The Earnings Announcement Premium as Uncertainty Aversion: Theory and Evidence*

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Abstract

We argue the earnings announcement premium is a measure of latent uncertainty. Our stylized model shows earnings announcements, as pure news events, are priced only if investors are uncertainty averse; further, the earnings announcement return is negatively correlated to future investment only if there is latent uncertainty. Consistent with the model, we empirically show that when the earnings announcement premium is higher, investment falls, cash levels and savings increase. Finally, the earnings announcement return is higher for firms with greater political risk, small firms, complex firms, and firms listed on NASDAQ or AMEX, inconsistent with time-separable expected utility.

JEL category: D81, G14, G31

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Uncertainty has been recognized as an important driver of economic behavior since Knight (1921) and Keynes (1936). As opposed to risk, which is measurable, uncertainty describes situations in which probabilities cannot be measured. Experimental evidence has shown a preference for known probabilities (Etner, Jeleva, and Tallon, 2012), and there is strong evidence that uncertainty aversion influences aggregate economic outcomes (see Maenhout, 2004 and Ju and Miao, 2012). Does uncertainty matter only for aggregate economic outcomes, not influencing individual firm behavior? Can corporate finance models ignore uncertainty, relying only on traditional methods? Is uncertainty merely asset pricing, not affecting corporate finance? We argue uncertainty aversion impacts individual firm behavior, and is thus necessary for corporate finance.

This paper presents a stylized model that considers the impact of information on returns and investment levels. The model predicts announcement returns will be higher when investors face more uncertainty, yet investment will be lower, because uncertainty-averse investors behave as if they are pessimistic. When investors are uncertainty neutral, there will be a positive correlation between announcement returns and investment. In contrast, the announcement return will be negatively correlated with investment when there is sufficient latent uncertainty (latent to the researcher, not the market). We empirically demonstrate this: we show that the earnings announcement return is *negatively* correlated with investment the following quarter.

Ai and Bansal (2018) show macroeconomic announcements, as pure news events (not affecting consumption today), should not be priced with time-separable expected utility: the expected return around an announcement should be zero. Using generalized risk preferences described in Strzalecki (2013), where the objective is $V_t = u(c_t) + \beta I(V_{t+1})$, Ai and Bansal (2018) show that pure news events are priced if and only if I is Schur Concave (note I is linear with time-separable expected utility). They further demonstrate this holds empirically: 55% of the market equity premium is earned on the 30 days of macroeconomic announcements.

Thus, Ai and Bansal (2018) reject time-separable expected utility, providing evidence consistent with investor uncertainty aversion. However, they are unable to exclude other possibilities, such as Epstein and Zin (1989) with a preference for early resolution of uncertainty. In contrast, our setting allows us to make a stronger claim for uncertainty aversion. We show that the reasoning in Ai and Bansal (2018) also shows that earnings announcements, as pure news events, would be priced if investors are uncertainty averse. However, a representative investor's continuation utility would not be affected by the earnings announcement of a small stock. Indeed, we empirically show that the earnings announcement premium is larger for small stocks. Thus, the earnings announcement premium gives strong evidence for investor uncertainty aversion.

The earnings announcement premium is a classic puzzle in finance. Originally documented by Chari, Jagannathan, and Ofer (1988) and Ball and Kothari (1991), it is a persistent phenomenon, as shown in Frazzini and Lamont (2007) and Barber et al. (2013). We document that the average cumulative excess return on earnings announcement dates per year is 0.95% in the period of 1961-2020, so 15.3% of the annual market equity premium is earned on the four announcement days. This suggests that earnings announcement premium is indeed large and even more substantial (per announcement) than the macroeconomic announcement premium. Savor and Wilson (2016) attribute the earnings announcement premium to pricing for systematic risk, because the aggregate market responds as well. However, the arguments of Ai and Bansal (2018) apply: earnings announcements are pure news events, which would not be priced under time-separable expected utility.

We argue that the earnings announcement premium (EAP) is driven by the uncertainty aversion of investors, and is thus a firm-specific measure of the costs of Knightian uncertainty. To empirically support this argument, we measure EAP by cumulative abnormal returns (CARs) over three days around quarterly earnings announcement and use a large panel of publicly traded U.S. firm-quarter observations between 1971 and 2020. To check whether the data support the predictions by our model, we first show that the realized EAP is *negatively* correlated with investment the following quarter, a result that requires latent uncertainty.[1] Specifically, a one-standard-deviation increase in EAP ($\approx$ 8%) is correlated with a 6.2% decrease in total investment (for the median firm) the following quarter. The negative relationship holds for investment in intangible assets as well, though the relationship is much stronger for investment in physical assets. This occurs in spite of the fact that profitability is increasing in the EAP.[2] These results are robust to controlling not only for earnings surprise which is believed to explain a significant portion of the variation

[1] A negative relationship between corporate investment and stock return is documented by Titman, Wei, and Xie (2004). They relate investment in the previous year to monthly excess returns in the following year (or to annual cumulative earnings announcement returns for the following year) while we relate abnormal returns around the earnings announcement for the previous quarter to investment during the following quarter. Though not the same specification as theirs, our results are robust to controlling for EAP_{t+1} as reported in Table A3 in the Appendix.

[2] Chang et al. (2017) shows the earnings announcement premium is larger in firms with high earnings seasonality. One might be concerned that the quarterly EAP-investment relationship could be driven by concurrent seasonality in investment. Our results are robust to controlling for the same fiscal quarter within firm, rejecting seasonality as the main channel.

in earnings announcement premium but also for analysts' forecast dispersion, a widely adopted measure of uncertainty.[3] We include firm and quarter fixed effects, so this latent uncertainty must be time-varying and firm specific.

The precautionary motive for saving implies that a firm may attempt to weather a high level of uncertainty by saving more and thereby increasing cash holdings. We document positive relationships between the realized EAP and cash as well as cash savings: 8% higher EAP is associated with a 7.48% increase in cash for a median firm the following quarter. Combined with our model prediction and earlier results on the negative EAP-investment relationship, which is consistent with the realized EAP capturing latent uncertainty, the positive relationship between EAP and cash suggests that firms with greater uncertainty hoard cash more while cutting back investments. We also find that these results on the relationship between EAP and corporate policies disappear when we replace the EAP with abnormal returns around a placebo date which is one month after the quarterly earnings announcement date.

Next, to empirically validate EAP as a measure of uncertainty, we examine likely determinants of the realized EAP. We first show that EAP is positively correlated with dispersion of analyst' earnings forecasts, the aforementioned measure of uncertainty in the literature. We also relate EAP to a text-based measure of firm-level political uncertainty (Hassan et al., 2019) and find that they are positively correlated. To address a potential concern that the novelty of our EAP as a measure of uncertainty could be diluted by the existing political uncertainty measure, we also show that our earlier results on the relationships between EAP and corporate policies are robust to controlling for the measure of political uncertainty.

Chari, Jagannathan, and Ofer (1988) first document that the earnings announcement premium is larger for small firms. We confirm that this negative correlation between the realized EAP and firm size still holds for our sample over a much longer period. This result is consistent with greater uncertainty for small firms, to the degree to which the realized EAP captures the firm-specific level of uncertainty. However, this result is inconsistent with both expected utility and long-run risk models. Because the conditional expectation of the earnings announcement return is zero for all firms under expected utility, any predictor of the earnings announcement return would contradict

[3]Following Diether, Malloy, and Scherbina (2002), however, the validity of forecast dispersion as a measure of uncertainty has been questioned and disputed over the past couple of decades (e.g., Doukas, Kim, and Pantzalis, 2006; Barron, Stanford, and Yu, 2009; Veenman and Verwijmeren, 2021).

expected utility. As mentioned earlier, this cannot be explained by long-run risk models, like Epstein and Zin (1989), because a representative investor's lifetime utility would not be affected by earnings announcements of small firms. Moreover, Savor and Wilson (2016) show that earnings announced by small firms do not signal much about future aggregate earnings.

Our results also show that the realized *EAP* is larger for firms listed on NASDAQ or AMEX, compared to those listed on NYSE. Moreover, further investigation reveals that such difference in *EAP* across exchanges vanishes for the post-Sarbanes-Oxley period. These results suggest that *EAP* is larger for more uncertain firms as the disclosure requirement for firms listed on NYSE was stricter before the Sarbanes-Oxley act became effective in 2003. We further study the number of segments as a determinant of *EAP* because firms with more business segments are more complex, thereby making it harder to be certain about firms' future cash flow. As expected, the results show that the realized *EAP* is larger for firms with more business segments.

As documented by numerous studies in the accounting literature,[4] the earnings announcement return is usually higher when a positive earnings surprise occurs. Also, dispersion in analysts' earnings forecasts has been used as a proxy for uncertainty. Thus, we control for both the standardized unexpected earnings (*SUE*) and forecast dispersion (*Forecast dispersion*) in all specifications for the determinants of *EAP*: our results remain unaffected.

To sum up, our analyses indicate that the realized *EAP* is larger for small firms and likely more uncertain firms, suggesting that the earnings announcement return measures uncertainty.[5] Thus, we can reject time-separable expected utility not only because the earnings announcement premium exists, but also because it is correlated with observables. We can also reject models like Epstein and Zin (1989) because the earnings announcement premium is larger for smaller firms.

The paper is organized as follows. Section 1 presents the model. Section 2 describes the data. Section 3 presents empirical results on the relationships between earnings announcement premium and corporate policies and outcomes. Section 4 presents empirical results on the determinants of earnings announcement premium. Section 5 concludes. All proofs are in the Appendix.

[4] See Ball and Brown (1968), Beaver (1968), Foster, Olsen, and Shevlin (1984), and Bernard and Thomas (1989) among many others. Kothari (2001) provides a review of related studies.

[5] Our findings support the theoretical results of Dicks and Fulghieri (2015) that uncertainty-averse investors are information avoidant: investors demand a premium to hold the asset when news is released. See also Caskey (2009), Sato (2014), and Andries and Haddad (2020), as well as Coval et al. (2009), Henderson and Pearson (2011), and Celerier and Vallee (2017).

1 The Model

Suppose we have a firm with assets in place, V, and an investment opportunity that can increase those assets, I, at cost $\frac{1}{2Z}I^2$. If the firm succeeds, it receives earnings $V + I$. If the firm fails, it receives 0. At $t = 0$, equity in the firm is traded. At $t = 1$, there is news and the firm makes an investment decision. At $t = 2$, payoffs are realized and paid out.

