Stock Market Rewards for Earnings that Beat Analyst Earnings Forecasts when the Economy is Unforecastable

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Abstract: This study examines whether and why the stock market assigns an incremental premium to the *act* of beating analyst earnings forecasts when the economy is unforecastable. Our study uses a novel measure of macroeconomic (macro) uncertainty from Jurado et al. (2015) that captures periods during which the real economy is not forecastable and a regression model that controls for the forecast error throughout the quarter. Results show that during high macro uncertainty periods, the market assigns a greater premium to earnings that beat analyst earnings forecasts compared to the premium assigned to these earnings during low macro uncertainty periods. We also report a lower likelihood of managing earnings to beat analyst earnings forecasts during high macro uncertainty periods, suggesting higher accounting information quality. We further show that the incremental premium in high macro uncertainty periods is mainly concentrated within the group of firms that have both low liquidity risk and high accounting information quality. Evidence from our study should be relevant to those interested in understanding the usefulness of earnings during periods of extreme macro uncertainty and forces that determine accounting information quality.

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1. Introduction

Although a stream of prior research shows that the market assigns a premium to the act of beating earnings expectations and that the premium reflects an expectation of higher future cash flows, this stream largely ignores whether the state of the economy affects the premium. [1] There are multiple reasons to believe that the premium associated with the act of beating earnings expectations and the underlying reasons for this premium depend on the state of the economy. First, given that earnings are predictive of future economic activity (Konchitchki and Patatoukas 2014), if real economic activity is not forecastable, then there is some question as to whether earnings matter for valuation during such economic periods. Second, as Jurado, Ludvigson, and Ng (2015) highlight, unforecastable economic periods are characterized by decreased stock liquidity and tighter financial constraints, which reduce stock prices by depressing real economic activity. Other research shows that accounting information quality and liquidity risk are important for firm valuation during economic crises (e.g., Sadka 2011). Thus, because factors other than just future cash flows are likely to be important determinants of the premium during unforecastable periods, our study assesses the roles of liquidity risk and accounting information quality on the premium assigned to earnings that beat expectations during highly uncertain economic times. The main contribution of our study is that it provides novel evidence about whether and why earnings matter during periods of extreme economic uncertainty; we also answer the call in Dechow, Ge, and Schrand (2010) for more research on macroeconomic (macro) determinants of earnings quality.

[1] Notable examples of this research include Bartov, Givoly, and Hayn (2002), Kasznik and McNichols (2002), and Koh, Matsumoto, and Rajgopal (2008). Research using the traditional earnings-return framework finds conflicting results using recessions to measure the state of the economy (Johnson 1999; Schmalz and Zhuk 2019). We discuss this research and its limitations later in the paper.

Given costly information acquisition (Grossman and Stiglitz 1980), Andrei, Friedman, and Ozel (2021) analytically show that investors' attention to firm-specific earnings announcements increases with the amount of economic uncertainty, thereby crowding out macro noise. On the other hand, given that earnings are predictive of future economic activity, if the economy is in a highly uncertain state, then earnings might not matter for valuation. This leads to our first research question, which predicts no difference in the premium for beating analyst earnings forecasts across high and low macro uncertainty periods.[2]

We then examine *why* the market would incrementally reward the act of beating earnings expectations, focusing on the mechanisms of liquidity risk and accounting information quality. Liquidity risk and accounting information quality are important determinants of firm value, and their effects are amplified during economic crises (Sadka 2011). Prior research shows that illiquid stocks have greater exposure to liquidity shocks (Acharya and Pedersen 2005), such as during periods of high macro uncertainty. This research suggests that when macro uncertainty is high, investors more strongly prefer the safety of assets with a lower sensitivity to liquidity shocks (i.e., "flight-to-liquidity"). This leads to our second research question, which predicts that when macro uncertainty is high, firms with low liquidity risk receive a higher incremental premium [3] for beating earnings expectations compared to firms with high liquidity risk.

We next analyze the impact of accounting information quality on the premium for beating earnings expectations in periods of high macro uncertainty. Consistent with prior research which shows that greater investor attention restricts earnings management (Teoh, Welch, and Wong

[2] We focus on beating earnings expectations due to the economic significance of the market reward for doing so compared to that for meeting earnings forecasts. However, our tests naturally include cases when firms also meet earnings forecasts; we discuss those results as appropriate.

[3] Throughout our study, "incremental premium" refers to the premium assigned to earnings that beat analyst earnings forecasts during periods of high macro uncertainty versus periods of low macro uncertainty.

1998), Koh, Matsumoto, and Rajgopal (2008) report a lower frequency of earnings management to beat analyst earnings forecasts in the post-Sarbanes Oxley (SOX) period. Because investor attention to firm-specific news is likely elevated during high macro uncertainty periods (Andrei et al. 2021), our third research question predicts a lower frequency of earnings management to beat analyst earnings forecasts during high macro uncertainty periods compared to low macro uncertainty periods.

Our fourth research question is whether the incremental premium for beating earnings forecasts when macro uncertainty is high is related to accounting information quality. Bartov (2002) shows that the premium for beating earnings expectations varies little with earnings quality, while other research supports the notion that earnings matter more during periods of greater economic uncertainty (Kacperczyk, Van Nieuwerburgh, and Veldkamp 2016; Sadka 2011). We therefore predict no difference in the incremental premium associated with accounting information quality.

Our final research question examines the relation between the incremental premium and the *interaction* of accounting information quality and liquidity risk. Extant research shows that higher quality accounting information provides protection to investors during liquidity crises (i.e., "flight-to-quality") (Ng 2011; Sadka 2011), leading to the prediction that the incremental premium is amplified for firms with both high accounting information quality and low liquidity risk.

Two features distinguish our empirical design. First, we use a novel measure of macro uncertainty from Jurado et al. (2015) based on 132 macro time-series that captures periods during which the real economy is not forecastable. Jurado et al. (2015) highlight that compared to measures of uncertainty used in prior studies (e.g., VIX), their uncertainty measure is more objective and captures macro uncertainty shocks that are larger and more persistent. Maslar, Serfling, and Shaikh (2021, p. 1491) further highlight the limitation of VIX in addition to the limitation of EPU (Baker, Bloom, and Davis 2016) for capturing real economic effects. Our use of the Jurado et al. (2015) measure thus allows us to draw strong inferences about the incremental premium. While the Jurado et al. (2015) macro uncertainty measure has gained acceptance in the economics and finance literatures (e.g., Bloom 2014; Herskovic, Kelly, Lustig, and Van Nieuwerburgh 2016), to the best of our knowledge, we are the first to use it in the accounting literature. Second, we follow Bartov et al. (2002) and Koh et al. (2008) and use a regression model that isolates the market response to the act of beating or missing analysts' earnings forecasts by controlling for firm performance throughout the quarter. As noted in Bartov et al. (2002), this approach fundamentally differs from the traditional unexpected earnings-return framework.

We provide several novel findings. Using a large sample of firms over the years 1986 to 2020, we report a premium associated with beating earnings forecasts that is about three percent higher in periods of high macro uncertainty compared to that in low macro uncertainty periods. Using two measures of liquidity risk [4] from Acharya and Pedersen (2005), we next assess the role of liquidity risk in the market's pricing of the incremental premium. We re-estimate our main regression model after splitting our sample into groups of high and low liquidity risk. Consistent with liquidity risk theory, we find that during high macro uncertainty periods, firms with low liquidity risk that beat analyst earnings forecasts receive a premium that is eight percent higher compared to low macro uncertainty periods. By contrast, we show that firms with high liquidity risk that beat analyst earnings forecasts do not receive any incremental premium.

We next conduct a series of tests to assess the role of accounting information quality in the market's pricing of the incremental premium. We define high accounting information quality as

[4] Following prior research, we use liquidity risk in our tests rather than liquidity levels because of the endogenous changes in liquidity around earnings announcements (e.g., Sadka 2011).

cases in which firms beat analyst earnings forecasts without using earnings management. We first show that the likelihood of using earnings management to beat analyst earnings forecasts is lower in high macro uncertainty periods. We then re-estimate our main regression model after partitioning the sample into two groups based on whether firms used earnings management to beat analyst earnings forecasts. Results from this test show that only firms *not* using earnings management to beat earnings expectations receive an incremental premium. To assess the interactive effect of accounting information quality and liquidity risk on the incremental premium, we double-sort our sample into groups based on whether firms beat analyst earnings forecasts by using earnings management and by liquidity risk (i.e., 2x2). Results from these tests show that the incremental premium is concentrated within the group of firms with both low liquidity risk and high accounting information quality.

