Earnings Volatility, Ambiguity, and Crisis-Period Stock Returns

by

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Abstract

Financial crises are typically marked by substantial increases in ambiguity where prices appear to decouple from fundamentals. Consistent with ambiguity-based asset pricing theories, we find that ambiguity concerns are more severe for firms with higher pre-crisis earnings volatility, causing investors to demand a higher ambiguity premium for such firms. While there is no relation between earnings volatility and stock returns under normal conditions, there is a significant negative relation between crisis-period stock returns and prior earnings volatility. In other words, during economic turmoil, investors punish stocks whose past earnings volatility was higher despite that they do not perceive these stocks to be riskier under stable economic conditions. Our findings indicate that a firm's past earnings volatility predicts its stock price performance during crisis periods. We also find that this relation is stronger in firms with low institutional ownership and low analyst-following, consistent with ambiguity concerns being more important for firms with a greater proportion of unsophisticated investors. Our results are robust to controlling for firm-level characteristics as well as industry-fixed effects. Our evidence suggests that earnings stability helps mitigate ambiguity-concerns during a financial crisis.

Keywords: Earnings volatility; Ambiguity; Financial Crisis; Stock Returns

1. Introduction

In the aftermath of the 2008 financial crisis, there has been increased interest in understanding the behavior of investors during periods of economic turmoil. This is due to findings that during periods of high uncertainty, stock prices appear to decouple from fundamentals, behaving in a manner not explained by standard asset pricing models [Epstein and Schneider (2008, 2010), Zhou (2015), Williams (2015)]. Therefore, accounting researchers have begun exploring how investors process earnings information under conditions of macroeconomic uncertainty. For example, Williams (2015) reports that following increases in market volatility, investors respond to negative earnings more strongly than to positive earnings.[2] In this study, we examine how an important earnings attribute – a firm's prior earnings volatility - affects investors' response to information during periods of economic turmoil. We report an intriguing finding - while there is no relation between earnings volatility and stock returns under normal conditions, there is a significant negative relation between crisis-period stock returns and prior earnings volatility.[3] In other words, during significant economic turmoil, investors punish stocks whose past earnings volatility was higher despite that they do not perceive these stocks to be riskier under normal conditions.[4] Our findings indicate that a firm's past earnings volatility predicts its stock price performance during crisis periods.

Our empirical tests are motivated by growing interest in theories based on "ambiguity" aversion that can potentially explain why investors appear to change their trading behavior when

[2] Recent work by Tang et al. (2015) also shows that when evaluating management's range-based forecasts, analysts tend to place greater weight on the lower endpoint of the range, suggesting that caution plays a role in how analysts evaluate range-based forecasts. The authors conclude that analysts' usage of differential rather than equal weights placed on endpoints of management forecasts is consistent with ambiguity based theories discussed below.
[3] Under standard asset pricing theory, only the systematic (undiversifiable) volatility (i.e., beta) of a firm's payoffs should determine prices, not overall volatility [Cochrane (2001)].
[4] This finding is robust to controlling for market betas and crisis period performance.

facing macroeconomic uncertainty. Intuitively, ambiguity is defined as uncertainty on the part of investors regarding their beliefs about future good or bad outcomes for investment assets. This type of uncertainty is differentiated from the traditional concept of risk where future outcomes can vary but investors are well informed about the probabilities of potential outcomes.[5] In formal ambiguity-based asset pricing models, a state of ambiguity is triggered by conditions of high macroeconomic uncertainty, causing investors to become unsure whether the past paradigm which defined their prior beliefs still applies to assets about which information quality is low. Under these conditions, investors behave as if they must choose from multiple sets of beliefs (multiple likelihood functions) when evaluating future outcomes and resort to a 'better safe than sorry' attitude towards investment assets. In formal models, this occurs because their subjective utility is maximized by resorting to the 'worst-case' likelihood function amongst possible likelihood functions during periods of high macroeconomic uncertainty. Their expectation under a 'worst-case' likelihood function is that bad news about a firm during economic turmoil is likely to persist while any good news is unlikely to persist.

The shift in investor focus towards 'worst-case' beliefs under conditions of economic turmoil motivates our central hypothesis. We hypothesize that investors demand an "ambiguity" premium during periods of economic crisis from firms whose earnings volatility was higher *prior* to the crisis. The intuition is as follows. In traditional asset pricing models, investors are assumed to possess high quality information about probabilities of payoffs so they do not face multiple likelihood functions. Therefore, under standard conditions, the risk-return relation is governed only by *systematic* risk; i.e., idiosyncratic volatility in value-relevant fundamentals

[5] This type of uncertainty was first identified by Knight (1921) and corroborated by Ellsberg (1961) via experimental evidence though capital markets studies have only recently begun accumulating empirical evidence on the implications of ambiguity for stock prices.

such as earnings does not matter. By contrast, the 'worst-case' scenario in ambiguity-based models depends upon total volatility, including idiosyncratic volatility in fundamentals such as earnings [Epstein and Schneider (2008)]. Therefore, we expect the ambiguity premium to be pronounced during periods of economic crisis for firms with higher earnings volatility. This implies a significant negative relation between crisis period stock returns and prior earnings volatility. Our empirical findings provide robust evidence confirming this hypothesis.

A major financial crisis typically involves significant increase in economic uncertainty which can cause investors to re-examine their prior beliefs [Greenspan (2004), Vayanos (2004), Caballero and Krishnamurthy (2008), Epstein and Schneider (2008), Bloom (2009), Easley and O'Hara (2010)].[6] To test our hypotheses, we focus on two prominent periods of significant economic turmoil in US markets. First, we test our hypotheses using data from the financial crisis of 2008 during which investors experienced substantial losses in an environment marked by substantial financial and economic shocks, leading to significant government intervention in the economy to restore confidence. In addition, we examine the financial crisis of 1982 which was also marked by substantial economic turmoil with significant volatility in inflation and interest rates. Using firms with available data over these periods, we find strong evidence that earnings volatility is negatively associated with crisis-period stock returns after controlling for standard measures of market risk. The intriguing aspect is that stock returns exhibit no significant relationship to earnings volatility prior to the crisis periods or during another placebo period that we examine. Moreover, we show that the results for the 2008 crisis are driven by firms with low institutional ownership and low analyst following, consistent with our second hypothesis that ambiguity concerns are mitigated for firms with a high proportion of well-

[6] Boyarchenko (2012) attributes spikes in CDS spreads during the 2008 financial crisis to increases in ambiguity.

informed and sophisticated investors. These results remain strong despite controlling for multiple firm characteristics as well as industry level fixed effects.