At $t = 1$, shareholders receive news, $n \in \{G, B\}$. If the shareholders receive good news, $n = G$, the probability of success is q_G. If they receive bad news, $n = B$, the probability of success is $q_B < q_G$. Shareholders receive good news with probability γ, and bad news with probability $1 - \gamma$.

Investors treat the success probabilities, q_G and q_B, and the probability of good news, γ, as uncertain. We model uncertainty aversion with the minimum expected utility (MEU) approach developed in Gilboa and Schmeidler (1989).[6] With MEU, investors do not have a single prior on future events – rather, they believe that the probability distribution of future events belongs to a given set $\mathcal{M}$, denoted as their "core beliefs set." Thus, uncertainty-averse agents maximize

$$\mathcal{U} = \min_{\mu \in \mathcal{M}} E_{\mu} \left[u \left(\cdot \right) \right], \tag{1}$$

where μ is a probability distribution over future events, and $u(\cdot)$ is a von-Neumann Morgenstern (vNM) utility function.[7] When u is a linear (or affine) function, the investor will be a risk-neutral but uncertainty-averse agent. For simplicity, we assume that $\mathcal{M} = \Gamma \times Q_G \times Q_B$, where $\Gamma = [\gamma^* - \alpha, \gamma^* + \alpha]$, $Q_G = [q_G^* - \alpha, q_G^* + \alpha]$, and $Q_B = [q_B^* - \alpha, q_B^* + \alpha]$. Similar to Illeditsch (2011), this captures the intuition that investors do not know the precision of the news. For tractability, we assume $\alpha < \gamma, q_B, q_G$. Note α captures uncertainty aversion of investors: when $\alpha = 0$, investors consider only one prior, and are thus uncertainty neutral. As is standard with MEU, the model does not differentiate between an increase in uncertainty and an increase in aversion to uncertainty: an increase in α could be driven by investors becoming more sensitive to uncertainty, or by investors perceiving the firm as more uncertain. α is known by market participants at $t = 0$ – varying α allows us to study how investors react to information when exposed to Knightian uncertainty.

[6]Alternative approaches to uncertainty aversion include Klibanoff et al. (2005) and Maccheroni et al. (2006).
[7]In the traditional framework, players have a single prior μ and maximize expected utility $E_{\mu} [u(\cdot)]$.

Given news n, the firm[8] chooses investment at $t = 1$ to maximize $\Pi_n = \min_{q_n \in Q_n} \pi_n$

$$\pi_n = q_n (V + I_n) - \frac{1}{2Z} I_n^2. \tag{2}$$

The prior value of the firm is $\Pi_0 = \min_{\gamma \in \Gamma} \pi_0$, where

$$\pi_0^* = \gamma \Pi_G^* + (1 - \gamma) \Pi_B^*. \tag{3}$$

Finally, define the announcement return upon hearing news $n \in \{G, B\}$ as $R_n = \frac{\Pi_n^* - \Pi_0^*}{\Pi_0^*}$. Let us first consider the case when the agent is uncertainty-neutral – when $\alpha = 0$.

Theorem 1 *When investors are uncertainty neutral, the optimal investment is higher following good news, $I_n = Zq_n$. The expected earnings announcement return is zero, $E[R_n] = 0$, and earnings announcement return is positively correlated with investment, $Cov(R_n, I_n) > 0$.*

When investors are uncertainty neutral, they behave as if q_G, q_B, and γ are all known, so the value of the firm prior to the news is equal to the expected value of the firm after the news. Thus, the expected earnings announcement premium is zero, regardless of the riskiness of the firm. An increase in risk increases the dispersion of the announcement return, but not the level of the return, under standard preferences. Because $q_G > q_B$, and firm value and investment are increasing in the probability of success, following good news, firm value and investment increase. Similarly, following bad news, firm value and investment decrease. Therefore, in the absence of uncertainty aversion, investment should be increasing in the realized earnings announcement premium. That is, the standard model predicts a positive correlation between earnings announcement return and investment in the following quarter.

Note the expectation in Theorem 1 is the conditional expectation given all available information at the time of the announcement. That is, Theorem 1 shows that under expected utility, there is no risk premium associated with the announcement. Thus, the earnings announcement premium is inconsistent with expected utility, whether this premium exists for only some firms or all firms. Further, any determinants of the earnings announcement premium (known before the announce-

[8]To focus on the role of uncertainty, we assume management is benevolent to shareholders, maximizing shareholder minimum expected payoff. For optimal contracting under uncertainty, see Carroll (2015), Carroll and Meng (2016), Dicks and Fulghieri (2021), Kellner (2015), Lee and Rajan (2018), and Miao and Rivera (2016).

ment) would also be inconsistent with expected utility. Section 2 shows that there is an earnings announcement premium, on average, and Section 4 shows that there are predictable determinants of the earnings announcement return, inconsistent with expected utility.

1.1 Uncertainty Aversion

Suppose shareholders are worried about the quality of the firm. They treat γ, q_G, and q_B as uncertain: they believe $\gamma \in [\gamma^* - \alpha, \gamma^* + \alpha]$, $q_G \in [q_G^* - \alpha, q_G^* + \alpha]$, and $q_B \in [q_B^* - \alpha, q_B^* + \alpha]$, where α is the uncertainty aversion of shareholders. Because the payoff at every point in the tree is increasing in the success probability and in the probability good news is learned, shareholders will behave as though $\gamma = \gamma^* - \alpha$, $q_G = q_G^* - \alpha$, and $q_B = q_B^* - \alpha$.

Theorem 2 *An increase in uncertainty decreases ex post investment and ex post firm value.*

Because uncertainty-averse investors are concerned about the worst-case scenario, they are pessimistic and underinvest when facing uncertainty: $I_n = (q_n - \alpha) Z$. Investors will be pessimistic both ex post and ex ante. Because $\pi_0^* = \gamma \Pi_G^* + (1 - \gamma) \Pi_B^*$, and $\Pi_0 = \min_{\gamma \in \Gamma} \pi_0$,

$$\Pi_0^* = (\gamma^* - \alpha) \Pi_G^* + (1 - \gamma^* + \alpha) \Pi_B^*. \quad (4)$$

Uncertainty-averse investors underestimate the probability of good news, behaving as if $\gamma = \gamma^* - \alpha$, rather than γ^*. Thus, $R_G = (1 - \gamma^* + \alpha) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*}$ and $R_B = -(\gamma^* - \alpha) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*}$.

Theorem 3 *When investors are uncertainty averse, there is an earnings announcement premium: $E[R_n] > 0$. Further, the earnings announcement premium is higher when investors are more uncertainty averse: $\frac{\partial E[R_n]}{\partial \alpha} > 0$.*

Theorem 3 holds because the expectation is from the perspective of the econometrician. That is, the core of beliefs is centered around the true probability distribution, $\{\gamma^*, q_G^*, q_G^*\}$. Uncertainty aversion induces shareholders to be pessimistic: prices are consistent with the pessimistic belief that good news is observed with lower probability $\gamma^* - \alpha$. Because good news arrives with greater probability, γ^*, than the worst-case scenario, there is a positive earnings announcement premium. Thus, uncertainty aversion induces pessimism, which produces the positive earnings announcement premium. This is the same mechanism whereby uncertainty resolves the equity premium puzzle, Maenhout (2004), and other asset-pricing puzzles, Ju and Miao (2012). As uncertainty increases, the worst-case scenario departs further from the true probability, magnifying the effect.

Theorem 2 shows that investment decreases when uncertainty increases. Theorem 3 shows that the expected earnings announcement return increases when uncertainty increases. However, we do not observe the expected earnings announcement return in the data, only the realized earnings announcement return. Empirical testing of this hypothesis, however, will be more nuanced. We will assume that the econometrician does not observe α, though all economic agents do. If uncertainty is constant, this effect will not be observed in the data, due to the following corollary.

Corollary 1 *Given a level of uncertainty, α, realized earnings announcement returns are positively correlated with investment: $Cov\left(R_n, I_n|\alpha\right) > 0$.*

Corollary 1 shows the intuitive result. When the firm receives good news, it increases in value, and investment increases going forward, so investment and realized earnings announcement returns will be positively correlated. Note that this holds whether investors do not care about uncertainty, $\alpha = 0$, or if investors always have the same perception of uncertainty: formally, constant $\alpha > 0$. In contrast, if there is sufficient latent uncertainty, the result changes. For ease of exposition, we will assume α is binomial: $P\left(\alpha = \alpha_H\right) = h$ and $P\left(\alpha = \alpha_L\right) = 1 - h$. Recall that market participants can see α, but the econometrician cannot (attitudes toward uncertainty are latent).

Theorem 4 *If there is sufficient latent uncertainty,[9] then the realized earnings announcement return is negatively correlated with future investment: $Cov\left(R_n, I_n\right) < 0$.*

Thus, Theorem 4 provides the key testable empirical implication. Under expected utility, as demonstrated by Theorem 1, the expected value of the earnings announcement return is zero for all firms, and the earnings announcement return is positively correlated with future investment. From Corollary 1, if each firm is affected by a consistent level of uncertainty and uncertainty aversion, the earnings announcement premium will be positive and positively correlated with future investment. Finally, if latent uncertainty is sufficiently volatile, and investors dislike uncertainty, Theorem 4 shows that not only will the earnings announcement premium be positive, but also that it will be

[9]The cutoff is $\sigma_\alpha^2 > \sigma_q^2 \frac{1}{\Delta ER(\alpha_H, \alpha_L)} E_\alpha \frac{V + \frac{Z}{2}\left(q_G^* + q_B^* - 2\alpha\right)}{\Pi_0^*(\alpha)}$, where ΔER is the difference quotient of expected return.

negatively correlated with future investment. As we will see in Section 3 and Section 4, empirical results are consistent with Theorem 4 and the existence of latent uncertainty. Because we will include firm and quarter fixed effects, this must be time-varying firm-specific uncertainty.

1.2 Numerical Example

We provide a numerical example here to aid intuition. Suppose that the probability of receiving good news is $\gamma^* = 0.5$, the probability of success given good news is $q_G = 0.8$, while the probability of success given bad news is $q_B = 0.6$. Further, assume that the assets in place pay off $V = 2000$ given success, and that the new project has productivity $Z = 2000$.

Consider first the case when investors are uncertainty-neutral: $\alpha = 0$. If the firm receives good news, they will invest $I_G = 1600$, and firm value will be $\Pi_G = 2240$. If the firm receives bad news, they will only invest $I_B = 1200$, and firm value will be $\Pi_B = 1560$. Therefore, in the absence of uncertainty, expected investment will be $E[I] = 1400$, and the firm's prior value will be $\Pi_0 = 1900$. This implies $E[R_n] = 0$ – the earnings announcement return averages zero. Further, $Cov(R_n, I_n) = 35.8$, which is strictly positive.