In additional tests, we examine potential additional explanations for our results. First, consistent with prior research, we find that the incremental premium to beating earnings forecasts is positively related to future cash flows and future ROA during low macro uncertainty periods, but we find no difference in these relations during high macro uncertainty periods. This suggests that the premium for beating analyst earnings forecasts when macro uncertainty is high is not driven by a stronger link between the signal of beating earnings and future firm performance. Second, we assess the role of potential investor overreaction in the market's assignment of an incremental premium. These tests reveal no future stock return reversals, eliminating investor overreaction as a potential determinant of the incremental premium. To deal with possibility that our main findings are driven by other proxies for macro uncertainty or investor sentiment, we include the additional control variables of VIX, EPU (Baker, Bloom, and Davis 2016), economic recessions, and investor sentiment (Baker and Wurgler 2006), and find that our main inferences are generally unaffected.

Our study provides three main contributions. First, we complement and extend the literature on the stock market premium associated with the act of beating earnings expectations. While prior research shows that the premium for beating earnings expectations signals stronger future ROA or cash flows (Bartov et al. 2002; Kasznik and McNichols 2002; Koh et al. 2008) and that accounting information quality does not have an economically significant impact on investors' assignment of an incremental premium (Bartov et al. 2002), our results suggest that investors instead assign an incremental premium based on liquidity risk and accounting information quality. We thus provide new evidence about determinants of the premium assigned to the act of beating earnings expectations.

Second, our study contributes to the literature on the relation between liquidity risk and accounting information quality. Extant research shows that the relation between accounting information quality and liquidity risk is amplified during liquidity crises (Sadka 2011; Lang and Maffett 2011; Ng 2011), and that cross-sectional variation in returns during liquidity crises is related to the interaction of accounting information quality and liquidity risk (Sadka 2011). We complement and extend this research by showing that it is the interactive effect of low liquidity risk and high accounting information quality which drives the incremental premium for beating analyst forecasts when the economy is not forecastable.

Finally, our study complements prior research studying the impact of macro factors on earnings quality (Aboody, Barth, and Kasznik 1999; Liu and Ryan 2006; El Ghoul, Guedhami, Kim, and Yoon 2021). As Dechow et al. (2010, p. 386) highlight, there is surprisingly little research on this relation. We help to fill this void by showing that accounting information quality improves during highly uncertain macro periods, and that such quality is an important driver of the premium for beating earnings expectations during these periods.

Our study proceeds as follows. In section 2, we review the relevant literature and develop our hypotheses. Section 3 contains the research design. We present our main results in section 4. Section 5 provides additional tests. We summarize and conclude the study in section 6.

2. Literature Review and Hypotheses

Our study is related to several streams of research, including (i) macro measures and the stock market response to earnings surprises, (ii) stock market rewards to the act of beating earnings expectations, (iii) determinants of accounting quality, as well as (iv) the roles of liquidity risk and accounting information quality in valuation. We next briefly review relevant studies in these areas and develop hypotheses.

Stock Market Response to Earnings Surprises Conditioned on Macro Factors

Our study focuses on the stock market premium to the *act* of beating earnings expectations and is thus only tangentially related to research using the traditional return-earnings framework, which we next discuss. Johnson (1999) shows that earnings response coefficients (ERCs) are lower in recessions than in expansions, while conversely Schmalz and Zhuk (2019) find larger ERCs during recessions. Williams (2015) finds that investors weigh bad news earnings surprises more than good news earnings surprises during periods of higher market volatility, measured by VIX; in a sensitivity test, he finds similar results using news events from Bloom (2009) such as “Black Monday.” Nagar, Schoenfeld, and Wellman (2019) show that higher government economic policy uncertainty (EPU) is related to a lower market response to earnings surprises, especially for firms with high liquidity risk. In a contemporaneous working paper, Guest, Kothari, and So (2021) show that higher levels of capital scarcity lead to a stronger market response to earnings surprises.

Our study differs from the aforementioned research in several important ways. Compared to macro uncertainty proxies used in prior research, our use of the Jurado et al. (2015) measure provides more reliable inferences about the market premium associated with earnings that beat expectations during high macro uncertainty periods. As Jurado et al. (2015) demonstrate, some events that Bloom (2009) identifies as being related to spikes in VIX are not related to true macro uncertainty. These events include "Black Monday" in 1987 and the second Gulf War in 2003, both of which increased stock market volatility but were not accompanied by changes in economic fundamentals. Importantly, by construction, the Jurado et al. (2015) measure is devoid of a market volatility component. Moreover, even recessions are noisy proxies for extreme levels of uncertainty in the economy. While recessions and macro uncertainty are related, Jurado et al. (2015, Figure 1) show that there are recessionary periods (1990) in which macro uncertainty is low and high macro uncertainty periods (e.g., September 2001-November 2001) that do not span recessions (i.e., April 2001-December 2001). Our sample period includes additional instances of a lack of intersection between high macro uncertainty periods and recessions that we detail later in the paper. Finally, while Jurado et al. do not explicitly compare their measure to EPU, Baker et al. (2016) show a correlation of 58% between EPU and VIX (Baker et al. 2016, p. 1613), suggesting that EPU is also likely to be a noisy proxy for true macro uncertainty. Our study thus fundamentally differs from Nagar et al. (2019) in that we use a broader and more objective measure of economic uncertainty; it also differs in that we focus on the premium to the act of beating earnings forecasts, we use a regression model that controls for earnings performance throughout the quarter, and we assess accounting information quality as well as the interaction of accounting information quality and liquidity risk.

Additionally, an implicit assumption from prior ERC studies is that good earnings news is higher quality. We posit that *how* a firm beats earnings expectations is likely more important than merely beating earnings expectations. This is an important feature of our study that allows us to provide important insights about the impact of accounting information quality on the incremental premium. Finally, our use of a regression model that controls for information released throughout the quarter allows us to isolate the "bump" provided to the act of beating analyst earnings forecasts.

We next discuss the stream of research that examines the stock market rewards associated with the act of beating earnings expectations. Kasznik and McNichols (2002) use a valuation framework and show that firms beating earnings expectations receive a higher valuation and higher forecasted earnings from analysts, and that the valuation premium is positively related to future profitability. Bartov et al. (2002) use an event-study framework and show that firms that meet or beat earnings expectations receive a premium over firms that fail to do so, even after controlling for earnings information released across the quarter. That is, Bartov et al. (2002) clearly identify that there is a market premium associated with the "bump" in earnings compared to the last analyst consensus forecast of the quarter. Like Kasznik and McNichols (2002), Bartov et al. (2002) show that the premium is related to future firm performance. Bartov et al. (2002) also report an economically small decrease in the premium for firms using earnings management to beat expectations. Koh et al. (2008) adapt the Bartov et al. (2002) methodology to assess the differential market premium for meeting or beating earnings expectations across pre- and post-SOX periods and find that the premium to small earnings beats virtually disappears in the post-SOX period, while the premium for large earnings beats fell by about one-half. Koh et al. (2008) also report that during the post-Sox period, the premium is positively related to future firm performance and that firms used less earnings management to beat earnings expectations. We extend this stream of research by examining whether the market rewards earnings that beat analyst forecasts when the economy is not forecastable. We also assess the impact of accounting information quality, liquidity risk, and their interaction on the market's pricing of the premium for beating earnings expectations.

Liquidity Risk and Asset Pricing

Prior theoretical and empirical studies show that liquidity risk is priced and that its effects are economically significant. In their seminal study, Amihud and Mendelson (1986) propose a model in which investors with different expected holding periods trade assets with different relative bid-ask spreads. They empirically test their model and report evidence consistent with this prediction, suggesting a positive relation between expected returns and illiquidity. The intuition for this finding is that since investors rationally avoid holding stocks that they would have difficulty selling, they demand a higher rate of return for stocks with greater liquidity risk. Amihud and Mendelson (1989) use Merton's (1987) CAPM framework and show that a firm's expected return is an increasing function of Beta and the bid-ask spread, implying that greater liquidity reduces firms' cost of capital and increases their market value. Brennan and Subrahmanyam (1996) and Amihud (2002) show that there is a positive and significant relation across stocks between expected return and illiquidity.