The research question we address is important for several reasons. First, a growing literature examines the determinants of stock price performance in crisis periods [Mitton (2002), Lemmon and Lins (2003), Tong and Wei (2008), Francis et al. (2013), Balakrishnan, Watts, and Zuo (2015)]. We contribute to this literature by identifying earnings volatility which contains a significant idiosyncratic component as an important fundamental attribute that becomes relevant during a financial crisis. Second, crisis periods provide a unique opportunity to investigate the effects of ambiguity on investor behavior and the role of accounting information under periods of economic stress. Prior work on ambiguity in capital markets research and especially in accounting is very sparse. To our knowledge, Williams (2015) is the first accounting study that provides evidence on ambiguity aversion by studying asymmetric responses to earnings news in the presence of market uncertainty. We add to the relevance of this nascent literature in accounting. Third, prior work finds that, in general, earnings volatility does not affect stock returns [McInnis (2010), Frankel and Litov (2014)] though there is mixed evidence on the effects of earnings volatility on firm values [Rountree et al. (2008), Allayannis and Simko (2009)]. Yet, to our knowledge, no prior study has investigated the potential effects of earnings volatility on stock prices during crisis periods. This is despite that survey evidence suggests that managers strongly dislike earnings volatility because they believe that it makes investors more uncertain about the firm's future performance [Graham et al. (2005)].

We also test two potential alternative explanations for our results. First, our hypothesized effects of earnings volatility on stock returns operate through the discount rate (i.e. the ambiguity premium). An alternative explanation for our results is that the relation we observe operates

through cash flow effects associated with earnings volatility. More specifically, it is plausible that firms with stable earnings are better able to withstand the effects of a crisis on their cash flows by avoiding distortions in investment policies. If this explanation is valid, then we ought to observe that earnings volatility is negatively associated with crisis-period operating cash flows or capital expenditures. We do not find any evidence to support this alternative explanation.

A second alternative explanation for our results is based on the finding in Balakrishnan et al. (2015) that conservatism mitigates distortions in investment policy during a crisis and that firms with more conservative accounting have smaller stock price declines during the 2008 financial crisis. If firms with conservative accounting have more stable earnings (or low earnings volatility) then our results could be picking up the conservatism effect. To test for this alternative explanation, we include a control for conservatism (the Khan and Watts (2009) C scores) in our tests. We find that the negative relation between earnings volatility and crisis-period returns is robust to this control. Thus, our results are also not attributable to conservatism. Overall, there is no support for either alternative explanation for our findings.

The remainder of the paper is organized as follows. Section 2 presents our hypothesis development and section 3 presents the research design and sample selection. We discuss our results in sections 4 and 5; section 6 concludes.

2. Hypothesis Development

Our hypotheses are based on theories that explain individual behavior under ambiguity [Knight (1921), Gilboa and Schmeidler (1989), Bewley (2002)]. Knight (1921) was the first to clarify the distinction between two dimensions of uncertainty faced by economic agents. The two dimensions are 1) the standard notion of risk defined as the potential for uncertain future

outcomes each with a *known* probability and 2) ambiguity defined as uncertainty regarding the probabilities of outcomes. Experimental work by Ellsberg (1961) showed that human beings change their behavior when the setting changes from one of known probabilities to one where probabilities of outcomes are unknown. An important implication of Ellsberg's work was that individuals exhibit an additional degree of aversion to uncertainty in the latter setting when moved to situations where probabilities of outcomes were known. This work laid the foundation for subsequent models that incorporate the ambiguity type of uncertainty to study the impact on behavior of investors [for example, Gilboa and Schmeidler (1989), Epstein and Schneider (2008)] with the implication that ambiguity averse investors potentially require an additional premium. Building on this line of research, Chen and Epstein (2002) analytically show that excess returns for a security can be expressed as the sum of the standard risk premium and an additional ambiguity premium when ambiguity is present. In their review and synthesis of models of ambiguity, Epstein and Schneider (2010) note that a common theme in all such models is that ambiguity averse investors demand an additional ambiguity premium in equilibrium on assets with uncertain returns.

Given that the nascent literature on ambiguity aversion continues to develop and capital market evidence on ambiguity is scarce, we do not rely on an individual model to develop our hypotheses but instead rely upon a generic implication of ambiguity based models.[7] These models typically propose that over time, an investor learns about the probability distribution of outcomes based on experience under stable economic conditions. For example, in a stock pricing setting, the investor relies on a volatile fundamental indicator such as earnings to assess the market value of a stock. In the simplest setting, the investor is interested in determining the

[7] Guidolin and Rinaldi (2013) provide a thorough review of ambiguity based models in the capital markets setting.

expected value (the mean) and variance of the earnings distribution.[8] In the absence of ambiguity, investors develop knowledge of this distribution by observing earnings outcomes over time. However, when ambiguity arises due to a significant uncertainty shock, the investor faces the possibility that the perceived probabilities and therefore the parameters of the distribution may no longer be the same. More simply, this can be stated as investors facing renewed uncertainty about the *probabilities* of future outcomes and therefore the expected (mean) earnings. Models of ambiguity aversion make predictions about how investors respond to new information under these conditions. The most important prediction of these models is that investors no longer rely on the probability distribution they perceived prior to the uncertainty shock but instead behave as if to choose a new probability distribution of earnings. Under these circumstances, ambiguity aversion causes them to behave with caution and resort to the probability distribution that reflects the worst-case scenario. This is equivalent to relying on the probability distribution that has a lower mean (i.e., lower expected earnings), than the distribution perceived prior to the uncertainty shock [Epstein and Schneider, 2008].

Based on the implications of ambiguity based models discussed above, we argue that we can link the investors' assessment of the "worst" case scenario to the volatility in fundamentals such as earnings that investors observed *prior* to the uncertainty shock. Our reasoning is straightforward. Ambiguity-based models imply that when ambiguity arises and investors become uncertain about probabilities, they choose the probability distribution that potentially reflects the worst-case scenario where the mean of the earnings distribution is lower than previously assessed. We argue that to assess the "worst-case" scenario for a given firm,

[8] Given a normal distribution, knowing the mean and variance of the distribution is equivalent to knowing the probability distribution, i.e. the probabilities of potential outcomes.

investors rely on their prior experience with the firm's earnings volatility prior to the uncertainty shock. The mean of the worst-case probability distribution is more likely to be perceived as lower for firms that have previously exhibited higher volatility (i.e., potential for greater downside). In other words, given the realm of possibilities the investor perceives, the stocks where the perceived earnings mean is assessed to be lower are firms where investors have previously perceived greater potential downside. This prediction links an important attribute of earnings, i.e. the volatility of earnings, to the investors' response to information given significant uncertainty shocks; i.e., under conditions of ambiguity.