Next, consider the case when investors are uncertainty-averse: $\alpha = 0.4$. If the firm receives good news, rather than behaving as if $q_G = 0.8$, investors are worried about the informativeness of the news, so they behave as if $q_G = 0.8 - 0.4 = 0.4$, so $I_G = 800$, and firm value will be $\Pi_G = 960$. If the firm receives bad news, they behave as if $q_B = 0.2$, so $I_B = 400$, and firm value will be $\Pi_B = 440$. Note, uncertainty harms expected investment: $E[I_n] = 600$. Further, investors are pessimistic not only about the probability of success given news, but also about the probability of receiving good news, behaving as if $\gamma = 0.1$. This implies that the initial value of the firm will be $\Pi_0 = 492$. Because good news arrives with probability $0.5 > 0.1$, this implies $E[R_n] = 0.42$ – there is an expected earnings announcement premium. However, $Cov(R_n, I_n) = 105.7$, which is strictly positive.

To get a negative relationship between the earnings announcement return and investment, assume that the econometrician cannot observe uncertainty preferences of investors, but observes a population where investors are worried about half of the firms, $h = 0.5$, but not concerned about the other half, $1 - h = 0.5$. The uncertain firms will have higher expected announcement return and lower investment. Thus, even though $E[Cov(R, I|\alpha)] = 70.5$, $Cov(E[R|\alpha], E[I|\alpha]) = -84.6$, so by the Law of Total Covariance, $Cov(R, I) = -13.8$. Therefore, the effect of expected investment and returns can dominate when the econometrician cannot observe uncertainty attitudes. Finally, note that in the absence of uncertainty, the conditional expectation of announcement returns will be zero, so any predictors of the announcement return would be inconsistent with expected utility.

2 Data and Variables

2.1 Sample construction

To empirically test the predictions of the model, we use data on daily stock returns around quarterly earnings announcements and data on quarterly accounting information compiled from CRSP and Compustat, respectively. Divisional data for U.S. publicly listed firms are acquired from Compustat Historical Segments file and data on quarterly EPS forecast and its dispersion across analysts are collected from I/B/E/S. We start our sample construction with all NYSE, NASDAQ, and AMEX stocks on the quarterly CRSP/Compustat Merged file between 1971 and 2020, and drop firm-quarter observations with total assets less than 1 million U.S. dollars. We also drop those missing information on stock returns around the earnings announcement or total assets. Finally, we also exclude from the sample non-manufacturing firms such as financial and utility firms. This procedure leads to the final sample of 614,375 firm-quarters.

2.2 Key variables

2.2.1 Earnings announcement premium

Since we only observe realized returns, we use cumulative abnormal return (CAR) approach to measure earnings announcement premium (EAP) at firm level. While some previous studies employ monthly (e.g., Frazzini and Lamont, 2007; Barber et al., 2013) or weekly (e.g., Savor and Wilson, 2016) long-short portfolio return approach to estimate EAP, we focus on returns for individual stocks to study how uncertainty aversion influences individual firm's policies. Following Engelberg, McLean, and Pontiff (2018), we identify the exact timing of earnings announcement by examining the firm's trading volumes each day around the reported announcement date and picking the day with the highest volume. We measure the daily market return by the daily return on the valueweighted market portfolio, and compute the three-day CARs from one day before to one day after the identified actual announcement date as our measure of EAP.[10]

Figure 1 shows time-series patterns in the average annual EAP proxied by the three-day fiscal-year-end earnings announcement CAR over time during our sample period. Note the average EAP dropped dramatically between 2002 and 2007. This diminishing EAP is consistent with the evidence documented in Heitz, Narayanamoorthy, and Zekhnini (2020), claiming that earnings announcement premium for 10-K or 10-Q filing has disappeared since the materiality requirement for 8-K filings was enacted in 2004 as a part of the Sarbanes-Oxley Act. Throughout the Great Recession, however, the average EAP had risen again. More interestingly, we observe a dramatic jump in the average EAP in 2020 during which the COVID-19 Pandemic Crisis hit the world. Through the results of formal regressions with a set of controls reported in Table A1 in the Appendix, we further confirm that the estimated EAP is significantly higher during the Pandemic by around 0.2%–0.7% depending on the choice of control variables. These historical patterns are consistent with earnings announcement premium potentially being a good proxy for uncertainty.

FIGURE 1 ABOUT HERE

2.2.2 Forecast dispersion

The existing literature considers the dispersion of analysts forecasts as a measure of uncertainty, as in Anderson, Ghysels, and Juergens (2009), Ilut and Schneider (2014), and Kim (2015). Intuitively, when analysts are predicting wildly different forecasts, the typical investor would have a more difficult time interpreting information about the firm. It is, however, not conclusive whether the forecast dispersion from data indeed captures uncertainty or not because of a well-documented negative relationship between the dispersion and stock returns (Diether, Malloy, and Scherbina, 2002; Johnson, 2004; Doukas, Kim, and Pantzalis, 2006; Barron, Stanford, and Yu, 2009; Barinov, 2013; Veenman and Verwijmeren, 2021). Nonetheless, we want to make sure that this measure of

[10]While expected announcement dates are widely used in the literature to measure earnings announcement premium, it is yet to be clear what the best way to predict the announcement dates is: some papers use the actual announcement date for the same quarter in the previous year while others attempt to refine it by executing some additional algorithms. Moreover, actual announcement date fits our model better: the representative investor has a *long* exposure because the stock has a positive net supply. Thus, the representative investor would just wait until the actual announcement is made. That said, most of our results are robust to using expected announcement dates instead of actual announcement dates. The only exception is the result in Section 4.3, which will be discussed further.

uncertainty works in the same way as ours, and to also ensure that the earnings announcement premium is not merely picking up this well-known source of uncertainty. Thus, we also control for the dispersion of analyst earnings forecasts. Following previous studies in the literature, we define the forecast dispersion as the standard deviation of earnings forecasts across analysts, normalized by the absolute value of the mean consensus forecast.

2.2.3 Corporate investment and other variables

Our main measure of investment is borrowed from Peters and Taylor (2017) and defined as capital expenditures in physical assets plus R&D and SG&A expenses during this quarter, deflated by total capital stocks at the beginning of the quarter. This way, we can take into account investments not only in tangible capital but also in intangible capital.[11] We define cash and cash saving as cash plus short-term investments normalized by total assets and an increase in cash during the quarter divided by total assets in the previous quarter, respectively. Firm size is the logarithm of total assets and Tobin's Q is the ratio of the market value of assets to the book value of assets. Cash flow and ROA are defined as quarterly net income and quarterly operating income before depreciation, both normalized by one-quarter lagged total assets. Debt equals the book leverage ratio, which is the sum of short-term and long-term debts (total debts) divided by total assets. Cash flow volatility is computed as the standard deviation of annual end-of-fiscal-year operating income before depreciation over the most recent five years, requiring at least twelve consecutive quarters of non-missing data preceding the quarter.[12] Return volatility is measured as the standard deviation of daily stock returns over the most recent 60 trading days. Firm age is the number of years during which the firm has been on Compustat with a non-missing stock price. Number of analysts is defined as the number of forecast estimates by analysts for the current quarter. Lastly, following Duchin (2010), we define cross-divisional correlation as the sales-weighted cross-divisional correlation in cash flows based on each division's industry-level measure of cash flow. We multiply by 100 all asset-normalized variables for the ease of interpretation of the results. All non-binary variables are winsorized at the 1% and 99% levels in all our analyses.

[11] Note that our model does not distinguish between physical investments and intangible investments.

[12] We use the annual frequency to avoid a potential overstatement of volatility by firms with seasonal performance. That being said, all of our empirical results are robust to using quarterly frequency.

2.3 Summary statistics

Table 1 summarizes the sample data and variables used in our empirical analyses. The unconditional average of the realized earnings announcement premium estimated by three-day (-1 day to +1 day) earnings announcement CAR is 27 basis points, which is close to the figure reported by Ball and Kothari (1991) while their sample period is different from ours. Though not tabulated separately, both parametric and non-parametric tests rejecting a null hypothesis of zero earnings announcement premium indicate that our estimated earnings announcement premium is strictly positive, consistent with our theory. For example, the reported unconditional average earnings announcement CAR for the full sample is statistically significant with t-statistics of 28.03.[13] The realized earnings announcement premium is sufficiently varying as well both within-firm and across firms, as its time-series standard deviation and cross-sectional standard deviation are 8.3% and 7.74%, respectively.

TABLE 1 ABOUT HERE

3 Earnings Announcement Premium and Corporate Policies

In this section, we discuss the results from various empirical analyses to study how earnings announcement premium relates to ex post corporate policies and outcomes.

3.1 Investment policies

We begin by studying how earnings announcement premium is related to ex post firm investment. Theorem 4 of our model in Section 1 predicts a negative relationship between realized earnings announcement return and ex post investment. To test whether we observe systematic patterns in data consistent with the model's prediction, we estimate the following fixed effect model with panel

[13] As discussed by many papers in the literature (e.g., Patell, 1976; Brown and Warner, 1980, 1985; Rosenstein and Wyatt, 1990; Boehmer, Masumeci, and Poulsen, 1991; Kramer, 2001), an event study investigating the effect of events on stock returns is subject to a potential problem of increases in the variance of stock returns around event-periods, so the use of a test statistic based on estimation-period standard deviation could over-reject a null hypothesis. However, since the standard deviation used in constructing our test statistic is calculated over a firm-quarter level sample of the estimated earnings announcement CARs, our parametric tests are not severely subject to the event-induced variance problem. Further, a Wilcoxon (1945) signed rank-sum test, for example, also shows that our estimated earnings announcement CARs are strongly positive with p-value of zero, which reinforces the credibility of our parametric tests on the significance of the estimated earnings announcement premium.

data on three-day CARs around quarterly earnings announcement and future investment:

$$Investment_{i,t} \quad = \quad \alpha + \beta EAP_{i,t-1} + \eta' \cdot \mathbf{X}_{i,t} + \varphi_i + \tau_t + \psi_{j,t} + \varepsilon_{i,t} \tag{5}$$

where i indexes firms, j indexes industries, t indexes quarters, $EAP_{i,t-1}$ denotes our measure for earnings announcement premium, i.e., three-day CAR around the earnings announcement for the previous quarter, $\mathbf{X}$ is a vector of control variables based on firm characteristics that may also affect the investment policies of firms – size, leverage, Tobin's Q, cash flow, cash-flow volatility, and cash, φ_i denotes firm fixed effects to control for unobserved time-invariant firm heterogeneity, τ_t denotes quarter fixed effects to control for unobserved market-wide shocks for each quarter, and $\psi_{j,t}$ denotes industry-quarter fixed effects to control for unobserved industry-wide shocks for each quarter.[14] The coefficient of interest here is β which estimates the marginal percentage increase in total expenditure on both physical and intangible capital in the beginning of the quarter, in response to a unit (i.e., 100%) increase in earnings announcement premium. We cluster standard errors throughout at the firm-level. For a comparison purpose, we estimate the same fixed effect model while replacing EAP with dispersion in analysts' earnings forecasts (*Forecast dispersion*) for the previous quarter. Finally, to control for dispersion in analysts' earnings forecasts which is another source of uncertainty, we also estimate the same model while including both EAP and *Forecast dispersion*.