Pastor and Stambaugh (2003) shift the focus of the liquidity literature from the level of liquidity to firms' sensitivity to it (i.e., liquidity risk). Pastor and Stambaugh (2003) find that expected stock returns are related to the sensitivities of returns to fluctuations in aggregate liquidity. Acharya and Pedersen (2005) extend the Pastor and Stambaugh model by developing a liquidity-adjusted capital asset pricing model in which illiquidity costs are priced. Their model also predicts that persistent positive shocks to market illiquidity are associated with low contemporaneous returns and high future returns. An important implication of these studies is when there is a liquidity shock to the economy, investors seek more liquid assets, commonly referred to as the "flight-to-liquidity." Sadka (2006) extends the literature on liquidity risk by isolating the component of liquidity risk related to stock price anomalies (i.e., momentum and PEAD), while Korajczyk and Sadka (2008) show that liquidity risk is priced, even after controlling for firm-level liquidity.

Macroeconomic Factors and Accounting Information Quality

Only a few papers assess the impact of macroeconomic conditions on earnings quality. Aboody, Barth, and Kasznik (1998) show a lower incidence of upward revaluations of fixed assets by UK firms when economic conditions are more volatile. Liu and Ryan (1995) show that banks manage earnings up via loan loss provisions for commercial loans during bad economic times, while Liu and Ryan (2006) show that during good economic times, banks increase their use of loan charge-offs to smooth their loan loss reserves for consumer loans. In a recent study with international data, El Ghoul et al. (2021) find a positive relation between economic policy uncertainty (EPU) and accounting quality. Dechow et al. (2010, p. 386) note the dearth of research on the relation between macro factors and earnings quality and call for more research on this subject. Our study attempts to help fill this void by examining whether, across high and low macro uncertainty periods, 1) accounting information quality differs and 2) there is a differential impact of accounting information quality on the premium for beating earnings expectations.

Accounting Information Quality, Liquidity Risk, and Stock Prices

The intuition for a relation between accounting information and liquidity is that the release of accounting information can reduce information asymmetry, which, in turn, can improve liquidity (Diamond and Verrecchia 1991). Most extant research in this area focuses on earnings releases and disclosure, and uses the level of liquidity (Lee, Mucklow, and Ready 1993). More recent studies examine the *quality* of accounting information and liquidity risk, an important aspect of our study. Lang and Maffett (2011) show that higher quality accounting information improves the level of liquidity, while Ng (2011) shows that higher quality accounting information reduces liquidity risk. Sadka (2011) further shows that during liquidity crises, cross-sectional variation in stock prices is related to liquidity risk. That is, firms with high liquidity risk underperform because investors seek to own more firms with high accounting information quality and fewer firms with low accounting information quality. Sadka (2011) also shows that illiquid stocks are demanded, so long as their accounting information quality is high. These results suggest an interactive effect of accounting information quality and liquidity risk on stock prices.

In sum, prior research shows that the relation between accounting information quality and liquidity risk is more pronounced during liquidity crises, underscoring the important role of accounting information quality during liquidity crises. We extend this research by examining the roles of accounting information quality and liquidity risk in the pricing of the reward for beating earnings expectations when the economy is not forecastable.

Hypotheses

We first examine whether the market rewards the act of beating earnings targets when macro uncertainty is high. On the one hand, recent research (e.g., Andrei et al. 2021) shows that investors' attention to firm-specific earning news increases with the amount of economic uncertainty. On the other hand, because earnings are predictive of future economic output (Konchitchki and Papatoukas 2014), if the economy is unforecastable, then earnings might not be an important determinant of the premium for beating earnings expectations (i.e., macro noise crowds out fundamentals). Thus, our first hypothesis in null form is:

> **H_1: The premium for beating earnings forecasts is not different across periods of high versus low macro uncertainty.**

We next turn to hypotheses on the mechanisms that underlie the incremental premium. Theory and empirical evidence support the notion that illiquid stocks have greater exposure to liquidity shocks, especially during periods of high macro uncertainty, leading to higher expected returns (Pastor and Stambaugh 2003; Acharya and Pedersen 2005). This suggests that when macro uncertainty increases, investors more strongly prefer the safety of assets with a lower sensitivity to liquidity shocks (i.e., "flight-to-liquidity"). We therefore predict that, compared to firms with higher liquidity risk, firms with lower liquidity risk will receive a higher incremental premium for beating analyst forecasts. This leads to our second hypothesis:

H_2: The incremental premium is negatively related to liquidity risk.

Our next two hypotheses focus on the relation between the incremental premium and accounting information quality. Because greater investor attention restricts earnings management opportunities (Teoh et al. 1998; Koh et al. 2008), and because investor attention to firm-specific earnings news is likely to be elevated during high macro uncertainty periods (Andrei et al. 2021), fewer firms likely have an opportunity to use earnings management to beat analyst earnings forecasts during high macro uncertainty periods compared to low macro uncertainty periods. This leads to our third hypothesis:

H_3: There is less earnings management to beat analyst earnings forecasts during high macro uncertainty periods compared to low macro uncertainty periods.

We then examine how accounting information quality impacts the premium to beating earnings expectations when macro uncertainty is high. Bartov et al. (2002) show that firms using earnings management to beat analyst forecasts receive a very small deduction from the premium for beating earnings forecasts, and that there are small (or no) differences in future firm performance associated with the premium. However, Sadka (2011) shows a positive relation between higher quality accounting information and stock prices during liquidity events, while Kacperczyk et al.'s (2016) model suggests that when uncertainty increases, earnings will be perceived as having higher quality and thus be more relevant for valuation. This leads to our next hypothesis, stated in the null form:

H_4: The incremental premium is not related to accounting information quality.

Our final hypothesis examines the relation between the incremental premium and the interaction of accounting information quality and liquidity risk. Extant research shows that higher quality accounting information provides protection to investors during liquidity crises (i.e., "flight-to-quality") (Ng 2011; Sadka 2011), leading to the prediction that the incremental premium for beating analyst forecasts is amplified for firms with *both* high accounting information quality and low liquidity risk.

H_5: The incremental premium is greater for firms with both high accounting information quality and low liquidity risk.

3. Research Design

Sample and Data

We obtain data on analyst forecasts and actual earnings from I/B/E/S for the period 1986 to 2020. We then merge that data with Compustat and CRSP. The intersection of these databases yields 197,267 firm-quarter observations. To mitigate the influence of outliers, we winsorize all continuous variables at the 1^{st} and 99^{th} percentiles.

Macro Uncertainty Measure

We adopt a novel measure of macro uncertainty from Jurado et al. (2015).[5] This measure is an index of macro uncertainty estimated using principal component analysis based on a broad set of 132 time series of macroeconomic and financial data, and captures periods in which the real economy is not forecastable. Jurado et al. (2015) estimate macro uncertainty using forecasting horizons of one-month-ahead, three-months ahead, and twelve-months-ahead. We use the three-month-ahead horizon because it fits well with our research setting of quarterly earnings. We detrend the uncertainty data using the Hodrick-Prescott filter (Hodrick and Prescott 1997), following Bloom (2009) and Jurado et al. (2015).[6] We then create a dummy variable equal to one for high macro uncertainty periods if the macro uncertainty index is greater than 1.65 standard deviations above its mean, again following Bloom (2009) and Jurado et al. (2015), zero otherwise.[7]

Figure 1 shows the time series of the Jurado et al. (2015) macro uncertainty measure during our sample period. The high macro uncertainty periods are August 1998, September 2001 to November 2001, September 2005 to October 2005, September 2008 to January 2009, February 2015 to March 2015, and April 2020 to December 2020. Note while there is some overlap between the Jurado et al. (2015) measure and recessions, this measure was not high during 1990 recession but was at high levels when there was no recession (i.e., August 1998, September 2005 to October 2005, February 2015 to March 2015, and April 2020 to December 2020).

[Insert Figure 1 here]

[5] We obtain Jurado et al.'s macro uncertainty measure from Sidney Ludvigson's website: https://www.sydneyludvigson.com/data-and-appendixes.

[6] Note that Jurado et al. (2015) present results based on a non-detrended uncertainty index in much of their paper, but provide the number of high macro uncertainty periods based on detrended data in footnote 18 on page 1200 to be consistent with Bloom (2009). Detrended data provide us with more periods of high macro uncertainty and are thus used in our primary tests. For robustness, we also use non-detrended data in our tests and find similar results to those based on detrended data (untabulated).

[7] A time series of data contains a trend component and a cyclical component. The Hodrick-Prescott filter is a commonly used tool in the macroeconomics literature to remove the trend component, leaving the cyclical component.