Significant uncertainty shocks in the models discussed above play an important role in triggering ambiguity because the shock has to be large enough so that investors believe that the economic paradigm has potentially changed; i.e., they are no longer confident in their prior assessment of the probability distribution of future earnings. We exploit the setting of a financial crisis to study the effects of ambiguity on investor interpretation of earnings volatility because a number of researchers suggest that a financial crisis typically involves significant increases in ambiguity [Vayanos (2004), Caballero and Krishnamurthy (2008), Epstein and Schneider (2008), Bloom (2009), Easley and O'Hara (2010)]. More specifically, Boyarchenko (2012) attributes spikes in CDS spreads during the 2008 financial crisis to increases in ambiguity. Also, Zhou (2015) argues that times of financial panic are times of high ambiguity. Furthermore, Caballero and Krishnamurthy (2008) argue that financial crises involve a reevaluation of models. The increase in ambiguity together with a reevaluation of models suggests a potential link between earnings volatility and stock returns.

Taken together the arguments above suggest that pre-crisis earnings volatility exacerbates ambiguity concerns in a financial crisis and thus firms that have prior volatile earnings should

exhibit higher "ambiguity premiums" and larger stock price declines than firms that previously exhibited stable earnings. This leads to our first hypothesis:

H1*: Pre-crisis Earnings volatility is negatively related to stock returns in a financial crisis.*

To supplement tests of our first hypothesis, our second hypothesis extends the first hypothesis by examining how the relation between earnings volatility and crisis period returns varies with the degree of investor or financial statement user sophistication. Williams (2015) argues that unsophisticated investors are more likely to choose more extreme probability distributions during periods of ambiguity. He hypothesizes and documents that asymmetric responses to earnings news in periods of ambiguity are more pronounced for firms with a high proportion of unsophisticated investors. Building on this insight, we expect ambiguity concerns associated with earnings volatility to be particularly severe for firms with a high proportion of unsophisticated investors or users of financial statements. In contrast, for firms with a high proportion of sophisticated investors or users, we expect the negative relation between earnings volatility and crisis-period returns to be mitigated.

Our second hypothesis can be stated as follows:

H2: *Investor sophistication mitigates the negative relation between earnings volatility and crisis period stock returns.*

3. Research Design and Sample

3.1 Measurement of Event Period Stock Returns

Since our primary objective is to explore the cross-section of returns during specific economic events (e.g. December 2007 to June 2009), we measure the total change in a firm's value using the sample period buy-and-hold abnormal returns (BHAR). This measure is the

simple difference between the compound holding period return and the value-weighted market return:

$$BHAR_i = \prod_{t=December\ 2007}^{June\ 2009} (1 + RET_i) - \prod_{t=December\ 2007}^{June\ 2009} (1 + VWRETD_t)$$

where RET_{it} is the monthly raw return of firm i at time t; and $VWRETD_t$ is the value-weighted market return in the same month.

Holding period returns are used in a number of papers studying the determinants of crisis period performance. Our research design is similar to Beltratti and Stulz (2009), who examine a single cross section of holding period returns (July, 2007 to December, 2008) in order to investigate how firm characteristics explain the performance of banks during the financial crisis. Similarly, Falenbrach and Stulz (2011) investigate the determinants of holding period returns for banks (July 1, 2007 to December 31, 2008), when regressed on various measures of bank executive compensation. Francis et al. (2013) similarly use a single cross section of holding period returns over the financial crisis (October 2007 to March 2009) in order to investigate the extent to which accounting conservatism affected shareholder value during the crisis. The primary advantage of using holding period returns, as argued by Fahlenbrach and Stulz (2011), is that we can explain cross sectional variation in performance using a large number of determinants in a multivariate regression design.

A potential alternative to using firm level holding period returns is to examine the time-series of an investment portfolio created on the basis of some firm characteristic or event (e.g. earnings volatility at the beginning of the crisis). Abnormal returns would then be evaluated as the intercept (e.g. alpha) from the regression of portfolio returns on known risk factors. The disadvantage of the time-series approach is that this method might fail to measure significant

abnormal returns if abnormal performance primarily exists in months of heavy event activity, but is weak in other months [Mitchell and Stafford (2000)]. This disadvantage is especially problematic in our research design since the financial crisis might not affect all firms equally each month. Firm-level BHAR is the better measure of average holding return from the beginning to the end of the sample period, and best represents investors' actual investment performance when compared to periodic (monthly) rebalancing of portfolios. Given these arguments, the use of holding period returns is more common in the crisis period literature [e.g. Beltratti and Stulz (2009), Falenbrach and Stulz (2011), Francis et al. (2013)].

3.2 Measure of Earnings Volatility

We measure earning volatility as the standard deviation of the firm's five year history of earnings, ending just prior to the sample period over which returns are measured. Earnings are defined as income before extraordinary items (IB) divided by total assets (AT). The advantage of measuring earnings volatility in the period prior to the crisis period is that this eliminates the possibility of simultaneity in our tests. Such a concern would arise if managers used discretion to reduce earnings volatility in response to stock returns. Rather, the measure should be interpreted as the earnings history observed by market participants prior to the beginning of each returns window. Because our volatility measure is strictly positive and highly skewed, we take the natural logarithm for our empirical tests, which significantly decreases the influence of the skew.[9]

3.3 Sample

[9] There are several advantages to taking the log transformation of the earnings and cash flow volatility measures. While it is common in the literature to take the decile rank of this measure [Francis et al. (2004), McInnis (2010)], taking the log preserves the measure on a continuous scale. A Box-Cox regression (untabulated) confirms that a level-log model best captures the relation between earnings volatility and buy-and-hold returns.

We test our hypotheses over two prominent periods of economic crisis in recent history, including the most recent crisis of 2008 and the financial crisis of 1982. We study the 2008 crisis because it resulted in the worst recession since the Great Depression. The primary motivation for selecting the 1982 crisis as our second crisis is that no other recessionary period in the last 30 years lasted nearly as long as the 2008 crisis or the 1982 recession. The National Bureau of Economic Research (NBER 2013) identifies the dates of each economic crisis.[10] The first period of economic crisis began July 1981 and ended November 1982 for a total of 17 months. Similarly, the second period of economic crisis began December 2007 and ended June 2009 for a total of 19 months.