The estimation results of the fixed effect model are reported in Table 2. They indicate that firms with larger earnings announcement premium lower investments for the following quarter: the coefficient on EAP is significantly negative in columns 1, 2, 5, and 6. As argued in Theorem 4 in Section 1, this is consistent with the existence of uncertainty-averse investors facing latent uncertainty. Furthermore, the results in columns 5 and 6 show that this relationship holds even when controlling for dispersion in analysts' earnings forecasts. At the same time, the negative coefficients on *Forecast dispersion* in columns 3 – 6 suggest that dispersion in analysts' earnings forecast may also capture a part of uncertainty aversion that predicts lower investments the following quarter.

[14] While controlling for firm and time fixed effects is a natural choice in testing the predictions of our model, we repeat the regression tests without fixed effects and report their results in Table A5 in the Appendix as a robustness check. The results remain largely the same.

This negative relationship between earnings announcement premium and investment is economically significant: in column 5, for example, the coefficient on EAP indicates that a one-standard-deviation increase in EAP is associated with a decline in annualized total investment by 30 basis point of the beginning-of-quarter total capital stock the following quarter, which is approximately a 6.2% decrease in total investment for a median firm.

<u>TABLE 2 ABOUT HERE</u>

The results reported in Table A2 in Appendix suggest that the negative relationship also holds for investments in tangible and intangible assets separately, when we decompose total investment into physical capital expenditures and R&D/SG&A expenses.[15] That said, in terms of economic magnitudes, the negative relationship is much stronger for investments in tangible assets, as a one-standard-deviation increase in EAP is followed by approximately a 17% decrease in CAPEX-to-capital-stock for a median firm while the same increase in EAP is associated with only a 3.4% decrease in investments in intangible assets the following quarter for a median firm.

Overall, results in Table 2 are consistent with the prediction in Theorem 4 that realized[16] earnings announcement premium is negatively associated with ex post capital investments at firm level.[17]

3.2 Cash policies

Given the documented negative relationship between earnings announcement premium and investments consistent with our uncertainty model's prediction, we next investigate whether and how firm-specific uncertainty proxied by earnings announcement premium is related to corporate cash policies. While reducing investment, a firm may pile saved funds into cash holdings for a precautionary saving motive when the level of uncertainty surrounding the firm is high (Keynes, 1936). To empirically test this prediction, we employ the same fixed-effect model in equation 5 in Section 3.1

[15] While not tabulated here, our results on the negative EAP-investment relationship are robust to replacing our main investment measure with another widely-used measure for investment, i.e. CAPEX normalized by total assets.

[16] In unreported analysis, we show stronger results regressing investment on estimated expected earnings announcement premium (available upon request). That would be a test of Theorems 2 and 3, weaker than Theorem 4.

[17] Titman et al. (2004) document a negative relationship between capital investments and stock returns the following year, which they interpret as being consistent with investors viewing abnormal corporate investments out of free cash flow as empire-building practices by corporate managers. On the other hand, we focus on the relationship between abnormal returns around quarterly earnings announcements and capital investments in the following quarter.

with the panel data on three-day CARs around quarterly earnings announcement – the measure of earnings announcement premium (EAP), and firm characteristics replacing quarterly investment with quarterly cash-to-assets ratio. To see what roles dispersion in analysts' earnings forecasts play in explaining firms' cash policies for the following quarter, we again either replace EAP with *Forecast dispersion* or include both in the fixed effect model.

Columns 1–3 of Table 3 presents the results of the fixed-effect model estimations for cash-to-assets. In columns 1 and 3, the coefficient on EAP is positive and statistically significant, which is consistent with our prediction. The economic magnitude of this relationship is also substantial: The coefficient on EAP in column 3, for instance, implies that a one-standard-deviation higher EAP is correlated with larger annualized cash reserves by approximately 0.69% of total assets in the following quarter, which is about a 7.48% increase in cash reserves for a median firm.

Table 3 About Here

To further our analysis on the relationship between earnings announcement premium and corporate cash policies, we also examine cash savings defined as the growth in cash level during a quarter divided by total assets using the same fixed-effect model. We report the estimation results in columns 4–6 of Table 3. The coefficient on EAP is positive and significant in all columns. More specifically, a one-standard-deviation increase in EAP is followed by an increase in annualized cash increment of around 0.78% of total assets. This is substantial as it is about 12.3% of the standard deviation of cash savings in our sample.

Unlike the estimation results for investments reported in 3.1, the coefficients on *Forecast dispersion* here show a different pattern. Specifically, the negative coefficients on *Forecast dispersion* in columns 2 and 3 of Table 3 indicate that firms with greater dispersion in analysts' earnings forecasts hold less cash the following quarter. This is contrary either to the notion that dispersion in analysts' forecasts measures the level of uncertainty or to the prediction that firms with greater uncertainty engage more in precautionary savings. At the same time, the positive coefficients on *Forecast dispersion* for cash savings in columns 5 and 6 of Table 3 make it even harder to interpret the results. It is not clear what conclusion we can draw from these results regarding how dispersion in analysts' forecasts affects firms' cash policies, yet we learn that earnings announcement premium captures uncertainty-driven corporate policies that the dispersion does not pick up.[18]

Combined together, our results from the analysis in this section show that earnings announcement premium is positively correlated not only with the level of cash reserves but also with the saving rate of cash. This may indicate that investors are uncertainty-averse and firms with a greater level of uncertainty engage more in cash savings and have a higher level of cash holdings as a result, consistent with our model and precautionary savings by firms.[19]

3.3 Placebo tests

The documented evidence so far of systematic patterns in the relationship between the realized earnings announcement premium and corporate investment and cash policies may be driven by unobservable time-varying factors other than the information from earnings announcement that are captured in stock returns. While it is extremely challenging to completely rule out this possibility, we attempt to address such a concern by conducting a placebo test. Specifically, we pick a placebo date apart from the quarterly earnings announcement date, compute the same three-day cumulative abnormal returns (CARs) based on the market model around the placebo date, and repeat the fixed-effect model estimations using investment, cash, and cash savings as the dependent variable, respectively. If there are always systematic relationships between excess returns and corporate policies of interest, we would find the same negative (positive) correlation between three-day CAR at any given point in time and investment (cash or cash savings).

We choose one month later from the earnings announcement as our placebo date. While most of the news content related to earnings announcement may be reflected in the stock prices within a week's window around the announcement (Savor and Wilson, 2016), many of the previous papers examine monthly returns (e.g., Barber, De George, Lehavy, and Trueman, 2013) because much of the announcement premium may be realized outside the week's window due to inattentive investors (Frazzini and Lamont, 2007). Given that earnings announcements are made on a

[18] While not tabulated here, a further analysis shows that the negative relationship between dispersion in analysts' forecasts and cash holdings only holds within firm, not in the cross-section. Also, the negative relationship persists across different timings, i.e. for the same quarter and for the previous quarter as well. This may suggest that the negative relationship is driven by a reverse-causality: firms with negative cash flows in consecutive quarters might lead to a greater differences of opinion about firms' future. We do not scrutinize this topic further here though as it is beyond the scope of this paper.

[19] Chang et al. (2017) document a seasonality in earnings and stock returns. Our results documented in this section may be merely a consequence of such a seasonality pattern. Though not reported here, all the results in Section 3 are robust to controlling for the same fiscal quarter within firm.

quarterly-basis, therefore, one-month-later from the announcement could be a safe harbor where most of the announcement premium for this quarter's earnings has been realized while the premium for the following quarter's earnings announcement is yet to be realized at all.

The results of the placebo tests are reported in Table 4.[20] The coefficient on $EAP^{placebo}$ is not statistically significant in any specifications, which suggests that the relationships between quarterly investment/cash policies and abnormal returns do not always hold other than for the earnings announcement periods.

<u>TABLE 4 ABOUT HERE</u>

3.4 Profitability

We also study the outcome of corporate response to changes in uncertainty level. In particular, we examine whether profitability is improved, deteriorated, or not affected when firms have greater uncertainty and their investment activities drop. Improved profitability along with reduced investment would be consistent with underinvestment by the firm following the uncertainty shock. To test this hypothesis, we define profitability as return on assets (ROA) and estimate the fixed effect model with ROA as the dependent variable.

Table 5 reports the results. The coefficient on EAP is positive and statistically significant in columns 1, 2, 5, and 6, indicating that higher earnings announcement premium is followed by an improved operating performance. For example, a one-standard-deviation increase in earnings announcement premium is correlated with an increase in EBITDA of approximately 0.25% of total assets. This positive correlation is economically significant as it is approximately a 8.6% improvement in ROA for a median firm and accounts for about 4.4% of the variation in ROA. Combined together with the documented evidence on investment, this shows that the negative relationship between the realized earnings announcement premium and future investment occurs despite the fact that operating performance is increasing in the earnings announcement premium. This result is consistent with underinvestment by firms following the uncertainty shock, consistent

[20]The relationship in our placebo test means that we relate, for example, three-day CAR around March 1 to investment for the first quarter of that year if the firm announced its earnings for the fourth quarter of the previous year on February 1.

with the predictions of our model.[21]

Table 5 About Here

4 Determinants of Earnings Announcement Premium

At this point, an important question remains: is earnings announcement premium really a pertinent measure of firm-specific uncertainty aversion? Do the data support Theorem 3 in Section 1? To answer this question, in this section, we analyze empirical results to study what determines earnings announcement premium. First, Section 4.1 and Section 4.2, respectively, show that earnings announcement premium is related to dispersion in analysts' earnings forecasts – a well-known proxy for uncertainty and a firm-level measure of political uncertainty, reinforcing the claim that it captures Knightian uncertainty.

