the three factor model. For example, the AAR [0] is −13.38% for both models. The three-day cumulative average abnormal return, CAAR [−1, 0, +1], is −14.24% using the 4-factor model and −14.27% using the 3-factor model. Our tests indicate that the difference in means between the abnormal returns from the two models is not significant. It appears that our results are not driven by the choice of the underlying asset pricing model.

We also redo the analysis with a regression methodology that is robust to the existence of outliers. Specifically, we employ quantile regressions to understand the impact of explanatory variables on the dependent variables at different points of the distribution. Koenker and Basett (1978) developed quantile regressions, which is an extension of the classical least square estimation of the conditional mean to a collection of models for different conditional quantile functions. We implemented this regression methodology using the 0.20, 0.50 and 0.80 percentiles. We repeat the regression if Eq. (1) using quantile regressions centered around these three percentiles. The results are untabulated. The coefficient of our primary variable of interest, Business Cycle (BC), is negative in each of the three regressions. The estimates are statistically significant at the five percent level or better for the two regressions at the 0.50 and 0.80 percentiles. However, the coefficient is insignificantly negative around the 0.20 percentile. We interpret these results as the negative market reaction to PWs being significantly stronger during expansion periods. However, the reaction is only marginally stronger for the PWs that have extraordinarily large negative returns.

6. Conclusions

We provide empirical evidence that business cycles, financial regulations, analyst's forecasts and firm-specific attributes affect the market response to profit warnings. Firms that issue profit warnings experience negative abnormal returns during the announcement period. The negative stock market effects are substantially higher for PW firms compared with non-warning firms with negative earnings surprises. In addition, the negative abnormal returns start to accumulate prior to the announcement, indicating the occurrence of information leakage or market anticipation, or both. The impact of PWs has declined over time as the financial regulation of the Sarbanes-Oxley Act has integrated into business, increasing overall information transparency and thus reducing surprises.

During an economic expansion, theory suggests that investors come to expect good news as the norm and sentiment becomes optimistic. Thus, when bad news is announced, especially in an unscheduled voluntary disclosure like a PW, market participants are more surprised and forced to revise their prior beliefs. Thus, bad news is predicted to be met with a greater reaction during good times than during bad times. Our evidence supports this theory. Specifically, the announcement day abnormal return for a PW during an economic expansion is −14.02%, compared to just −10.72% during an economic contraction. These results are robust to event window size, asset pricing model choice, and regression specification. We also

find that the stock market reaction is the most negative late in the expansion, when investors have had more good times to build their optimistic sentiment.

Managers periodically know of important information that investors are likely to consider to be bad news, such as earnings that fail to reach market expectations. Those managers can let shareholder discover that information through regularly scheduled announcements, or they can choose to voluntarily disclose the problem early. While there may be good reasons to voluntarily disclose the information early, such as trying to reduce legal liabilities, there are also negative ramifications. First, the stock price reaction to the announcement is quite negative. Second, the stock market reaction is greater for profit warnings than for non-warned earnings misses. Lastly, the price reaction is significantly greater during economic expansions than during contractions. So managers may make different disclosure decisions throughout the business cycle. Further research in this area may consider a focus on the timing of the profit warning compared to announcements of other firms in the industry.

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