We also examine the relation between earnings volatility and stock returns during each period of non-crisis preceding our crisis period events. Our hypothesis does not predict a relation between earnings volatility and stock returns during periods of non-crisis, and therefore we do not expect to find a relation during the pre-crisis period. We select the non-crisis samples as the length of time immediately preceding each crisis periods, where the dates of the non-crisis periods are selected in order to match the same number of months as the corresponding crisis period. For example, the first period of crisis began in July 1981 and ended in November 1982 for a total of 17 months. Accordingly, we identify the corresponding period of non-crisis immediately preceding the 1982 crisis as beginning February 1980 and ending June 1981, also for a total of 17 months. Similarly, the second period of economic crisis began December 2007 and ended June 2009 for a total of 19 months. Therefore, we identify the corresponding period of

[10] The National Bureau of Economic Research (NBER) Business Cycle Dating Committee identifies the dates of recession as the period of economic decline. The Committee does not have a fixed rule for identifying economic peaks and troughs but rather applies its judgment using inputs including Gross Domestic Product (GDP), Gross Domestic Income (GDI), economy-wide employment, and the Federal Reserve's index of industrial production (IP). A comprehensive list of metrics is compiled at made available at the NBER's website.

non-crisis immediately preceding the 2008 crisis as beginning May 2006 and ending November 2007.

We obtain all observations at the intersection of Compustat and CRSP during each of the two periods under study. We eliminate observations with negative assets, equity, shares outstanding, or stock price. If a firm delists during the sample, then the holding period returns are forced to -100%.[11] We also eliminate utilities (SIC: 4400-4999) and financial industries (SIC: 6000-6499). The total number of observations available within each of the two samples is reported in the tables. All continuous variables are winsorized at 1% and 99% in order to reduce the influence of outliers.[12]

3.4 Control Variables

As noted earlier, we focus on earnings volatility as our primary variable of interest because Dichev and Tang (2009) show that this has a greater effect on earnings predictability than operating cash flow volatility. However, we also include operating cash flow volatility as an explanatory variable to allow for the possibility that this may have an incremental effect beyond earnings volatility. Cash flow volatility is measured analogously to earnings volatility, and is the logarithmic transformation of the standard deviation of the firm's five-year history of cash flows from operations.

We also include other control variables common in the economic crisis literature [Mitton (2002), Lemmon and Lins (2003), Francis et al. (2013), Balakrishnan, Watts, and Zuo (2014)] in order to capture additional factors that might influence stock price performance. The first control is *Leverage*, measured as the sum of short-term and long-term debt, all scaled by total assets. Highly levered firms are more likely to experience value losses during economic crisis. The

[11] Our results are robust to dropping delisted firms during each sample period.
[12] No single observation in our main regression has a Cook's D greater than 1.00.

second control is *Cash Holdings*, measured as the balance of cash and cash-equivalents scaled by total assets. Firms with more cash on hand prior to the economic crisis are less likely to experience a capital shortage and associated loss of value during a crisis. The third control is *Sales Growth*, measured as the compound annual growth in revenue over the same five-year period that earnings volatility is measured over. Firms with high sales growth may be better able to withstand crisis period shocks. The fourth control is *Tangibility*, calculated as the balance of gross plant, property, and equipment, all scaled by total assets. Firms with higher tangibility can use their assets as collateral during periods of financial crisis. The fifth control is *Return on Assets*, measured as net income before extraordinary items scaled by lagged total assets. Firms with high return-on-assets are likely to use their assets more efficiently and therefore fare better during economic crisis. We also control for the common risk factors of *Firm Size*, *Market-to-Book*, and market *Beta*. In addition, we control for a lagged value of the BHAR to take into account potential momentum effects. The lagged BHAR control is measured over the same number of months as the event window (e.g. crisis period), but ending with the month immediately before the event.

Finally, we include industry dummies using the SIC two-digit classification code for sample periods after 1989, which is when industry membership data is available in Compustat. Appendix A further defines these and the remainder of variables used throughout this paper.

All control variables are measured using the most recent financial statement information available just prior to the beginning of the returns window. This ensures that there is no overlap in the period we use to measure the control variables and the period we use to measure the stock returns. For control variables measured as of a point in time (e.g., firm size, market-to-book), we use the most recent set of financial statements within 12 months prior to the start of the returns

window. For control variables measured over a long period of time (sales growth, and market beta), we use the firms' history of financial statements ending within 12 months prior to the start of the returns window. This design feature reduces the likelihood of simultaneity in our study. Appendix B details the beginning and end of each of the control and return windows used.

4. Empirical Results

4.1 Descriptive Statistics

Table 1, Panel A, reports the descriptive statistics for the sample periods used in our main results. The first variable is the market adjusted holding period return, which is the difference between raw returns and the value-weighted market return. If we examine raw returns, then the mean and median average returns during the crisis period are -34% and -38%, respectively. Our results are comparable to the crisis period returns reported by Balakrishnan, Watts, and Zuo (2015), who report a mean of -32% and a median of -36% during the same period. Negative returns were pervasive across all firms in the economy during this crisis. Only the top decile of firms in our sample avoided any holding period losses, while the bottom decile of firms lost more than 75% of their stock value. Therefore, the 2008 crisis sample period was a clear shock to the economy that resulted in the repricing of many stocks to a lower value. The majority of the remaining descriptive statistics are qualitatively similar in all periods, which suggests a comparable cohort of firms in each sample.

We also report the descriptive statistics for our measure of earnings volatility in the same table. The average value of our earnings volatility measure is negative because of the log transformation. One interesting observation is that earnings are less volatile than cash flows, on average. This inference is similar to prior studies [Jayaraman (2008)] that also report the distribution of earnings volatility.

Table 1, Panel B, presents the descriptive statistics during the 2008 pre-crisis period. The table suggests that earnings and cash flow volatility was comparable during the 2008 pre-crisis period and the crisis period. Regardless, we still observe large variation in earnings volatility across firms.

4.2 Multivariate Regression Results

We test the relation between earnings volatility and sample periods returns, while controlling for firm characteristics, with the following regression design:

$$BHAR_{i,t} = \beta_0 + \beta_1(Earnings\_Volatility_{,t-1}) + \beta_2(Cash\_Flow\_Volatility_{,t-1}) + \beta_3(Cash\ Holdings_{i,t-1}) + \beta_4(Tangibility_{i,t-1}) + \beta_5(Firm\ Size_{i,t-1}) + \beta_6(MTB_{i,t-1}) + \beta_7(ROA_{i,t-1}) + \beta_8(Sales\ Growth_{i,t-1}) + \beta_9(Beta_{i,t-1}) + \beta_{10}(Leverage_{i,t-1}) + \beta_{11*}(Lag\ BHAR_{i,t-1}) + \beta_*(Industry\ Dummies) + \varepsilon \quad (1)$$

This model represents a single cross-section of firms in each sample period, where the explanatory variables are measured immediately before the sample period begins, and is similar to other studies on the financial crisis (Francis et al. 2013). The main coefficient of interest is β_1, which measures the effect of earnings volatility on sample period returns. Under H1, we expect this coefficient to be statistically significant and positive in crisis period samples, but not otherwise. Industry fixed effects are included.