Under time-separable expected utility, the conditional expected earnings announcement premium is zero for all firms (see Theorem 1, as well as Ai and Bansal, 2018), so the realized earnings announcement premium would be noise. Thus, any correlation of predictable observables with the earnings announcement return would be inconsistent with expected utility. Section 4.3 shows that the earnings announcement premium is larger for smaller firms, contradicting both subjective expected utility and smooth generalized risk preferences. Similarly, Section 4.4 shows that the earnings announcement premium is larger for firms not listed on the NYSE before SOX, and Section 4.5 shows the earnings announcement premium is larger for more complex firms.

4.1 Dispersion in analysts' earnings forecasts

As briefly mentioned in Section 2.2.2, the literature has viewed dispersion in analysts' earnings forecasts as a reasonable proxy for uncertainty specific to firms' quarterly earnings. Hence, an immediate prediction would be that earnings announcement premium be positively related to analyst forecast dispersion, if the former also captures firm-specific uncertainty.

[21]The negative correlation between *Forecast dispersion* and subsequent ROA reported in columns 3 – 6 of Table 5 is hard to interpret, given that firms with greater forecast dispersion invest less as documented in Table 3. This may suggest that such firms drop some of the most profitable projects instead of marginal ones following the shock to the dispersion. Alternatively, it may be again simply due to reverse-causality, i.e. firms with poor performance make analysts more divergent in their opinions about the firms' future.

Since Diether, Malloy, and Scherbina (2002) documented the negative correlation between forecast dispersion and future stock returns, however, it has long been a puzzle whether forecast dispersion indeed captures uncertainty or not. Johnson (2004) and Barinov (2013), respectively, adopt an option framework to explain this puzzle. A recent work by Veenman and Verwijmeren (2021) shows that this empirical regularity is concentrated in earnings months, and can be explained by earnings expectations game and mispricing. This naturally leads us to expect to observe a negative relationship between forecast dispersion and earnings announcement premium in a firm-level panel regression as well, which would then reject either the prior that forecast dispersion captures uncertainty or our claim that earnings announcement premium is a measure of uncertainty.

To investigate how the two variables are related at firm-level, we run a panel regression with both firm and (industry-) quarter fixed effects. More specifically, we estimate the following fixed effects model:

$$EAP_{i,t} = \alpha + \beta_0 D_{i,t} + \beta_1 SUE_{i,t} + \eta' \cdot \mathbf{X}_{i,t} + \varphi_i + \tau_t + \psi_{j,t} + \varepsilon_{i,t} \quad (6)$$

where i indexes firms, j indexes industries, t indexes quarters, EAP denotes our measure for earnings announcement premium, i.e., three-day CAR (in a percentage) around the earnings announcement, D is the determinant of interest, which is *Forecast dispersion* in this section, SUE stands for standardized unexpected earnings, $\mathbf{X}$ is a vector of control variables based on firm characteristics that may also affect earnings announcement premium, φ_i denotes firm fixed effects, τ_t denotes quarter fixed effects, and $\psi_{j,t}$ denotes industry-quarter fixed effects. The coefficient of interest here is β_0 which estimates the marginal percentage increase in earnings announcement premium in response to a unit increase in *Forecast dispersion.* We cluster standard errors throughout at the firm-level.

It is worth describing SUE in more detail which is our proxy for earnings surprise. One of the well-documented common findings in the literature is that stock returns on the earnings announcement dates are positively correlated with earnings surprise (e.g., Ball and Brown, 1968; Beaver, 1968; Foster, Olsen, and Shevlin, 1984; Bernard and Thomas, 1989). Therefore, announcement-day returns may be merely a consequence of price reactions to earnings surprise and we need to control for this possibility at a minimum.[22] To this end, *SUE* is defined as EPS surprise, i.e. the reported EPS minus the median EPS forecast, normalized by the end-of-quarter price. For firm-quarter observations missing EPS forecast by analysts, we set the reported non-missing EPS for the same fiscal quarter in the previous year as this quarter's EPS forecast.[23]

The estimation results of Equation 6 reported in Table 6 show that earnings announcement premium (*EAP*) and analysts forecasts dispersion (*Forecast dispersion*) are positively correlated in all specifications, which is contrary to the existing evidence documented in the prior studies (especially, the one in Veenman and Verwijmeren, 2021). Column 4 shows that the relationship becomes even stronger when controlling for earnings surprises and other firm characteristics that may potentially be related to both forecast dispersion and earnings announcement premium. These results are consistent with our claim that earnings announcement premium is a measure of uncertainty to the degree to which forecast dispersion also captures uncertainty.

Table 6 About Here

A remaining puzzle is how we can reconcile our results with the negative relationship between the two variables already documented in the prior studies. This puzzle can be resolved by noting that our results are obtained by running a panel regression *with firm fixed effects* while the previous studies document the negative relationship *in the cross-section* through portfolio analyses. To further validate our positive *Forecast dispersion–EAP* relationship documented here through the panel analysis, we run the panel regression *without firm fixed effects* or *with quarter fixed effects only* and reproduce the negative relationship between the two variables, as reported in Table A4 in the Appendix. Column 4 of Table A4 in the Appendix also shows that, consistent with the earnings expectations game hypothesis in Veenman and Verwijmeren (2021), the negative dispersion–*EAP* relationship in the cross-section disappears when controlling for earnings surprises. This additional analysis indicates that controlling for firm fixed effects matters in explaining the relationship between dispersion of analysts' earnings forecasts and earnings announcement premium, which is

[22] That said, as a robustness check, we repeat the regressions without controlling for earnings surprise and report their results in Table A6 in the Appendix. The results remain largely the same.

[23] We use this four-quarter-ahead EPS to control for seasonality. Nonetheless, all the results in Section 4 remain largely unchanged when we use the previous quarter's EPS as a proxy for this quarter's EPS forecast or even when we drop the observations missing analyst forecasts.

further supportive of our uncertainty-based model that exploits jointly time-varying uncertainty and earnings announcement premium within firm.[24]

4.2 Political risk

How does earnings announcement premium correlate with political risk or uncertainty? Previous studies find that political uncertainty affects firm value as well as corporate policies and operating performance (e.g., Pástor and Veronesi, 2012, 2013; Julio and Yook, 2012; Akey and Lewellen, 2017; Jens and Page, 2020; Hassan et al., 2019, among others). These findings suggest political risk is a critical source of uncertainty that investors are worried about which has real effects on firm decision making and subsequent outcomes. If the earnings announcement premium measures uncertainty at the firm level, we would predict that earnings announcement premium be correlated with firm-level political risk.

To examine the relationship between earnings announcement premium and political risk, we employ a text-based firm-level measure of political risk constructed by Hassan et al. (2019).[25] From the authors' website, we download the data for the measure that are available for public firms and quarters spanning years from 2002 to 2020, and merge with our sample panel.[26] We then regress the three-day quarterly earnings announcement CAR (EAP) on the political risk measure ($PRisk$) based on the fixed effects model described in Equation 6.

Panel A of Table 7 reports the results from estimating Equation 6 above. Both in the univariate (column 1) and in the multivariate (column 2) results, we see a positive and statistically significant correlation between political risk and earnings announcement premium: since $PRisk$ is standardized by its standard deviation, the estimated coefficient in the multivariate result (column 2), for example, suggests that a one-standard-deviation increase in political risk is associated with a 0.068 percent point increase in earnings announcement premium.

Now that political risk is positively correlated with earnings announcement premium, we test whether our results in Section 3 on the relationships between earnings announcement premium and

[24] The analysis in this section raises further research question on *why* the sign flips depending on whether we control for firm fixed effects or not, which we leave to a future study.

[25] They analyze languages in transcripts for quarterly earnings conference call and compute the proportion of conversations mentioning risks or uncertainties related to politics.

[26] Downloadable at https://www.firmlevelrisk.com/. We are grateful to the authors for sharing the full data through the website.

corporate policies are robust to controlling for political risk. Julio and Yook (2012) and Hassan et al. (2019) document negative relationships between political risk and investments. Jens and Page (2020) find that firms save cash more thereby showing higher cash balances when political uncertainty is high. Hence, we rerun panel regressions on investment, cash, and cash savings while including *PRisk* as a control variable.

The results are presented in Panel B of Table 7. In all specifications, the baseline results continue to hold and the magnitudes of the coefficients on *EAP* are now even larger.[27] In columns 1–2 and 3–4, we observe negative correlations between political risk and investment, and positive correlations between political risk and cash balances, respectively, as documented in the previous studies. Yet, columns 5–6 show no significant relationship between political risk and cash savings, which is inconsistent with the findings by Jens and Page (2020).[28]

Table 7 About Here

Overall, the results in this section suggest that a well-measured firm-level political risk is captured by earnings announcement premium, which further validates earnings announcement premium as a measure of uncertainty aversion. Moreover, the baseline results on the relationships between earnings announcement premium and corporate policies survive, or get even stronger when controlling for the political uncertainty.

4.3 Size

One of the most natural determinants of the uncertainty level that one can think of is firm size. Larger firms are more likely to have a long history of cash flow, followed by more investors, covered by media more frequently, etc. On the other hand, information about smaller firms is less reliable and poorer both in quantity and quality. Therefore, if earnings announcement premium captures the level of uncertainty aversion well, we would observe a negative association between earnings announcement premium and firm size. In contrast, if the earnings announcement premium was

[27]Note that the sample is different though compared to the baseline specifications because the political risk measure is available through 2002–2016.

[28]This result may be more consistent with Akey and Lewellen (2017) and Hassan et al. (2019) in that they show more spending by firms on donation and lobbying to politicians when political uncertainty is high. Therefore, along with the reduced investments by firms facing higher uncertainty, it is unclear whether to expect positive or negative relationship between political risk and cash savings.

driven by a smooth concave aggregator functional I, for example with Epstein and Zin (1989) with preference for early resolution of uncertainty, we would expect it to be increasing in firm size, because large firms are more important for the lifetime utility of the representative investor.[29] Finally, under time-separable expected utility, the earnings announcement premium is zero for all firms, so there would be no relationship with firm size.

While it is natural to assume that large firms are more important for investors' utility than small firms, however, it is not implausible that earnings reported by small firms provide significant information about aggregate earnings. As Savor and Wilson (2016) show, then, investors of such firms should bear higher risks, thereby requiring higher premiums for earnings announcements of those firms. That being said, the results reported in the second column of Table 8 in Savor and Wilson (2016) suggest that earnings announcement returns of small firms do not signal much about aggregate earnings growth in the following quarter. Therefore, the alternative possibility based on information-sharing risks does not invalidate our uncertainty-based interpretation of higher earnings announcement premiums for small stocks.