Liquidity Risk Measures

We use two liquidity betas from Acharya and Pedersen (2005). The liquidity-adjusted asset pricing model of Acharya and Pedersen (2005) is based on the intuition that investors tend to avoid holding stocks that they would have difficulty selling, so they demand higher rates of return to compensate for the liquidity risk. Acharya and Pedersen's (2005) liquidity-based capital asset pricing model (CAPM) generates four betas.[8] The first beta is analogous to the traditional CAPM beta, except that it is scaled by market illiquidity risk. The other three betas are *liquidity betas* and capture different dimensions of liquidity risk. The first liquidity beta represents illiquidity commonality, measured as the covariance between a stock's illiquidity risk and the market's overall illiquidity risk; this beta is expected to have a positive coefficient. The second liquidity beta represents the covariance between an individual stock's return and unexpected changes in market illiquidity; this beta is expected to have a negative coefficient. Note that the second liquidity beta from Acharya and Pedersen (2005) is the same used by Pastor and Stambaugh (2003), Ng (2011), Sadka (2011), and Nagar et al. (2019). The third liquidity beta is the covariance between an individual stock's unexpected change in illiquidity and market returns; this beta is expected to have a negative coefficient. Acharya and Pedersen (2005, p. 377) show that most of the illiquidity risk variance is explained by the second and third liquidity betas; Acharya and Pedersen (2005) show that these betas explain 0.16% and 0.82%, respectively, of the total illiquidity risk variance of 1.1%. We therefore employ these two liquidity betas in our tests, and label them *APLiq_BETA2* and *APLiq_BETA3*.

[8] We refer the reader to Acharya and Pedersen (2005) for details about the estimation of the four betas.

Accounting Information Quality Measure

We define high accounting information quality as cases in which firms beat analyst earnings forecasts without using earnings management. We first compute abnormal accruals and normal accruals by using the modified Jones (1991) model, as in Dechow, Sloan and Sweeney (1995). We then convert the asset-scaled abnormal accruals to a per share basis, $AbACCPS_{i,q} = (AbACC_{i,q} \times ATQ_{i,q-1})/CSHPRQ_{i,q}$, where *AbACCPS* is abnormal accruals per share, *AbACC* is abnormal accruals estimated based on Dechow et al.'s (1995) model, *ATQ* is total assets, and *CSHPRQ* is total common shares used to compute *EPS* for quarter *q* of firm *i.* The sample size is reduced to 106,090 firm-quarter observations (of which there are 61,723 firm-quarter observations related to firms beating earnings forecasts) due to the data requirements for abnormal accruals.

We then partition firms that beat earnings into groups based on whether they used earnings management to beat analyst earnings forecasts. We first adjust each firm's actual earnings by deducting abnormal accruals. If a firm's actual earnings after deducting abnormal accruals exceeds the last analyst earnings forecast, then we designate that firm as not using earnings management to beat the forecast. If a firm's actual earnings after deducting abnormal accruals is less than the last analyst earnings forecast, then we designate that firm as using earnings management to beat the forecast.

Empirical Models

To test H_1, we follow Bartov et al. (2002) and Koh et al. (2008) and use the following model:

$$\begin{aligned} CAR_{i,q} = \beta_0 &+ \beta_1 UEPS_{i,q} + \beta_2 DBEAT_{i,q} + \beta_3 DMEET_{i,q} + \beta_4 DMACRO\_UNCRTN_q \\ &+ \beta_5 DMACRO\_UNCRTN_q \times UEPS_{i,q} + \beta_6 DMACRO\_UNCRTN_q \times DBEAT_{i,q} \\ &+ \beta_7 DMACRO\_UNCRTN_q \times DMEET_{i,q} + \varepsilon_{i,q} \end{aligned} \quad \textbf{(1)}$$

The Koh et al. (2008) regression model is like Bartov et al.'s (2002) model, except that it doesn't control for the forecast error based on the last forecast of the quarter, referred to as *SURP* in Bartov et al. (2002).[9] The subscripts i and q refer to firm i in quarter q. For brevity, we omit subscripts in the discussion of the variables. The dependent variable, *CAR,* is the cumulative value-weighted, market-adjusted abnormal return over the period beginning two days following the date of the first analyst forecast in quarter q for firm i made at least three days after the announcement of the previous quarter's earnings and ending one day after the release of quarter q earnings. We define *UEPS* as unexpected earnings for the quarter, measured as ($Actual\ EPS_{i,q} - First\ forecast\ EPS_{i,q}$) / $Price_{i,q-1}$, where $Actual\ EPS_{i,q}$ is the actual earnings per share announced by firm i in quarter q. $First\ forecast\ EPS_{i,q}$ is the first earnings per share forecast in quarter q for firm i made at least three days after the announcement of the previous quarter's earnings. $Price_{i,q-1}$ is the stock price per share at the end of the previous quarter. *DBEAT* is a dummy variable that equals 1 if ($Actual\ EPS_{i,q} - Last\ forecast\ EPS_{i,q}) > 0$, where $Last\ forecast\ EPS_{i,q}$ is the last earnings per share forecast in quarter q for firm i made at least three days before the quarter q earnings announcement, and zero otherwise. *DMEET* is a dummy variable that equals 1 if ($Actual\ EPS_{i,q} - Last\ forecast\ EPS_{i,q}) = 0$, and zero otherwise.

Our main variable of interest is *DBEAT* interacted with *DMACRO_UNCRTN.* The coefficient on this interaction term (β_6) captures the market response to earnings that beat analyst forecasts across periods of high and low macro uncertainty; a positive sign on β_6 implies an incremental premium to beating analyst earnings forecasts in high macro uncertainty periods compared to low macro uncertainty periods (H_1). To test H_2, we estimate equation (1) on subsamples based on high and low liquidity risk.

[9] In untabulated tests, we obtain qualitatively similar results after adding S*URP* to our main regression model. These results are available from the authors upon request.

In the test of H_3, to assess whether the propensity of firms rely on earnings management to beat earnings expectations is lower during high macro uncertainty periods, we follow Koh et al. (2008) and estimate the following logistic regression:

$$BEATbyEM_{q,t} = \beta_0 + \beta_1 DMACRO\_UNCRTN_q + \beta_2 GDP_q + \beta_3 INDROA_{i,q} + \beta_4 FirstQuarterDummy + \beta_5 SecondQuarterDummy + \beta_6 ThirdQuarterDummy + \varepsilon_{i,q} \quad \textbf{(2)}$$

We include *GDP* (gross domestic product), *INDROA* (industry-adjusted return on assets) and dummy variables for firms' first, second, and third fiscal quarters as control variables, following Koh et al (2008). The dependent variable, *BEATbyEM*, is an indicator variable that equals 1 for firms that use earnings management to beat analysts' earnings forecasts, and zero otherwise. Consistent with H_3, we predict a significantly negative sign on β_1.

To test H_4, we re-run equation (1) using subsamples partitioned based on our accounting information quality measure, *BEATbyEM*. If there is no incremental premium to beating analyst earnings forecasts during high macro uncertainty periods associated with accounting information quality, then β_6 in equation (1) is expected to be insignificantly different across these subsample estimations. Finally, we test H_5 by estimating equation (1) in subsamples based on high or low liquidity risk and high or low accounting quality.

4. Empirical Results

Descriptive Statistics and Correlations

Panel A of Table 1 provides descriptive statistics for the full sample, while Panels B and C of Table 1 provide descriptive statistics for high and low macro uncertainty periods, respectively. High (low) macro uncertainty periods are those for which our macro uncertainty measure is more (less than or equal to) than 1.65 standard deviations above (below) its mean, following Jurado et al. (2015). The mean *CAR* for the full sample is 3.3%; the mean *CAR* during high macro uncertainty periods is –1.3%, while the mean *CAR* during low macro uncertainty periods is 3.5%. The likelihood of beating analysts' forecasts (*DBEAT*) varies inversely with macro uncertainty; 49.3% (59.3%) of sample firm-quarters beat earnings forecasts in high (low) macro uncertainty periods. Both liquidity betas are negative, consistent with Acharya and Pedersen (2005).

[Insert Table 1 here]

Table 2 reports Spearman correlations between the main variables used in our analyses. The correlation coefficients between *CAR* and the two measures of liquidity risk, *APLiq_BETA2* and *APLiq_BETA3*, are significantly negative, indicating that firms with higher liquidity risk tend to have lower contemporaneous returns, consistent with liquidity risk theory that predicts higher expected future returns for firms with higher liquidity risk. These results are qualitatively consistent with those in Sadka (2011). The dummy variable for macro uncertainty (*DMACRO_UNCRTN*) is negatively correlated with *CAR* and positively correlated with *APLiq_BETA2* and *APLiq_BETA3*, as expected. *CAR* has a positive correlation with *DBEAT,* implying a stock market premium for beating earnings expectations. In general, the correlations are consistent with prior research (e.g., Koh et al. 2008).