Table 2 reports the results of estimating equation (1) within each of the 1982 and 2008, crisis and pre-crisis periods. The coefficient on earnings volatility is statistically significant and negative in each crisis period, but not statistically significant in either pre-crisis period. The results suggest that firms with greater pre-crisis earnings volatility experience greater downward revision of their values during the crisis period, consistent with an ambiguity premium. The results are economically meaningful as well. Similarly, the economic effect for the 1982 crisis is

similar suggests that a firm moving from the first to the third quartile of earnings volatility would experience a greater than 12% decrease in firm value. Collectively, these results are consistent with our primary hypothesis: pre-crisis earnings volatility is negatively related to stock returns in an economic crisis. An interesting observation is that the coefficient on cash flow volatility is not statistically significant in either period, which suggests that cash flow volatility does not create additional ambiguity concerns.

4.3 Tests of the Effect of Investor Sophistication

Our second hypothesis predicts that the relation between earnings volatility and crisis period holding returns is mitigated by the presence of sophisticated investors. One potential proxy for the presence of sophisticated investors is analyst following [Lang and Lundholm (1996), Hong, Lim, and Stein (2000), Gleason and Lee (2003)]. If sophisticated investors do not suffer from the ambiguity created by earnings volatility, then greater analyst following ought to mitigate the ambiguity created by earnings volatility during crisis periods.

The second additional proxy for the presence of sophisticated investor is the level of institutional ownership, as in Williams (2015). We characterize firms with a high percentage of institutional ownership as a proxy for the presence of sophisticated investors because institutional investors have incentives to accumulate private information and incorporate this private information in price. Previous empirical literature supports this notion. El-Gazzar (1998) demonstrates that the market reaction to earnings news is smaller when institutional ownership is high, which suggests that earnings contain less new information. Consistent with this finding, Jiambalvo et al. (2002) find that the extent to which stock prices lead earnings is positively related to the percentage of institutional ownership, which is consistent with the hypothesis that institutional owners use non-earnings information to predict future earnings. To the extent that

high institutional ownership indicates the presence of sophisticated investors and less reliance on ambiguous information, we expect the relation between earnings volatility and crisis period returns will be mitigated when institutional ownership is high.

In order to test our predictions, we first split the sample into two subsamples based on the median of analyst following and institutional investors, respectively. Because the data on both analyst following and institutional investors is not available for the 1982 sample periods, we restrict these tests to the 2008 crisis and pre-crisis periods. We expect that firms with greater analyst following will have more sophisticated investors than firms with low analyst following. Similarly, we expect that firms with a higher percentage of institutional ownership will tend to have a higher proportion of sophisticated investors, while firms with low percentage of institutional ownership will not.

Panel A of table 3 presents the results of splitting the 2008 pre-crisis and crisis samples by analyst following. With respect to the pre-crisis period, the coefficient on earnings volatility is not statistically significant in either model, which is consistent with our main results discussed above, and continues to suggest that earnings volatility is not associated with any change in firm value in the pre-crisis period. With respect to the crisis period, the coefficient on earnings volatility is statistically significant and negative amongst firms with low analyst following, but not statistically significant amongst firms with high analyst following. The results are consistent with our second hypothesis, which suggests that the earnings volatility exacerbates ambiguity concerns especially for firms with a high proportion of unsophisticated investors.

Panel B of table 3 presents a similar set of results when the 2008 pre-crisis and crisis samples are split by institutional ownership. With respect to the pre-crisis period, the coefficient on earning volatility is not statistically significant in either model, which continues to support the

inference that earnings volatility is not associated with a revision of firm value before the crisis. With respect to the crisis period, the coefficient on earnings volatility is statistically significant and negative amongst firms with low institutional ownership, but not statistically significant amongst firms with high institutional ownership. The results are once again consistent with our second hypothesis, and suggest that the ambiguity concerns associated with earnings volatility during crisis periods are mitigated for firms with sophisticated investors.

5. Robustness Tests

In this section, we examine two potential alternative explanations for the primary findings in this study.

5.1 Cash Flow Effects Related to Earnings Volatility

Our hypothesized effects of earnings volatility on stock returns operate through a potential ambiguity premium. As mentioned earlier, an alternative explanation for our results is that the relations we observe operate through cash flow effects associated with earnings volatility. More specifically, it is plausible that firms with stable earnings are better able to withstand the effects of a crisis on their cash flows by avoiding distortions in investment policies. If our results are attributable to firm performance or cash flows rather than ambiguity, then we would expect to find a statistically significant relationship between earnings volatility and variables proxying for firm performance or operating cash flows and investment during the crisis period. We select three variables measured over the crisis periods to test this conjecture. We use capital expenditures as a proxy for firm level investment, cash return on assets as a measure of cash profitability, and cash dividends paid as a proxy for payout policy. We measure all variables at the end of each sample period. For example, we measure 2008 crisis period dividends at the end of the financial crisis.

Panel A of table 4 presents the results of estimating the relation between lagged earnings volatility each of the three crisis-period performance variables during the 1982 crisis period, while panel B presents the results of estimating the same during the 2008 crisis period. Overall, the coefficients on earnings volatility are generally insignificant, which suggests that earnings volatility is not related to crisis period accounting performance or cash. In other words, there is little evidence that the effects we observe are driven by potential crisis-period cash flow effects associated with earnings volatility rather than due to an ambiguity premium as we hypothesize.

5.2 Alternative Explanation – Accounting Conservatism

Balakrishnan, Watts, and Zou (2015) find a positive association between crisis period returns and the level of accounting conservatism. If firms with conservative accounting have more stable earnings (or low earnings volatility) then our results could be picking up the conservatism effect documented in their study. To test for this alternative explanation, we include a control for conservatism (the Khan and Watts C-score) in our tests. In all cases (untabulated) our inferences are unaffected by controlling for conservatism which suggests that earnings volatility has a distinct effect on crisis period returns separate from the effect of accounting conservatism.