The negative relationship between abnormal returns around earnings announcements and firm size is already documented in Chari, Jagannathan, and Ofer (1988). They find earnings announcement abnormal returns are positive and statistically significant only for small firms. Following their paper, we sort firms into decile portfolios for each quarter based on market capitalization, compute the average three-day CAR around the earnings announcements for each decile-quarter, and take the mean of this portfolio earnings announcement premium across all quarters in our sample.

Figure 2 shows the results. It depicts the same decreasing earnings announcement premium in market capitalization. However, compared to their results, earnings announcement abnormal returns are now positive and significant for large firms as well. The main difference between the two results is the sample periods: we use a much longer period of 1971–2017 while Chari, Jagannathan, and Ofer (1988) use a short period of 1976–1984. This indicates that our empirical results in this paper are not driven only by small firms even though we still observe much greater earnings announcement premium for small firms.[30]

[29] See Equation 11 of Ai and Bansal (2018). For smooth I and small announcements, I' is constant.

[30] As mentioned in Section 2, our estimated average earnings announcement abnormal returns for each size decile in Figure 2 could be subject to the over-rejection problem due to ignoring event-induced variance of stock returns. However, the standard errors reported in Figure 2 are calculated over a sample for each size decile consisting of earnings announcement abnormal returns for each firm and each quarter, which considers only announcement-day

Figure 2 About Here

Table 8 formalizes the negative relationship between firm size and earnings announcement premium. In Panel A, we report the results from mean-difference tests (columns 1–3) and median-difference test (column 4). In all columns, the difference in the average (median) earnings announcement premium between largest firms and smallest firms is statistically significant, showing that earnings announcement premium is much larger for smallest firms on average. In Panel B we report the results from estimation of Equation 6 where we now regress earnings announcement premium on market capitalization. The coefficient on market capitalization is negative and significant in all specifications, indicating that earnings announcement premium is decreasing in firm size.[31] This evidence is inconsistent with both expected utility and generalized risk preferences with a smooth concave aggregator function, like Epstein and Zin (1989), but consistent with uncertainty aversion. Thus, the analysis and the results here suggest that earnings announcement premium is a good candidate as a relevant measure for firm-specific uncertainty.

Table 8 About Here

returns. While not tabulated separately, t-tests using test statistics based on these standard errors show that earnings announcement abnormal returns for all size deciles in Figure 2 are strictly positive with t-statistics ranging between 6.99 and 21.57. The largest t-statistics, i.e. 21.57 is the one for the smallest firms.

[31] As mentioned earlier in this paper, some studies in the literature use expected announcement dates instead of actual announcement dates to estimate earnings announcement premiums, which is not relevant though in this paper because actual announcement date fits our model better and we estimate the premiums using cumulative abnormal daily returns instead of a long-short portfolio approach. Nevertheless, we follow those studies and repeat the analysis in this section with expected dates instead of actual dates. Specifically, when we follow the algorithm in Savor and Wilson (2016) for predicting announcement dates and replace the actual announcement dates with the predicted announcement dates, the magnitude of the coefficient on market capitalization in Panel B of Table 8 becomes much smaller: it reduces from 0.698 in column 3, for example, to 0.004, or equivalently, a one-standard-deviation increase in market capitalization is associated with 0.009% decrease in earnings announcement premium while it is associated with 1.51% decrease in the premium when using actual announcement dates, which is consistent with Cohen et al. (2007) and Savor and Wilson (2016). However, the size-premium relationship is still non-zero negative even when measuring the premium using expected announcement dates. This can be explained neither by a standard risk-based model, nor by an information-sharing-cost hypothesis, especially given the uninformativeness of earnings reported by small firms about future aggregate earnings as documented in Savor and Wilson (2016). Instead, this is more consistent with our uncertainty-aversion model as it means that small firms are subject to greater uncertainty either in future earnings or even in announcement timings, so the market puts higher premiums than those for large stocks.

4.4 Exchanges

We next consider stock exchanges as a plausible determinant of firm-specific uncertainty. NYSE, AMEX, and NASDAQ have been three major stock exchanges in the U.S. Due to their differences in histories, trading systems, listing requirements, though, the quantity and the quality of information produced by the market are not the same for firms across the exchanges. Furthermore, the cross-section of such differences has changed over time too. Accordingly, not only is the level of uncertainty different across the exchanges, but also it has changed over time. For this reason, if earnings announcement premium is a good measure of firm-specific uncertainty, we would expect to observe cross-sectional and time-series variations in the earnings announcement premium across the exchanges. Specifically, we predict that earnings announcement premium would be smaller for firms on NYSE and larger for those on NASDAQ/AMEX as the former is the oldest among the three exchanges, the largest exchange in the world, has the most stringent listing requirements, thereby possibly reducing the level of uncertainty for the stocks listed there. We also predict that such gaps in earnings announcement premium among the exchanges have been narrowed in the post-Sarbanes-Oxley period, as the Sarbanes-Oxley Act mandates a more transparent process for listed firms to report on their information regardless of the exchange they are listed on, thereby reducing uncertainty overall in the market and to a greater extent especially for stocks listed on NASDAQ/AMEX. See Easley and O'Hara (2010) for a theoretical discussion.[32]

To compare quarterly earnings announcement premiums across stock exchanges, we first regress our measure of earnings announcement premium (EAP), i.e. three-day CAR *in percentages* around the earnings announcement on a dummy variable *NASDAQ/AMEX* that takes the value of one if the firm is listed either on NASDAQ or AMEX in a given quarter. Second, to examine whether the differences, if any, in earnings announcement premiums between NASDAQ/AMEX firms and NYSE firms drop or even disappear during the post-Sarbanes-Oxley period, we interact the dummy variable *NASDAQ/AMEX* with another dummy variable *Post-SOX* for the quarters following the enactment of the Sarbanes-Oxley. Then, since changes in the earnings announcement premium differentials, if any, between NASDAQ/AMEX firms and NYSE firms could be attributable to the relative growth of NASDAQ in market capitalizations of its listed firms in the early 2000s,

[32] It is already observed in Figure 1 in Section 2 that earnings announcement premium overall dramatically dropped since the Sarbanes-Oxley Act was enacted.

we control for firm size and allow the slope between earnings announcement premium and firm size to change before and after the Sarbanes-Oxley. Again we also control for earnings surprise (*SUE*). Throughout the tests except the first regression, we include firm fixed effects to control for any unobserved firm characteristics that are constant over time which may affect earnings announcement premium. We include quarter fixed effects as well in some specifications.

The results are reported in Table 9. The positive and statistically significant coefficient on *NASDAQ/AMEX* in column 1 indicates that earnings announcement premium is overall greater for NASDAQ/AMEX-listed firms than NYSE firms, yet only by 4 basis points on average. When we separate this into the pre- and the post-Sarbanes-Oxley periods, however, earnings announcement premium was far greater for NASDAQ/AMEX-listed firms than NYSE firms prior to the Sarbanes-Oxley Act, as the positive and large coefficients on *NASDAQ/AMEX* in columns 2–4 show. The negative coefficients on the interaction term *NASDAQ/AMEX*×*Post-SOX* in columns 2–4 suggest that such pre-Sarbanes-Oxley earnings announcement premium differentials became smaller or even nearly indistinguishable from zero after the Sarbanes-Oxley Act. These results are robust to controlling for firm size and its interaction with *Post-Sox*, which confirms that they are not likely to be driven by the growth of NASDAQ around the early 2000s.

Table 9 About Here

Combined together, the results from the analysis in this section suggest that earnings announcement premium was higher for stocks listed on NASDAQ or AMEX before the Sarbanes-Oxley Act and this differential became negligible after the Sarbanes-Oxley Act as it likely mitigated the information uncertainty for stocks on those exchanges. Because the firm's exchange is predictable, this is inconsistent with expected utility.

4.5 Complexity

Another determinant that may explain the level of uncertainty at firm level is complexity. Information regarding firms with complicated business structures or organizations are more complex and harder to process and interpret. Hence, the more complex a firm's structure is, the higher uncertainty level it would have.

Following Doyle, Ge, and McVay (2007) and Ashbaugh-Skaife, Collins, Kinney Jr, and LaFond (2009), we use the number of business segments as a proxy for the complexity of a firm. If earnings announcement premium proxies firm-specific uncertainty well, we would observe a positive correlation between the number of segments and earnings announcement premium. To test this, we estimate equation 6 where we now regress EAP on the number of business segments as the determinant of interest. On the other hand, conglomerates with many divisions may be well-diversified in cash flow across different industries, thereby reducing the overall risk and hence earnings announcement premium as well. To address this possibility, we borrow Duchin (2010)'s cross-divisional correlation as a proxy for diversification[33] and include it as a control variable in the specifications. We also control for firm size as it usually is positively correlated with the number of segments, thus could possibly confound any estimated effects of the number of segments.

The results are represented in Table 10. The coefficients on Ln(number of segments) are positive and statistically significant in all columns, indicating that earnings announcement premium is positively correlated with the number of business segments which is our proxy for complexity. This result is robust to controlling for diversification, SUE, size, and quarter fixed effects.

<u>Table 10 About Here</u>

The results in this section are consistent with our prediction that the earnings announcement abnormal return is positively correlated with the number of segments, which implies that more complex firms show higher earnings announcement premium. This further supports the validity of the realized earnings announcement premium as a proxy for firm-specific uncertainty aversion, and is inconsistent with time-separable expected utility.

The results in Section 4 show that the earnings announcement premium is larger for smaller firms as well as those with likely greater levels of uncertainty, proxied by dispersion of analysts' earnings forecasts, firm-specific political risk, the number of business segments, or listing on NASDAQ or AMEX. Together, these analyses reject time-separable expected utility, as well as generalized risk preferences with a smooth aggregator function, like Epstein and Zin (1989), and suggest that the earnings announcement premium is a relevant measure for firm-specific uncertainty.

[33] Larger cross-divisional correlation means smaller degree of diversification, thus greater risk.

5 Conclusions

In this paper, we argue the earnings announcement premium is due to investor uncertainty aversion. If investors are worried about news the firm will release, they will demand a premium for bearing that uncertainty, exhibiting information avoidance. As pure news events, the earnings announcement premium is inconsistent with time-separable expected utility. Because the earnings announcement premium is larger for smaller stocks, however, we provide evidence for uncertainty aversion of investors, rather than general concave recursive utility.