[Insert Table 2 here]

Initial Evidence of an Incremental Premium

Table 3 provides results from our test for a differential premium to beating analyst earnings forecasts across high and low macro uncertainty periods (H_1). We show that the market responds positively to firms that beat (*DBEAT* coefficient = 0.036, *t*-statistic = 42.99) or meet (*DMEET* coefficient = 0.015, *t*-statistic = 5.36) earnings expectations in low macro uncertainty periods.[10] Results also show a positive return due to the forecast error throughout the quarter (*UEPS*

[10] Note that the coefficient estimates for *Beat* and *Meet* are relative to firms that miss earnings expectations.

coefficient = 0.107, *t*-statistic = 10.65). These results are in line with prior research (Bartov et al. 2002; Koh et al. 2008). For our variable of interest, *DMACRO_UNCRTN* × *DBEAT,* we show a positive and significant coefficient of 0.001, implying a 0.1 percentage point incremental premium. The incremental premium is about 3% higher than the premium given to firms that beat earnings expectations in low macro uncertainty periods (i.e., 0.001/0.036). We next examine reasons why the market assigns a higher premium for earnings that beat analyst earnings forecasts during high macro uncertainty periods.

[Insert Table 3 here]

Liquidity Risk and the Incremental Premium

We now turn to tests of H_2, which predicts a higher incremental premium for firms with lower liquidity risk. We match the quarterly average liquidity risk measures with the quarterly window of our *CAR*s and then partition firms that beat earnings forecasts into high and low liquidity risk based on the median values of *APLiq_BETA2* and *APLiq_BETA3*, respectively. We then re-estimate our equation (1) using these subsamples and report results in Table 4.

We report that during high macro uncertainty periods, firms with low liquidity risk receive a higher premium for beating earnings expectations. In column (2) of Table 4, we report that the coefficient on *DMACRO_UNCRTN* × *DBEAT* for firms with low liquidity risk is 0.003 (*t*-statistic = 3.90) and statistically significant at the 1% level; this implies an incremental premium of about 8% (0.003 / 0.038), compared to an incremental premium of 3% for the full sample reported in Table 3. We also report an insignificant coefficient on *DMACRO_UNCRTN* × *DBEAT* for firms that beat earnings expectations and that have high liquidity risk (column (1)). Consistent with our second hypothesis, an *F*-test confirms that the coefficient on *DMACRO_UNCRTN* × *DBEAT* for firms with low liquidity risk exceeds that for firms with high liquidity risk (F-statistic = 8.95, $p <$ 0.01). We obtain similar results for *APLiq_BETA3* (columns (3) and (4) of Table 4).

[Insert Table 4 here]

Accounting Information Quality during High Macro Uncertainty Periods

We next assess the likelihood of firms using earnings management to beat analyst earnings forecasts during high macro uncertainty periods (H_3). We conduct univariate and multivariate tests using the sample of firms that beat analyst earnings forecasts. To conduct our tests, we double-sort these firms based on high and low macro uncertainty and whether earnings management was used to beat analyst earnings forecasts. Table 5 contains the results of these tests.

Panel A of Table 5 shows that the proportion of firms using earnings management to beat earnings forecasts in high macro uncertainty periods (31.02%) is significantly lower (p-value = 0.027) than the proportion doing so in low macro uncertainty periods (33.14%). This result supports the notion that greater investor attention during high uncertainty periods constrains firms' use of earnings management to beat analyst earnings forecasts. Panel B of Table 5 reports the results of a logistic regression that controls for other likely determinants of using earnings management to beat analyst earnings forecasts. Results from this test show a negative and significant coefficient (-0.121, p-value < 0.01) on the dummy variable for high macro uncertainty (*UNCRTNDummy*), consistent with the univariate results. These results are similar in spirit to those in Koh et al. (2008), who show a lower likelihood of earnings management to beat analyst forecasts during the post-SOX period, in which there was also higher scrutiny of firms' financial reporting.

[Insert Table 5 here]

Accounting Information Quality and the Incremental Premium

We next test our hypothesis about whether the market differentially prices the incremental premium based on whether firms use earnings management to beat analysts' earnings forecasts (H_4). We re-estimate equation (1) after partitioning the full sample into two groups based on whether earnings management was used to beat analyst earnings forecasts. We report results in Table 6.[11] In column (1), we report results for the subsample of firms that beat analysts' earnings forecasts with earnings management; we show an insignificant coefficient of 0.001 on *DMACRO_UNCRTN* × *DBEAT,* suggesting that the stock market does not provide an incremental premium for firms using earnings management to beat analyst forecasts. In column (2), we report results for the subsample of firms that beat analysts' earnings forecasts without earnings management; we report a positive and significant coefficient of 0.002 (t-statistic = 2.95) on *DMACRO_UNCRTN* × *DBEAT,* suggesting that firms with higher quality earnings receive an incremental premium. An F-test (F-statistic = 3.17) indicates the coefficients on *DMACRO_UNCRTN* × *DBEAT* are statistically different (p-value < 0.01). In sum, results from these tests suggest that the market only assigns an incremental premium to firms that beat analyst earnings forecasts using higher quality earnings.

[Insert Table 6 here]

Interactive Effect of Liquidity Risk and Accounting Information Quality on the Incremental Premium

We next turn to tests of the interactive effect of liquidity risk and accounting information quality on the incremental premium (H_5). To execute our tests, we double-sort the sample, first into high versus low liquidity risk, and then into firms that beat earnings forecasts with or without

[11] Data constraints reduce sample observations to 106,090.

earnings management. We then re-estimate equation (1) for each sub-group and for each liquidity beta, resulting in eight regressions. We report results for these tests in Table 7.

For *APLiq_BETA2*, we report that investors only provide an incremental premium for firms with low liquidity risk and high accounting information quality, as revealed in column (4) of Table 7. That is, for *APLiq_BETA2*, this is the only result for which the coefficient on *DMACRO_UNCRTN x DBEAT* is different from zero (coeff. est. = 0.004, *t*-stat = 3.18). Results based on *APLiq_BETA3* are similar to those for *APLiq_BETA2* in that the coefficient on *DMACRO_UNCRTN x DBEAT* in column (8) is positive and significant (coeff. est. = 0.002, *t*-stat = 2.41). We also report marginally significant evidence that the market also assigns an incremental premium for firms with both high liquidity risk and higher accounting information quality (column (6)), consistent with results in Sadka (2011). Results from *F*-tests show that the incremental premium for the group of firms with low risk/high accounting information quality is statistically greater than that for any of the other groups. Overall, results in this table highlight the importance of the interactive effect of information quality and liquidity risk on the incremental premium.

[Insert Table 7 here]

5. Additional Tests

Future Firm Performance

Because prior studies show that the premium associated with the act of beating earnings is related to future firm performance (Bartov et al. 2002; Kasznik and McNichols 2002; Koh et al. 2008), we next assess where the incremental premium is related to future firm performance. We follow Koh et al. (2008) and employ the following model:

$$Future\ Performance_{i,q+4} = \beta_0 + \beta_1 UEPS_{i,q} + \beta_2 PERF_{i,q-1} + \beta_3 \delta PERF_{i,q-4} + \beta_4 SALES_{i,q-1} + \beta_5 INDROA_{i,q} + \beta_6 DBEAT_{i,q} + \beta_7 DMEET_{i,q} + \beta_8 DMACRO\_UNCRTN_{i,q} + \beta_9 DMACRO\_UNCRTN \times UEPS_{i,q} + \beta_{10} DMACRO\_UNCRTN \times PERF_{i,q} + \beta_{11} DMACRO\_UNCRTN \times \delta PERF_{i,q} + \beta_{12} DMACRO\_UNCRTN \times SALES_{i,q} + \beta_{13} DMACRO\_UNCRTN \times INDROA_{i,q} + \beta_{14} DMACRO\_UNCRTN \times DBEAT_{i,q} + \beta_{15} DMACRO\_UNCRTN \times DMEET + \varepsilon_{i,q} \quad \textbf{(3)}$$

We measure future firm performance as either future cash flows from operations, based on the statement of cash flows (*FUTCFO*), or future return on assets (*FUTROA*). *FUTCFO* is cash flows from operations, scaled by lagged total assets, averaged over the four quarters after quarter *q*. *FUTROA* is net income, scaled by lagged total assets, averaged over the four quarters after quarter *q*. *PERF* is either lagged *CFO* or lagged *ROA*. *δPERF* is the standard deviation of either *CFO* or *ROA* for four quarters prior to quarter *q*. *SALES* is the natural logarithm of sales for the quarter prior to quarter *q*. *INDROA* is the average of quarter *q ROA* computed for the two-digit SIC code to which firm *i* belongs (excluding the *ROA* of firm *i*). All other variables are as previously defined. If the incremental premium is due to an expectation of stronger future performance, then we expect a positive sign on β_{14} in equation (3).