5.3 Additional Placebo Test

A potential concern with studying pre-crisis periods is that they are likely to be economic boom periods. Thus, the effects in these pre-crisis periods may not be generalizable to other periods. To shed light on this issue, we select a third non-crisis period as the 12 months in calendar year 1995. We select 1995 because this year is the most distant from any period of financial crisis identified by the NBER. We then regress the holding period returns against earnings volatility and controls for this non-crisis period similar to our main tests. Because

ambiguity concerns are unlikely to be important in normal times, we do not expect earnings volatility to have an effect on returns in this placebo period. Consistent with our expectations, the coefficient on earnings volatility (untabulated) is not statistically significant in this additional placebo test. This result is consistent with the broader result in the accounting literature that earnings volatility does not affect stock returns in general as shown by Frankel and Litov (2009) and McInnis (2010).

6. Conclusion

We hypothesize that pre-crisis earnings volatility exacerbates ambiguity concerns in a financial crisis. Thus, we expect firms with high earnings volatility to have a higher ambiguity premium and therefore greater stock price decline during a crisis. We document evidence of a significant negative relation between earnings volatility and crisis period stock returns during the recent 2008 crisis and an earlier 1982 crisis. Furthermore, we find that in the 2008 crisis these effects are stronger for firms with a higher proportion of less sophisticated investors (i.e. for firms with lower analyst coverage, and firms with lower institutional ownership). Finally, we document that earnings volatility does not affect returns in non-crisis or placebo periods.

Our results are consistent with the existence of an ambiguity premium in stock markets during crisis periods as suggested by prior theoretical work [Chen and Epstein (2002), Epstein and Schneider (2010)] and empirical work (Williams, 2015). Our principal contribution is to identify an important attribute of earnings, i.e. volatility, that has a material impact on stock returns during a crisis. Our results also contribute to the literature on determinants of stock price performance during crisis periods [Balakrishnan et al. (2015)].

While our findings are consistent with the notion that investors respond to periods of heightened ambiguity by punishing more stocks with higher prior earnings volatility, we note the

caveat that we do not measure ambiguity directly because it is an inherently difficult endeavor. As in several recent studies, we instead rely on periods of heightened ambiguity. As in those studies, there remains the possibility that our findings can be attributed to some other type of risk that existing literature has not yet identified.

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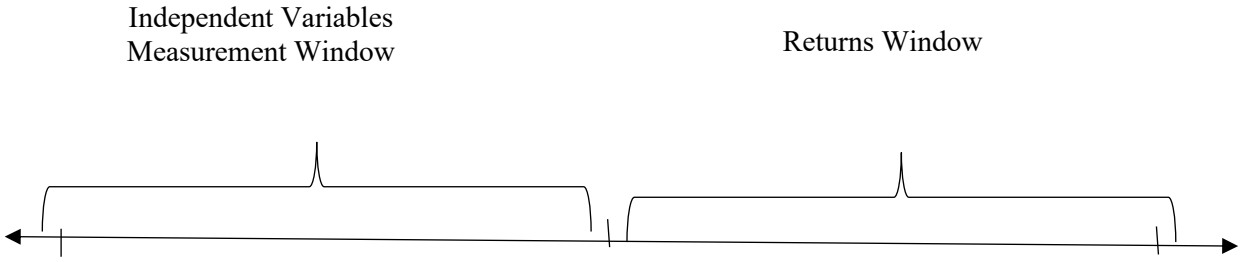
Appendix A - Variable Definitions

Buy and Hold Returns	Calculated for each firm as the product of monthly raw returns (1+RET) minus the product of the value weighted market return (1+VWRETD). The holding period returns are measured over the sample period windows defined by Appendix B. (CRSP)
Lagged Buy and Hold Return	The historical buy-and-hold return (BHAR) measured over the same number of months as the event window (e.g. crisis period), but ending with the month immediately before the event.
Log Earnings Volatility	Calculated as the natural logarithm of the standard deviation of earnings over a five-year horizon, ending in the year before the returns window. Earnings is calculated as income before extraordinary items (IB) scaled by total assets (AT). We require the firm to have all the complete five-year history of earnings to calculate this variable. (COMP)
Log CFO Volatility	The natural logarithm of the standard deviation of cash flow over a five-year horizon, ending in the year before the returns window. Cash flow is calculated as cash flow from operations (OANCF) if the Statement of Cash Flow is available, or else calculated as income minus Accruals, where accruals is as defined below. Cash flow is scaled by total assets, and we require the firm to have the complete five-year history of cash flow to calculate this variable. (COMP)
Accruals	Calculated as the change in current assets (ACT) minus the change in cash (CHE) minus the change in current liabilities (LCT) plus the change in current liabilities (DLC) minus depreciation expense (DP). (COMP)
Leverage	The sum of short term debt (DLC) plus long term debt (DLT) all scaled by total assets (AT). (COMP)
Cash Holdings	Total cash and cash equivalents (CHE) scaled by total assets (AT). (COMP)

Tangibility	Total plant, property and equipment (PPEGT) scaled by total assets (AT). (COMP)
Firm Size	Natural log of total assets (AT). (COMP)
MTB	Product of year-end share price (PRCC_F) and shares outstanding (CSHO), all scaled by book-value of equity (CEQ). (COMP)
ROA	Income before extraordinary items (IB) all scaled by total assets (AT). (COMP)
Sales Growth	Natural log of the ratio of current year sales (SALE) to prior year sales. (COMP)
Beta	Calculated over a five-year historical horizon ending in the year before the returns window, using OLS regression of monthly stock returns (RET) on the market value-weighted returns (VWRETD). (CRSP)
Cash Flow	Cash flow from operations (OANCF) scaled by assets (AT), where cash flow is as defined above. (COMP)
CAPX	Annual capital expenditures from the Statement of Cash Flows (CAPX), scaled by total assets (AT). (COMP)
Dividends	Cash dividends paid from (DIV), scaled by total assets (AT). (COMP)
Analyst Following	The count of the number of unique analysts (ANALYS) following the firm. Stale forecasts greater than 90 days old are not included in the count. Missing values are set equal to zero. (IBES)
Institutional Ownership	The percentage of all shares outstanding owned by institutional investors. (Thompson Reuters s34 Institutional Holdings)

APPENDIX B
Returns Window Definitions



	Sample Period	Independent Variables Measurement Window Begin	Independent Variables Measurement Window End	Returns Window Begin	Returns Window End
1	1980's Crisis	July 1980	June 1981	July 1981	November 1982
2	2000's Crisis	December 2006	November 2007	December 2007	June 2009