We also showed that the earnings announcement premium is negatively correlated with future investment, which requires sufficient latent uncertainty, which we demonstrated must be time varying and firm specific. When the earnings announcement premium is higher, firms invest less, even though their profitability improves, choosing instead to stockpile cash. Consistent with treating the earnings announcement premium as a proxy of firm-specific uncertainty, we find that the earnings announcement premium is larger for smaller stocks, more complex stocks (measured by the number of business segments), stocks followed by fewer or no analysts, and stocks with greater firm-specific political uncertainty. Further, we show stocks listed on AMEX and NASDAQ had higher earnings announcement premium, but only before Sarbanes-Oxley, consistent with the hypothesis that increased listing requirements made investors more comfortable.

Under time-separable expected utility, the conditional expectation of the earnings announcement return would be zero for all firms, and the realized earnings announcement return should thus be noise, uncorrelated with observable firm characteristics. In contrast, we show that it is strictly positive, and correlated with intuitive measures for uncertainty, thus rejecting time separable expected utility. Generalized risk preferences with a smooth concave aggregator function, like Epstein and Zin (1989), would predict a larger effect for large firms' earnings announcements, as they are more informative on the representative investor's continuation utility. However, the earnings announcement return is larger for smaller firms, thus rejecting that class of preferences in favor of uncertainty aversion.

Therefore, we argue not only that investors are uncertainty averse, but also that it matters for firm decisions. Further, we argue the earnings announcement premium is a proxy for firm-specific uncertainty, allowing empiricists to test models of uncertainty aversion in corporate finance.

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Appendix: Proofs

Proof of Theorem 1. Because investors are uncertainty neutral, $\Gamma = \{\gamma^*\}$ and $Q_n = \{q_n^*\}$, for $n \in \{G, B\}$. Thus, $\Pi_n = q_n^* (V + I_n) - \frac{1}{2Z} I_n^2$, so $\frac{\partial \Pi_n}{\partial I_n} = q_n^* - \frac{I_n}{Z}$. Thus, $I_n = Z q_n^*$, so firm value given news n is $\Pi_n^* = q_n^* V + \frac{1}{2} (q_n^*)^2 Z$. Further, the prior value of the firm is $\Pi_0^* = \gamma \Pi_G^* + (1-\gamma) \Pi_B^*$. Because $R_n \equiv \frac{\Pi_n^* - \Pi_0^*}{\Pi_0^*}$, $R_G = (1-\gamma) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*}$ and $R_B = -\gamma \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*}$, so $E[R_n] = \gamma R_G + (1-\gamma) R_B = 0$. Because $R_G > R_B$ and $I_G > I_B$, $Cov(R_n, I_n) > 0$. ■

Proof of Theorem 2. $\pi_n = q_n (V + I_n) - \frac{1}{2Z} I_n^2$ is increasing in q_n, so the worst-case scenario is $q_n - \alpha$. Thus, $\Pi_n = (q_n - \alpha)(V + I_n) - \frac{1}{2Z} I_n^2$, so $I_n = (q_n - \alpha) Z$, and $\Pi_n^* = (q_n - \alpha) V + \frac{1}{2} (q_n - \alpha)^2 Z$, both decreasing in α. ■

Proof of Theorem 3. $R_n = \frac{\Pi_n^* - \Pi_0^*}{\Pi_0^*}$, so $R_G = (1 - \gamma^* + \alpha) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*}$, and $R_B = -(\gamma^* - \alpha) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*}$. This has expected value $E[R_n] = \gamma R_G + (1-\gamma) R_B$, or equivalently, $E[R_n] = \alpha \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*} > 0$, because $\Pi_G^* > \Pi_B^*$. $\frac{dE[R_n]}{d\alpha} = \frac{\partial E[R_n]}{\partial \alpha} + \frac{\partial E[R_n]}{\partial \Pi_G^*} \frac{d\Pi_G^*}{d\alpha} + \frac{\partial E[R_n]}{\partial \Pi_B^*} \frac{d\Pi_B^*}{d\alpha}$. $\frac{\partial E[R_n]}{\partial \alpha} = \frac{E\Pi_n}{\Pi_0^2} (\Pi_G^* - \Pi_B^*) > 0$, $\frac{\partial E[R_n]}{\partial \Pi_B^*} = \frac{-\alpha \Pi_G^*}{(\Pi_0^*)^2}$, but $\frac{\partial E[R_n]}{\partial \Pi_G^*} = \frac{\alpha \Pi_B^*}{(\Pi_0^*)^2}$. Because $\frac{d\Pi_n^*}{d\alpha} = -(V + I_n)$, $\frac{\partial E[R_n]}{\partial \Pi_G^*} \frac{d\Pi_G^*}{d\alpha} + \frac{\partial E[R_n]}{\partial \Pi_B^*} \frac{d\Pi_B^*}{d\alpha} = \frac{\alpha}{(\Pi_0^*)^2} [V (\Pi_G^* - \Pi_B^*) + \Pi_G^* I_B - \Pi_B^* I_G]$. Because $\Pi_G^* > \Pi_B^*$ and $\Pi_G^* I_B - \Pi_B^* I_G = \frac{1}{2} (q_G^* - q_B^*) I_G I_B > 0$, $\frac{\partial E[R_n]}{\partial \Pi_G^*} \frac{d\Pi_G^*}{d\alpha} + \frac{\partial E[R_n]}{\partial \Pi_B^*} \frac{d\Pi_B^*}{d\alpha} > 0$, so $\frac{dE[R_n]}{d\alpha} > 0$. ■

Proof of Corollary 1. $R_G - E[R_n|\alpha] = (1-\gamma^*) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*} > 0 > R_B - E[R_n|\alpha] = -\gamma^* \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*}$. Also, $I_G - E[I_n|\alpha] = (1-\gamma^*)(q_G^* - q_B^*) Z > 0 > I_B - E[I_n|\alpha] = -\gamma^* (q_G^* - q_B^*) Z$. $Cov(R, I|\alpha) = \gamma^* (1-\gamma^*) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*} (q_G^* - q_B^*) Z > 0$. ■

Proof of Theorem 4. By the Law of Total Covariance, $Cov(R, I) = E[Cov(R, I|\alpha)] + Cov(E[R|\alpha], E[I|\alpha])$. Corollary 1 showed $Cov(R, I|\alpha) = \gamma^* (1-\gamma^*) \frac{\Pi_G^* - \Pi_B^*}{\Pi_0^*} (q_G^* - q_B^*) Z$. $\Pi_G^* - \Pi_B^* = (q_G^* - q_B^*) \left[V + \frac{Z}{2} (q_G^* + q_B^* - 2\alpha)\right]$,

$$E[Cov(R, I|\alpha)] = \gamma^* (1-\gamma^*) (q_G^* - q_B^*)^2 Z \left[h \frac{V + \frac{Z}{2} (q_G^* + q_B^* - 2\alpha_H)}{\Pi_0^* (\alpha_H)} + (1-h) \frac{V + \frac{Z}{2} (q_G^* + q_B^* - 2\alpha_L)}{\Pi_0^* (\alpha_L)} \right].$$

By Theorem 3, $E[R|\alpha_H] > E[R|\alpha_L]$, so $E[R|\alpha_H] - E[R] = (1-h)(E[R|\alpha_H] - E[R|\alpha_L])$ and $E[R|\alpha_L] - E[R] = -h(E[R|\alpha_H] - E[R|\alpha_L])$. Define $\bar{q} \equiv \gamma^* q_G + (1-\gamma^*) q_B$. Then, $E[I|\alpha] = (\bar{q} - \alpha) Z$, so $E[I|\alpha_H] - EI = -(1-h)(\alpha_H - \alpha_L) Z$ and $E[I|\alpha_L] - EI = h(\alpha_H - \alpha_L) Z$. Thus,

$$Cov(E[R|\alpha], E[I|\alpha]) = -h(1-h)(\alpha_H - \alpha_L)^2 Z \Delta ER(\alpha_H, \alpha_L)$$

where $\Delta ER(\alpha_H, \alpha_L) \equiv \frac{E[R|\alpha_H] - E[R|\alpha_L]}{\alpha_H - \alpha_L} > 0$ because $E[R|\alpha]$ is increasing. Define $\sigma_q^2 \equiv \gamma^* (1-\gamma^*) (q_G^* - q_B^*)^2$ and $\sigma_\alpha^2 \equiv h(1-h)(\alpha_H - \alpha_L)^2$. Therefore, $Cov(R, I) < 0$ iff $\sigma_\alpha^2 > \sigma_q^2 M$, where $M = \frac{1}{\Delta ER(\alpha_H, \alpha_L)} E_\alpha \frac{V + \frac{Z}{2}\left(q_G^* + q_B^* - 2\alpha\right)}{\Pi_0^*(\alpha)}$. $E[R_n|\alpha] = \alpha (q_G^* - q_B^*) \frac{V + \frac{Z}{2}\left(q_G^* + q_B^* - 2\alpha\right)}{\Pi_0^*}$, so $Cov(E[R|\alpha], E[I|\alpha])$ is a multiple of $q_G - q_B$, while $E[Cov(R, I|\alpha)]$ is a multiple of $(q_G - q_B)^2$. Thus, for mean-preserving contractions of q, small positive $q_G - q_B \implies Cov(R, I) < 0$, even for more general distributions of α. ■

Figure 1
Time-series Trends in Earnings Announcement Premium

This figure plots trends over the years in three-day annual earnings announcement abnormal returns. For a given year, we compute the unconditional mean of cumulative abnormal returns over three days around the fiscal-year-end earnings announcement across all publicly traded firms.