In untabulated results, we find that the coefficients on *DBEAT* for *FUTCFO* and *FUTROA* are positive (0.013 and 0.012, respectively) and significant ($p < 0.01$), indicating that the premium during low macro uncertainty periods is positively related to future firm performance. However, we report insignificant coefficients on *DMACRO_UNCRTN × DBEAT* for both *FUTCFO* and *FUTROA,* indicating that the relation between future firm performance and the premium for beating analyst earnings forecasts does not differ across low and high macro uncertainty periods. We therefore rule out that the incremental premium is due to higher expectations about future firm performance.

Return Reversal

If investors overreact to earnings news in periods of high macro uncertainty, then such overreaction should be followed by subsequent reversals of abnormal returns. We therefore next assess whether earnings announcement returns reverse in the following quarter and year. Following Barber and Lyon (1997), we estimate the long-term buy and hold abnormal stock returns over the following quarter and year and regress them on the announcement period returns for firms that beat analyst earnings forecasts across high and low macro uncertainty periods. In untabulated results, we find that the coefficients on *DMACRO_UNCRTN* × *DBEAT* are statistically insignificant for returns measured over the following quarter and year. These results suggest that the incremental premium to beating analysts' forecasts in high macro uncertainty periods is not driven by investor overreaction.

Alternative Measures of Macro Uncertainty and Investor Sentiment

It is possible that other measures of macro uncertainty and/or investor sentiment drive our results. To mitigate this concern, in untabulated tests, we re-run tests from Tables 3, 4, 6, and 7 after including VIX, EPU (Baker et al. 2016), economic recessions, and investor sentiment (Baker and Wurgler 2006). Our main inferences are generally unaffected by these robustness tests.[12]

6. Summary and Conclusions

This study examines whether and why the stock market provides an incremental premium to the act of beating earnings expectations during periods of extreme uncertainty in the economy. Our study is motivated in part by research that documents a premium associated with the act of beating earnings expectations. Missing from the literature is an examination of whether and why

[12] The only robustness results that qualitatively differ from those tabulated are those based on *APLiq_BETA2* for low risk firms in Table 7, where we find a significant result for firms that beat analyst forecasts using earnings management and do not find a significant result for firms that beat analyst forecasts without earnings management. All robustness results are available upon request from the authors.

the state of the economy influences this premium. Our study helps to fill this void and also answers the call in Dechow et al. (2010) for more research on how the macro economy impacts earnings quality.

Our tests employ a measure of macro uncertainty from Jurado et al. (2015) that captures periods in which the economy is not forecastable and a regression model that controls for the forecast error throughout the quarter. Using a large sample of U.S. firms over the years 1986 to 2020, we find that compared to the premium assigned to firms that beat analyst earnings forecasts during low macro uncertainty periods, the premium assigned to these firms is greater during high macro uncertainty periods. We posit that accounting information quality and liquidity risk are important determinants of this premium during periods of extreme macro uncertainty. Results show that there is a lower proportion and likelihood of firms using earnings management to beat earnings forecasts during high macro uncertainty periods, supporting the notion that additional investor attention reduces firms' opportunity to manage earnings, thereby resulting in higher quality earnings. We further show that the incremental premium is concentrated within firms that have low liquidity risk and high accounting information quality. These results highlight that during periods of extreme economic uncertainty, market participants seek protection in the form of higher accounting information quality (i.e., flight-to-quality) and lower exposure to liquidity risk (i.e., flight-to-liquidity). Additional tests reveal that the incremental premium is not related to future performance or returns reversals, and that our main inferences remain generally unchanged after controlling for VIX, EPU, economic recessions, and investor sentiment. Results from our study should be useful to investors, managers, and others interested in understanding the usefulness of earnings during periods of extreme economic uncertainty and forces that determine accounting information quality.

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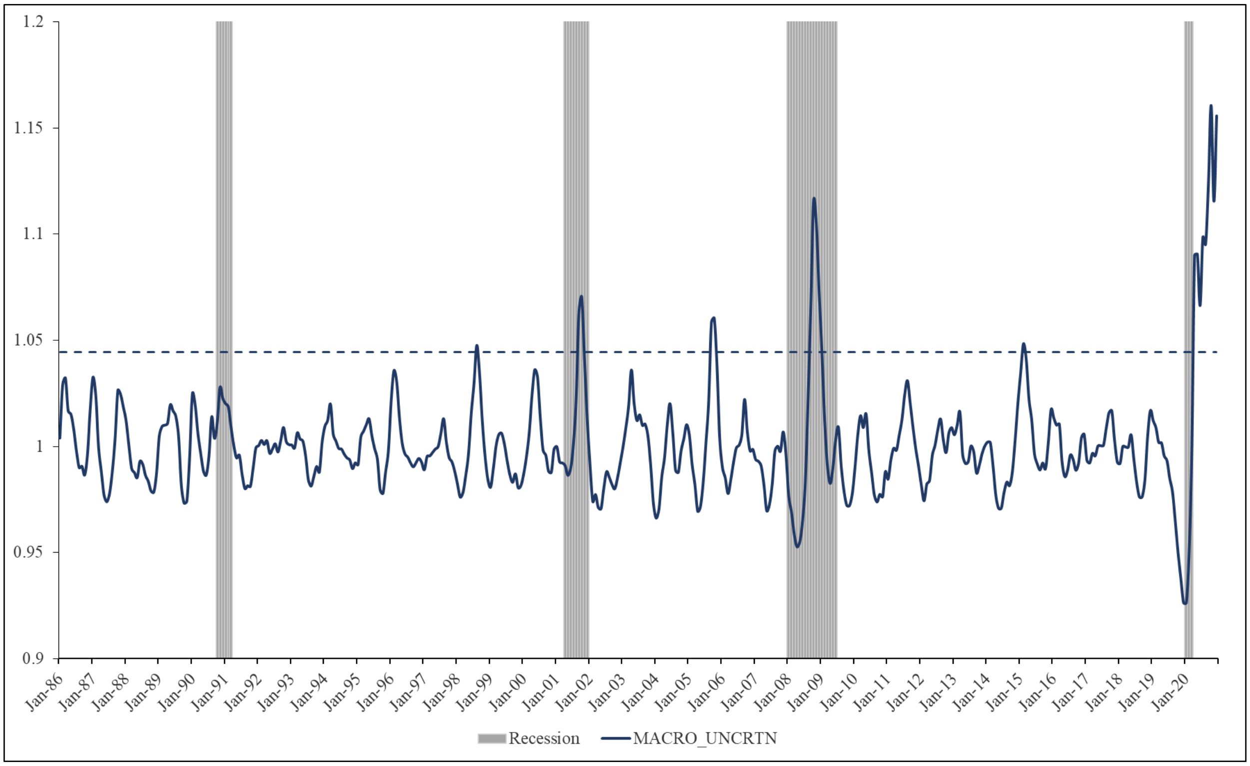
Figure 1
Macroeconomic Uncertainty Index



This figure provides the time-series of the Hodrick-Prescott detrended Macroeconomic Uncertainty Index, *MACRO_UNCRTN* (solid blue line). The horizonal dotted blue line represents 1.65 standard deviations above the mean of the Macroeconomic Uncertainty Index for the sample period January 1, 1986 to December 31, 2020. The scale on the left side of the figure represents the level of the Macroeconomic Uncertainty Index. Recession periods are shown in grey shade. See Appendix A for details about the construction of the Macroeconomic Uncertainty Index.