Table 1

Panel A: Summary Statistics over 1982 Pre-Crisis and Crisis Sample Periods

	Pre-Crisis (February 1980 - June 1981)					Crisis Period (July 1981 - November 1982)				
	Mean	SD	Q1	Median	Q3	Mean	SD	Q1	Median	Q3
Buy and Hold Returns	0.19	0.71	-0.26	0.02	0.43	-0.01	0.58	-0.39	-0.07	0.28
Log Earnings Volatility	-3.95	1.26	-4.64	-3.90	-3.19	-3.99	1.26	-4.67	-3.92	-3.19
Log of CFO Volatility	-2.85	0.89	-3.38	-2.84	-2.32	-2.88	0.88	-3.42	-2.89	-2.35
Leverage	0.28	0.20	0.14	0.26	0.41	0.27	0.19	0.12	0.24	0.39
Cash Holdings	0.09	0.11	0.02	0.05	0.12	0.11	0.14	0.02	0.05	0.14
Tangibility	0.56	0.34	0.31	0.51	0.80	0.55	0.34	0.31	0.51	0.79
Firm Size	4.40	2.11	2.90	4.20	5.78	4.37	2.19	2.77	4.17	5.84
MTB	1.67	3.05	0.65	0.96	1.64	2.43	4.05	0.70	1.16	2.46
Sales Growth	0.16	0.27	0.08	0.15	0.25	0.14	0.30	0.02	0.12	0.23
Beta	1.24	0.68	0.81	1.17	1.61	1.21	0.62	0.80	1.17	1.58
ROA	0.04	0.11	0.02	0.05	0.09	0.03	0.13	0.01	0.05	0.08
Lagged BHAR	0.03	0.64	-0.31	-0.10	0.22	0.18	0.87	-0.27	0.00	0.37

Panel B: Summary Statistics over the 2008 Pre-Crisis and Crisis Sample Periods

	Pre-Crisis (May 2006 - November 2007)					Crisis Period (December 2007 - June 2009)				
	Mean	SD	Q1	Median	Q3	Mean	SD	Q1	Median	Q3
Buy and Hold Returns	-0.13	0.53	-0.45	-0.17	0.08	0.02	0.35	-0.21	-0.01	0.21
Log Earnings Volatility	-2.93	1.32	-3.90	-3.05	-2.04	-3.01	1.28	-3.90	-3.08	-2.17
Log of CFO Volatility	-2.92	1.00	-3.55	-2.96	-2.32	-2.95	1.01	-3.60	-3.01	-2.38
Leverage	0.20	0.22	0.00	0.14	0.31	0.20	0.22	0.00	0.14	0.32
Cash Holdings	0.23	0.24	0.04	0.14	0.36	0.23	0.25	0.04	0.13	0.36
Tangibility	0.45	0.36	0.16	0.34	0.66	0.43	0.37	0.14	0.32	0.64
Firm Size	5.82	2.05	4.33	5.77	7.24	5.95	2.04	4.46	5.89	7.39
MTB	3.32	4.22	1.48	2.35	3.87	3.41	4.20	1.57	2.45	4.01
Sales Growth	0.16	0.35	0.01	0.11	0.25	0.15	0.34	0.02	0.11	0.25
Beta	1.20	1.02	0.45	0.97	1.74	1.23	1.01	0.50	1.04	1.77
ROA	-0.03	0.24	-0.03	0.04	0.08	-0.04	0.25	-0.03	0.04	0.08
Lagged BHAR	0.07	0.64	-0.23	-0.03	0.22	-0.09	0.60	-0.40	-0.15	0.11

Table 2
Regression of Holding Period Returns on Earnings and Cash Flow Volatility During 2008 Crisis and Pre-Crisis Periods

	1982 Crisis		2008 Crisis	
	Pre-Crisis Period	Crisis Period	Pre-Crisis Period	Crisis Period
Log Earnings Volatility	**0.014**	**-0.085*****	**-0.021**	**-0.026*****
	(0.017)	**(0.014)**	**(0.016)**	**(0.009)**
Log of CFO Volatility	0.012	0.006	-0.022	-0.005
	(0.019)	(0.017)	(0.022)	(0.011)
Leverage	0.027	0.118*	0.036	-0.122**
	(0.084)	(0.067)	(0.066)	(0.049)
Cash Holdings	0.210	0.199*	-0.001	0.095***
	(0.160)	(0.103)	(0.104)	(0.031)
Tangibility	-0.036	-0.058*	0.102*	0.008
	(0.039)	(0.033)	(0.055)	(0.027)
Firm Size	-0.058***	-0.013**	0.015	0.004
	(0.008)	(0.006)	(0.009)	(0.006)
MTB	-0.019**	-0.034***	0.003	0.002
	(0.009)	(0.004)	(0.003)	(0.002)
Sales Growth	0.089	-0.156***	-0.040	-0.015
	(0.065)	(0.045)	(0.049)	(0.020)
Beta	0.056**	-0.051**	-0.037**	-0.021*
	(0.023)	(0.020)	(0.015)	(0.010)
ROA	0.525**	0.374**	0.265***	0.049
	(0.223)	(0.160)	(0.061)	(0.060)
Lagged BHAR	0.002	0.039***	-0.003	-0.010
	(0.031)	(0.015)	(0.016)	(0.013)
Industry FE	No	No	Yes	Yes
Observations	3056	2948	2933	2716

Standard errors in parentheses. * p<0.1 **p<0.05 *** p<0.01

This table presents the results of regressing sample period buy and hold returns on our measure of earnings volatility and control variables. The control variables are measured immediately before the returns window. Variable definitions are according to Appendix A.

Table 3
Panel A: Relation Between Earnings Volatility on 2008 Crisis and Pre-Crisis Returns When Split by Analyst Following

	Pre-Crisis		Crisis	
	Low Analyst Following	High Analyst Following	Low Analyst Following	High Analyst Following
Log Earnings Volatility	**-0.034**	**-0.000**	**-0.047*** **	**0.004**
	(0.026)	**(0.016)**	**(0.014)**	**(0.012)**
Log of CFO Volatility	-0.025	-0.030	0.008	-0.016
	(0.028)	(0.020)	(0.015)	(0.014)
Leverage	-0.008	0.073	-0.139**	-0.079
	(0.103)	(0.095)	(0.057)	(0.066)
Cash Holdings	0.052	-0.080	0.024	0.145**
	(0.133)	(0.107)	(0.055)	(0.072)
Tangibility	0.142*	0.016	0.014	-0.006
	(0.071)	(0.056)	(0.039)	(0.048)
Firm Size	0.001	0.045**	-0.002	-0.005
	(0.014)	(0.018)	(0.008)	(0.007)
MTB	0.000	0.009*	0.002	0.001
	(0.003)	(0.005)	(0.003)	(0.002)
Sales Growth	-0.056	0.037	-0.017	-0.025
	(0.055)	(0.047)	(0.028)	(0.044)
Beta	-0.051**	-0.003	-0.006	-0.060***
	(0.022)	(0.022)	(0.016)	(0.016)
ROA	0.229***	0.269***	-0.005	0.107
	(0.074)	(0.088)	(0.060)	(0.118)
Lagged BHAR	0.011	-0.023	0.000	-0.018
	(0.020)	(0.027)	(0.013)	(0.022)
Industry FE	Yes	Yes	Yes	Yes
Observations	1517	1416	1378	1338

Standard errors in parentheses. * p<0.1 **p<0.05 *** p<0.01

This table presents the results of regressing holding period returns on earnings volatility and selected control variables. Holding period returns are measured over the dates defined in the paper, while control variables are measured immediately before each holding period. Standard errors are clustered on industry. Variable definitions are according to Appendix A.