Appendix A
Variable Definitions

Variable	Definition
CAR	Cumulative value-weighted market-adjusted abnormal return over the period beginning two days following the date of the first earnings forecast in quarter *q* for firm *i* made at least three days after the announcement of previous quarter's earnings and ending one day after the release of quarter *q* earnings.
MACRO_UNCRTN	Macroeconomic uncertainty index, estimated by the method of principal component analysis based on a broad category of macroeconomic and financial time series data, as in Jurado et al. (2015). The data are collected from Sydney Ludvigson's website: https://www.sydneyludvigson.com/data-and-appendixes.
DMACRO_UNCRTN	An indicator variable that equals 1 if the Hodrick-Prescott detrended index exceeds 1.65 standard deviations above its mean (following Bloom 2009 and Jurado et al. 2015), and zero otherwise.
APLiq_BETA2	*APLiq_BETA2* is a liquidity risk measure from Acharya and Petersen (2005). *APLiq_BETA2* is the covariance of firm returns and unexpected market illiquidity.
APLiq_BETA3	*APLiq_BETA3* is a liquidity risk measure from Acharya and Petersen (2005). *APLiq_BETA3* is the covariance of unexpected firm illiquidity and market returns.
UEPS	Unexpected earnings for the quarter defined as $(Actual\ EPS_{i,q} - First\ forecast\ EPS_{i,q})/Price_{i,q-1}$,where $Actual\ EPS_{i,q}$ is the actual earnings per share announced by firm *i* in quarter *q*, $First\ forecast\ EPS_{i,q}$ is the first earnings per share forecast for quarter *q* of firm *i* made at least three days after the announcement of the previous quarter's earnings. $Price_{i,q-1}$ is the stock price per share at the end of previous quarter.
DBEAT	An indicator variable that equals 1 if $(Actual\ EPS_{i,q} - Last\ forecast\ EPS_{i,q}) > 0$, where $Last\ forecast\ EPS_{i,q}$ is the last earnings per share forecast for quarter *q* of firm *i* made at least three days prior to the release of earnings announcement of quarter *q*, and zero otherwise.
DMEET	An indicator variable that equals 1 if $(Actual\ EPS_{i,q} - Last\ forecast\ EPS_{i,q}) = 0$, where $Last\ forecast\ EPS_{i,q}$ is the last earnings per share forecast in quarter *q* for firm *i* made at least three days prior to the release of earnings announcement of quarter *q*, and zero otherwise.

Appendix A (cont'd)

BEATbyEM	An indicator variable that equals 1 for firms that use earnings management to beat analysts' earnings forecasts, and zero otherwise. Firms which rely on earnings management to beat earnings forecast are those with ($Actual\ EPS_{i,q}$ – $Last\ forecast\ EPS_{i,q}$) > 0 (*DBEAT* = 1) and ($Actual\ EPS_{i,q} - AbACCPS_{i,q}$) < $Last\ forecast\ EPS_{i,q}$, where $AbACCPS_{i,q}$ is estimated as follows. First, we compute abnormal accruals and normal accruals using the modified Jones model from Dechow, Sloan and Sweeney (1995). We then convert the asset-scaled abnormal accruals to a per share basis as $AbACCPS_{i,q} = (AbACC_{i,q} \times ATQ_{i,q-1})/CSHPRQ_{i,q}$,where *AbACCPS* is abnormal accruals per share, *AbACC* is abnormal accruals, *ATQ* is total assets, and *CSHPRQ* is total common shares used to compute *EPS* in quarter *q* for firm *i*.
FUTCFO	Cash flows from operations, scaled by lagged total assets, averaged over the four quarters subsequent to quarter *q*.
FUTROA	Net income, scaled by lagged total assets, averaged over the four quarters subsequent to quarter *q*.
BHAR	Buy and hold abnormal return, measured as in Barber and Lyon (1996) over the period starting from one day after the earnings announcement date and ending two days prior to the next quarter (or next four quarters) earnings announcement date.
SALES	Natural logarithm of sales for quarter *q-1*.
INDROA	Average of quarter *q ROA* computed for the two-digit SIC code to which firm *i* belongs (excluding the ROA of firm *i*).
GDP	The percentage change in seasonally adjusted gross domestic product over quarter *q-1*.

Table 1
Descriptive Statistics

Panel A: Full Sample

	N	Mean	Std Dev	Q1	Median	Q3
CAR	197,267	0.033	0.153	–0.061	0.035	0.129
DMACRO_UNCRTN	197,267	0.049	0.215	0.000	0.000	0.000
APLiq_BETA2	197,267	–0.267	0.417	–0.486	–0.237	–0.032
APLiq_BETA3	197,267	–0.049	0.373	–0.050	–0.004	–0.000
UEPS	197,267	–0.001	0.051	–0.005	0.001	0.006
DBEAT	197,267	0.589	0.492	0.000	1.000	1.000
DMEET	197,267	0.017	0.128	0.000	0.000	0.000

Panel B: High Macro Uncertainty

	N	Mean	Std Dev	Q1	Median	Q3
CAR	9,609	–0.013	0.182	–0.156	–0.013	0.112
APLiq_BETA2	9,609	–0.221	0.303	–0.368	–0.220	–0.070
APLiq_BETA3	9,609	–0.074	0.333	–0.059	–0.007	–0.001
UEPS	9,609	–0.008	0.064	–0.011	0.000	0.005
DBEAT	9,609	0.493	0.499	0.000	0.000	1.000
DMEET	9,609	0.011	0.102	0.000	0.000	0.000

Panel C: Low Macro Uncertainty

	N	Mean	Std Dev	Q1	Median	Q3
CAR	187,658	0.035	0.152	–0.057	0.037	0.130
APLiq_BETA2	187,658	–0.269	0.422	–0.494	–0.239	–0.030
APLiq_BETA3	187,658	–0.047	0.375	–0.050	–0.004	0.001
UEPS	187,658	–0.001	0.050	–0.005	0.001	0.006
DBEAT	187,658	0.593	0.491	0.000	1.000	1.000
DMEET	187,658	0.017	0.129	0.000	0.000	0.000

This table reports descriptive statistics for the main variables used in our study. Panel A reports descriptive statistics for the full sample of 197,267 firm-quarter observations. Panels B and C report descriptive statistics for subsamples partitioned into high and low macro uncertainty periods. Variable definitions are provided in Appendix A.

Table 2
Spearman Correlations
(N=197,267)

	DMACRO_ UNCRTN	*APLiq_ BETA2*	*APLiq_ BETA3*	*UEPS*	*DBEAT*	*DMEET*
CAR	–0.062	–0.016	–0.014	0.128	0.126	–0.006
DMACRO_UNCRTN		0.016	0.005	–0.040	–0.044	–0.011
APLiq_BETA2			0.032	–0.004	–0.009	–0.021
APLiq_BETA3				–0.010	–0.034	0.020
UEPS					0.760	–0.040
DBEAT						–0.156

This table reports Spearman rank correlations for the main variables used in the study. All correlations are significant at the 5% level or greater. Variable definitions are provided in Appendix A.

Table 3
Unconditional Results for Incremental Premium

	Dependent Variable: *CAR*
Intercept	–0.014***
	(–21.74)
UEPS	0.107***
	(10.65)
DBEAT	0.036***
	(42.99)
DMEET	0.015***
	(5.36)
DMACRO_UNCRTN	–0.038***
	(–13.43)
DMACRO_UNCRTN × *UEPS*	0.025
	(0.62)
DMACRO_UNCRTN* × *DBEAT	**0.001*** **
	(2.88)
DMACRO_UNCRTN × *DMEET*	0.000
	(0.02)
R^2	2.11%
N	197,267

This table reports results from an OLS regression to test for an incremental premium across high and low macro uncertainty periods (H_1). Standard errors are clustered by firm and quarter. *t*-statistics are in parentheses. *, **, *** represents statistical significance at the 10%, 5%, and 1% levels, respectively (two-tailed). Variable definitions are provided in Appendix A.