Table 3
Panel B: Relation Between Earnings Volatility on 2008 Crisis and Pre-Crisis Returns When Split by Institutional Ownership

	Pre-Crisis Period		Crisis Period	
	Low Institutional Ownership	High Institutional Ownership	Low Institutional Ownership	High Institutional Ownership
Log Earnings Volatility	**-0.007**	**-0.017**	**-0.033****	**-0.007**
	(0.024)	**(0.016)**	**(0.015)**	**(0.012)**
Log of CFO Volatility	-0.040	-0.022	-0.002	-0.013
	(0.030)	(0.025)	(0.020)	(0.015)
Leverage	0.118	0.108	-0.121	-0.103
	(0.097)	(0.133)	(0.079)	(0.078)
Cash Holdings	0.056	-0.074	0.078	0.147**
	(0.099)	(0.141)	(0.049)	(0.064)
Tangibility	0.090	0.102*	0.000	0.037
	(0.096)	(0.055)	(0.049)	(0.045)
Firm Size	0.013	0.032*	-0.004	-0.001
	(0.013)	(0.017)	(0.009)	(0.009)
MTB	0.006*	0.005	0.003	-0.000
	(0.004)	(0.005)	(0.003)	(0.002)
Sales Growth	-0.014	-0.014	-0.012	0.059
	(0.049)	(0.097)	(0.048)	(0.042)
Beta	-0.021	-0.022	-0.012	-0.051***
	(0.031)	(0.020)	(0.015)	(0.017)
ROA	0.241**	0.408***	0.061	0.115
	(0.099)	(0.130)	(0.121)	(0.151)
Lagged BHAR	-0.028	-0.014	-0.009	-0.010
	(0.025)	(0.023)	(0.018)	(0.019)
Industry FE	Yes	Yes	Yes	Yes
Observations	1168	1165	1125	1125

Standard errors in parentheses. * p<0.1 **p<0.05 *** p<0.01

This table presents the results of regressing holding period returns on earnings volatility and selected control variables. Holding period returns are measured over the dates defined in the paper, while control variables are measured immediately before each holding period. Standard errors are clustered on industry. Variable definitions are according to Appendix A.

Table 4

Panel A: Cash Flow Effects During the 1982 Crisis Period

	Cash Flow		CAPX		Dividends	
Log Earnings Volatility	**0.004**	**(0.003)**	**0.001**	**(0.001)**	**-0.001***	**(0.000)**
Log of CFO Volatility	-0.004	(0.004)	0.004*	(0.002)	-0.002***	(0.000)
Leverage	-0.014	(0.016)	0.006	(0.008)	-0.020***	(0.002)
Cash Holdings	0.017	(0.025)	0.014	(0.013)	0.020***	(0.005)
Tangibility	0.045***	(0.007)	0.113***	(0.004)	-0.002**	(0.001)
Firm Size	0.003**	(0.001)	0.002***	(0.001)	0.002***	(0.000)
MTB	-0.003*	(0.001)	0.006***	(0.001)	0.001***	(0.000)
Sales Growth	-0.033**	(0.013)	0.042***	(0.007)	-0.005***	(0.001)
Beta	-0.007	(0.004)	0.017***	(0.002)	-0.006***	(0.001)
ROA	0.473***	(0.068)	0.101***	(0.021)	0.056***	(0.009)
Lagged BHAR	-0.003	(0.003)	0.008***	(0.002)	-0.002***	(0.000)
Industry FE	No		No		No	
Observations	3166		3097		3120	

Standard errors in parentheses. * p<0.1 **p<0.05 *** p<0.01

This table presents the results of regressing four sample period dependent variables on our measure of earnings volatility and associated control variables. The dependent variable is measured at the end of the sample period (corresponding to the same dates used to calculate holding period returns), while the earnings volatility and control variables are measured immediately before the sample period. Standard errors are clustered on industry. All variable definitions are provided in Appendix A.

Table 4

Panel B: Cash Flow Effects During the 2008 Crisis Period

	Cash Flow		CAPX		Dividends	
Log Earnings Volatility	**0.007***	**(0.004)**	**0.001**	**(0.001)**	**-0.000**	**(0.001)**
Log of CFO Volatility	-0.009**	(0.004)	-0.000	(0.001)	-0.001*	(0.001)
Leverage	-0.021	(0.021)	-0.009*	(0.005)	-0.009***	(0.003)
Cash Holdings	-0.175***	(0.027)	0.003	(0.004)	0.011***	(0.003)
Tangibility	0.031**	(0.015)	0.064***	(0.007)	0.008***	(0.002)
Firm Size	0.010***	(0.002)	0.001	(0.001)	0.001***	(0.000)
MTB	0.005***	(0.001)	0.001***	(0.000)	0.001***	(0.000)
Sales Growth	0.004	(0.019)	0.009*	(0.005)	-0.005***	(0.001)
Beta	-0.006	(0.006)	0.001	(0.001)	-0.003***	(0.000)
ROA	0.502***	(0.027)	-0.002	(0.010)	0.018***	(0.005)
Lagged BHAR	0.024***	(0.005)	0.002**	(0.001)	-0.001	(0.001)
Industry FE	Yes		Yes		Yes	
Observations	3021		2998		2983	

Standard errors in parentheses. * p<0.1 **p<0.05 *** p<0.01

This table presents the results of regressing four sample period dependent variables on our measure of earnings volatility and associated control variables. The dependent variable is measured at the end of the sample period (corresponding to the same dates used to calculate holding period returns), while the earnings volatility and control variables are measured immediately before the sample period. Standard errors are clustered on industry. All variable definitions are provided in Appendix A.