Table 4
Incremental Premium Conditioned on Liquidity Risk

	Dependent Variable: *CAR*					
	APLiq_BETA2			*APLiq_BETA3*		
	(1) High Risk	**(2) Low Risk**	***F*-test for diff. between (1) and (2)**	**(3) High Risk**	**(4) Low Risk**	***F*-test for diff. between (3) and (4)**
Intercept	–0.018***	–0.009***		–0.017***	–0.010***	
	(–22.42)	(–10.11)		(–20.57)	(–11.20)	
UEPS	0.119***	0.096***		0.106***	0.105***	
	(8.35)	(6.84)		(7.16)	(7.75)	
DBEAT	0.033***	0.038***		0.031***	0.040***	
	(31.58)	(31.48)		(28.60)	(33.97)	
DMEET	0.009***	0.021***		0.018***	0.013***	
	(2.50)	(4.80)		(4.49)	(3.34)	
DMACRO_UNCRTN	–0.029***	–0.047***		–0.042***	–0.034***	
	(–7.97)	(–10.69)		(–10.46)	(–8.66)	
DMACRO_UNCRTN × *UEPS*	0.007	0.026		–0.025	0.055	
	(0.11)	(0.50)		(–0.40)	(1.06)	
DMACRO_UNCRTN* × *DBEAT	**0.000**	**0.003*****	***F*-stat: 8.95**	**0.001**	**0.002*****	***F*-stat:1.75**
	(0.43)	**(3.90)**	***p*-value: 0.01**	**(1.07)**	**(2.98)**	***p*-value: 0.07**
DMACRO_UNCRTN × *DMEET*	0.001	–0.000		–0.004	0.003	
	(0.26)	(–0.04)		(–1.34)	(1.23)	
R^2	2.05%	2.23%		1.83%	2.36%	
N	98,633	98,634		98,636	98,631	

This table reports results from OLS regressions to test for an incremental premium across subsamples partitioned on median liquidity risk (H_2). Standard errors are clustered by firm and quarter. *t*-statistics are in parentheses. *, **, *** represents statistical significance at the 10%, 5%, and 1% levels, respectively (two-tailed). Variable definitions are provided in Appendix A.

Table 5
Earnings Management to Beat Analyst Earnings Forecasts across High and Low Macro Uncertainty Periods

***Panel A: Univariate analysis of the proportion of firms using earnings management (EM) to beat analyst earnings forecasts* (N = 61,723)**

	#Firms that beat with EM	#Firms that beat without EM	Proportion of firms that beat with EM
High Macro Uncertainty (*DMACRO_UNCRTN* = 1)	784	1,743	31.02%
Low Macro Uncertainty (*DMACRO_UNCRTN* = 0)	19,615	39,581	33.14%
z-statistic			2.209
p-value			0.027

Panel B: Multivariate analysis of determinants of using earnings management (EM) to beat analyst earnings forecasts

$$Pr\ (BeatbyEM_{q,t} = 1) = \beta_0 + \beta_1 DMACRO\_UNCRTN_q + \beta_2 GDP_q + \beta_3 IndustryROA_{i,q} + \beta_4 FirstQuarterDummy + \beta_5 SecondQuarterDummy + \beta_6 ThirdQuarterDummy + \varepsilon_{i,q}$$

	Coeff. Est.	Wald χ^2	*p*-value
Intercept	–0.144***	19.358	<0.01
UNCRTNDummy	–0.121***	15.356	<0.01
GDP	0.000***	537.729	<0.01
INDROA	–2.603***	478.327	<0.01
FirstQuarterDummy	–0.498***	748.956	<0.01
SecondQuarterDummy	–0.132***	52.134	<0.01
ThirdQuarterDummy	0.046***	6.252	0.01
N	61,723		
Log-likelihood ratio χ^2	2,195.64		

Panel A of this table presents a univariate test for the proportion of firms that beat analyst earnings forecasts either using or not using earnings management across high and low macro uncertainty periods. Panel B of this table provides results from a logistic regression to assess the likelihood of using earnings management to beat analyst earnings forecasts across high and low macro uncertainty periods (H_3). The samples in both panels are restricted to firms that beat analyst earnings forecasts (N=61,723).*, **, *** represents statistical significance at the 10%, 5%, and 1% levels, respectively (two-tailed). Variable definitions are provided in Appendix A.

Table 6
Incremental Premium Conditioned on Accounting Information Quality

	Dependent Variable: CAR		
	Beat with Earnings Management	***Beat without Earnings Management***	***F-test for diff. between (1) and (2)***
	(1)	**(2)**	
Intercept	–0.010***	–0.019***	
	(–8.68)	(–16.80)	
UEPS	0.114***	0.112***	
	(5.38)	(6.44)	
DBEAT	0.033***	0.032***	
	(19.96)	(22.27)	
DMEET	0.016***	0.016***	
	(3.10)	(3.36)	
DMACRO_UNCRTN	–0.033***	–0.041***	
	(–5.10)	(–8.13)	
DMACRO_UNCRTN × *UEPS*	–0.109	0.133**	
	(–1.22)	(2.06)	
DMACRO_UNCRTN* × *DBEAT	**0.001**	**0.002*** **	***F*-stat: 3.17**
	(0.79)	**(2.95)**	***p*-value: <0.01**
DMACRO_UNCRTN × *DMEET*	–0.006*	–0.000	
	(–1.71)	(–0.15)	
R^2	1.78%	1.97%	
N	43,126	62,964	

This table reports results from OLS regressions that test for an incremental premium across subsamples based on whether a firm relies on earnings management (abnormal accruals) to beat analysts' earnings forecasts (H_4). Standard errors are clustered by firm and quarter. *t*-statistics are in parentheses. *, **, *** represents statistical significance at the 10%, 5%, and 1%, respectively (two-tailed). Variable definitions are provided in Appendix A.

Table 7
Incremental Premium Conditioned on the Interaction of Liquidity Risk and Accounting Information Quality

	Dependent Variable: *CAR*							
	APLiq_BETA2				*APLiq_BETA3*			
	High Risk		Low Risk		High Risk		Low Risk	
	Beat with Earnings Management	Beat without Earnings Management	Beat with Earnings Management	Beat without Earnings Management	Beat with Earnings Management	Beat without Earnings Management	Beat with Earnings Management	Beat without Earnings Management
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	–0.016***	–0.023***	–0.004**	–0.015***	–0.014***	–0.023***	–0.008***	–0.015***
	(–10.79)	(–15.15)	(–2.39)	(–9.07)	(–8.11)	(–14.54)	(–4.52)	(–9.39)
UEPS	0.157***	0.143***	0.072**	0.085***	0.112***	0.088***	0.114***	0.128***
	(5.55)	(5.86)	(2.34)	(3.52)	(3.67)	(3.49)	(3.92)	(5.49)
DBEAT	0.030***	0.030***	0.037***	0.034***	0.030***	0.029***	0.036***	0.035***
	(14.41)	(16.03)	(14.20)	(15.67)	(12.19)	(14.80)	(15.71)	(16.86)
DMEET	0.003	0.017***	0.030***	0.014*	0.014*	0.018***	0.018***	0.015**
	(0.47)	(2.88)	(3.52)	(1.75)	(1.67)	(2.67)	(2.59)	(2.20)
DMACRO_UNCRTN	–0.028***	–0.028***	–0.038***	–0.054***	–0.045***	–0.041***	–0.025***	–0.040***
	(–3.30)	(–4.35)	(–3.82)	(–6.83)	(–4.65)	(–5.33)	(–2.99)	(–5.93)
DMACRO_UNCRTN × *UEPS*	–0.221*	0.025	–0.021	0.196**	–0.145	0.023	–0.084	0.181**
	(–1.67)	(0.24)	(–0.18)	(2.31)	(–0.98)	(0.21)	(–0.76)	(2.25)
DMACRO_UNCRTN* × *DBEAT	**0.000**	**0.001**	**0.002**	**0.004*** **	**0.000**	**0.002***	**0.001**	**0.002*** **
	(0.02)	**(1.01)**	**(1.13)**	**(3.18)**	**(0.03)**	**(1.82)**	**(0.94)**	**(2.41)**
DMACRO_UNCRTN × *DMEET*	–0.005	–0.001	–0.009	0.002	–0.010*	–0.005	–0.003	0.002
	(–1.33)	(–0.23)	(–1.18)	(0.39)	(–1.82)	(–1.07)	(–0.69)	(0.60)
R^2	1.94%	1.83%	1.72%	2.23%	1.69%	1.59%	1.86%	2.28%
N	21,862	31,185	21,264	31,779	19,996	29,822	23,130	33,142

F-test to compare coefficient on *DMACRO_UNCRTN* × *DBEAT* in column (4) with columns (1), (2) and (3); and in column (8) with columns (5), (6), and (7), respectively.

	(4) and (1)	(4) and (2)	(4) and (3)
F-stats	5.14	1.95	6.46
p-value	<0.01	0.05	<0.01

	(8) and (5)	(8) and (6)	(8) and (7)
F-stats	1.93	3.04	1.78
p-value	0.05	<0.01	0.07

Table 7 continued

This table reports results from OLS regressions that test for an incremental premium based on the interaction of median liquidity risk and whether a firm relies on earnings management to beat analyst earnings forecasts (H_5).. Standard errors are clustered by firm and quarter. *t*-statistics are in parentheses. *, **, *** represents statistical significance at the 10%, 5%, and 1% levels, respectively (two-tailed). Variable definitions are provided in Appendix A.