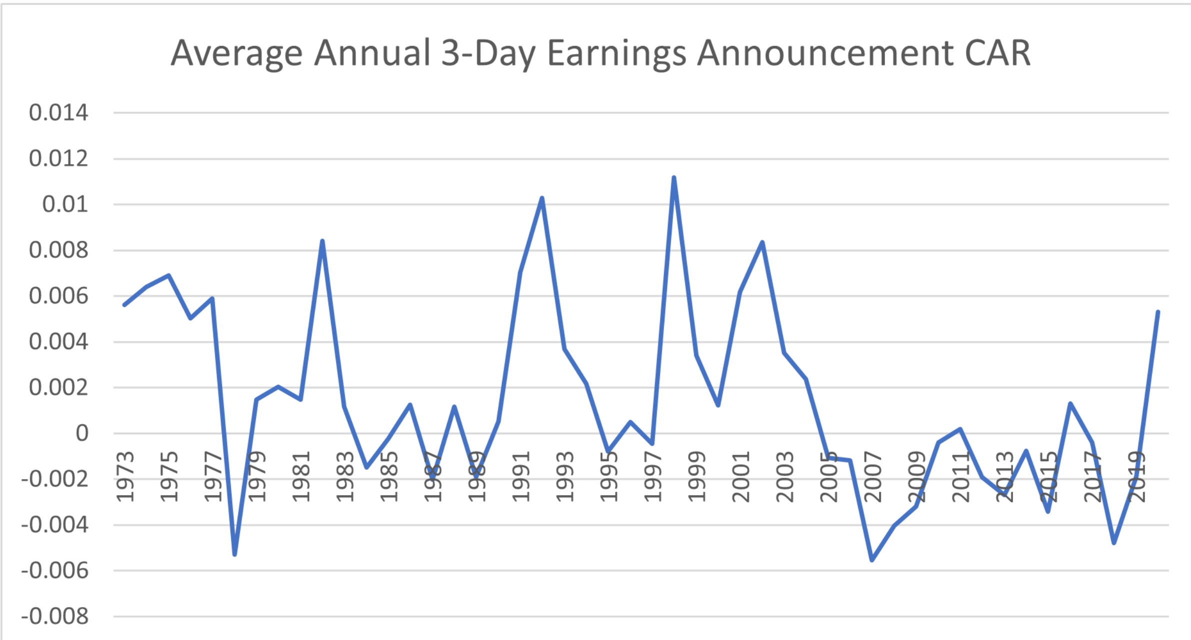

Figure 2
Firm Size and Earnings Announcement Premium

This figure plots the average three-day cumulative abnormal returns around quarterly earnings announcements for firms in each of the size deciles. For a given quarter, we sort all publicly traded firms into deciles based on market capitalization, compute the equal-weighted average of cumulative abnormal returns over three days around the quarterly earnings announcement across all firms in each decile, and take the mean of the average earnings announcement abnormal returns for each decile across all quarters.

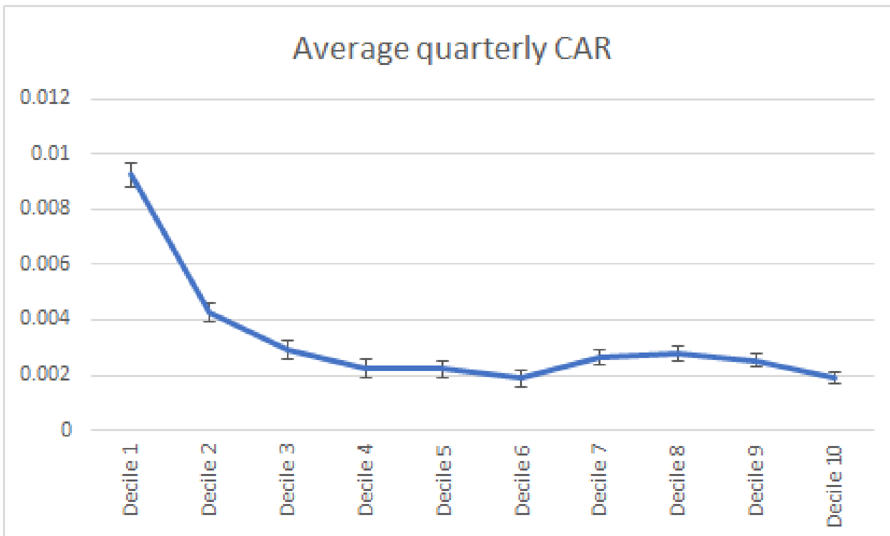

Table 1
Summary Statistics

This table reports summary statistics of the variables for our sample data. EAP is three-day cumulative abnormal returns (CAR) around quarterly earnings announcement (from -1 to +1 day where day 0 is the earnings announcement date) and SUE is standardized unexpected earnings. All variables are defined in Table A7 in Appendix: Supplementary Tables.

	Mean	SD	P1	P25	P50	P75	P99	N
EAP (%)	0.270	8.270	-19.882	-3.984	0.034	4.333	21.917	614,375
Time-series S.D.	8.294	3.183	1.313	6.072	8.303	10.310	16.662	15,732
Cross-sectional S.D.	7.740	1.541	4.782	6.357	7.960	8.748	11.372	198
SUE (%)	-0.436	7.614	-33.143	-0.522	0.016	0.467	24.506	572,976
I^{tot}/K^{tot}	6.341	5.502	0.061	2.816	4.717	7.810	27.259	506,353
I^{phy}/K^{tot}	2.070	2.861	-0.116	0.419	1.087	2.428	15.157	506,353
I^{int}/K^{tot}	4.085	3.969	0.000	1.273	3.063	5.398	17.710	595,006
Cash (%)	18.752	22.247	0.099	2.679	9.156	26.650	84.456	595,872
Cash saving (%)	-0.054	6.321	-16.342	-2.062	-0.024	1.651	22.024	594,798
Size	5.337	2.045	1.785	3.801	5.131	6.709	10.654	614,375
$Tobin$'s Q (%)	196.101	144.984	67.459	106.237	143.568	224.052	738.433	599,959
Cash flow (%)	-0.576	5.653	-21.622	-0.953	0.927	2.223	7.266	597,089
Debt (%)	21.943	19.916	0.000	3.237	18.867	34.392	79.489	583,037
ROA (%)	1.876	5.677	-17.312	0.631	2.913	4.826	12.175	521,561
CF volatility	0.086	0.113	0.006	0.025	0.047	0.092	0.591	547,237
Return volatility	0.035	0.022	0.008	0.020	0.029	0.044	0.106	610,374
Firm age	14.242	11.477	0.000	4.000	11.000	22.000	37.000	598,060
Number of analyst	4.242	6.789	0.000	0.000	1.000	6.000	30.000	614,375
Forecast dispersion	0.215	0.371	0.000	0.036	0.083	0.204	2.000	266,648
Number of segments	1.925	1.368	1.000	1.000	1.000	3.000	6.000	525,603
Ln(N. of segments)	0.453	0.601	0.000	0.000	0.000	1.099	1.792	525,603
Cross-division Corr	-0.006	0.156	-0.425	-0.079	-0.003	0.069	0.401	241,628

Table 2
Earnings Announcement Premium and Investments

This table reports the results of panel regressions on the relationship between our firm-level uncertainty measures and investments the following quarter. In columns 1 and 2, we use our measure for earnings announcement premium, i.e. the three-day cumulative abnormal returns around quarterly earnings announcements (EAP) as the measure of uncertainty. In columns 3 and 4, we use the dispersion in analyst forecasts (*Forecast dispersion*). In columns 5 and 6, we include both. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm and quarter or industry-quarter fixed effects, and other firm characteristics as control variables in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable = I^{tot}/K^{tot}						
EAP_{t-1}	-0.527***	-0.514***			-0.876***	-0.754***
	(-8.11)	(-7.65)			(-10.44)	(-8.56)
Forecast dispersion$_{t-1}$			-0.464***	-0.380***	-0.461***	-0.377***
			(-16.25)	(-12.55)	(-16.12)	(-12.45)
Size	0.329***	0.422***	-0.059	0.157***	-0.063	0.153***
	(9.48)	(12.13)	(-1.27)	(3.16)	(-1.36)	(3.07)
Debt	-0.020***	-0.019***	-0.019***	-0.018***	-0.019***	-0.018***
	(-17.87)	(-16.81)	(-11.75)	(-11.13)	(-11.72)	(-11.10)
$Tobin$'s Q	0.006***	0.005***	0.006***	0.005***	0.006***	0.005***
	(50.62)	(48.17)	(42.56)	(39.31)	(42.56)	(39.29)
Cash flow	-0.028***	-0.039***	-0.041***	-0.057***	-0.040***	-0.055***
	(-9.00)	(-12.22)	(-8.84)	(-11.87)	(-8.51)	(-11.59)
CF volatility	1.859***	1.598***	2.498***	2.006***	2.486***	1.998***
	(6.86)	(5.87)	(6.26)	(5.07)	(6.23)	(5.05)
Cash	0.019***	0.022***	0.021***	0.023***	0.021***	0.023***
	(15.37)	(17.88)	(12.88)	(14.02)	(12.93)	(14.06)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	No	Yes	No	Yes	No
Industry × Quarter FE	No	Yes	No	Yes	No	Yes
N	427,720	420,368	222,533	211,825	222,533	211,825
R^2	0.5266	0.5904	0.6306	0.7006	0.6308	0.7007

Table 3
Earnings Announcement Premium and Cash Policies

This table reports the results of panel regressions on the relationship between our firm-level uncertainty measures and cash policies, i.e. cash holdings and cash savings, the following quarter. In columns 1 and 4, we use our measure for earnings announcement premium, i.e. the three-day cumulative abnormal returns around quarterly earnings announcements (EAP) as the measure of uncertainty. In columns 2 and 5, we use the dispersion in analyst forecasts (*Forecast dispersion*). In columns 3 and 6, we include both. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm and quarter or industry-quarter fixed effects, and other firm characteristics as control variables in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable		Cash			Cash savings	
EAP_{t-1}	2.187***		2.071***	2.072***		2.354***
	(9.40)		(6.23)	(17.06)		(13.02)
Forecast dispersion$_{t-1}$		-0.664***	-0.674***		0.363***	0.352***
		(-5.55)	(-5.64)		(7.80)	(7.55)
Size	-0.050	-0.954***	-0.949***	0.732***	1.153***	1.158***
	(-0.30)	(-3.77)	(-3.76)	(16.68)	(16.37)	(16.45)
Debt	-0.187***	-0.111***	-0.111***	0.042***	0.029***	0.029***
	(-32.03)	(-12.27)	(-12.29)	(25.41)	(10.69)	(10.63)
$Tobin$'s Q	0.014***	0.015***	0.015***	-0.001***	-0.001***	-0.002***
	(19.26)	(15.25)	(14.95)	(-4.97)	(-4.30)	(-4.94)
Cash flow	0.209***	0.274***	0.270***	0.099***	0.089***	0.085***
	(16.38)	(15.14)	(14.95)	(19.51)	(10.74)	(10.26)
CF volatility	16.905***	18.659***	18.678***	-1.325***	-2.524***	-2.496***
	(14.60)	(10.65)	(10.66)	(-3.66)	(-4.31)	(-4.27)
Cash				0.229***	0.249***	0.249***
				(85.49)	(63.56)	(63.52)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	No	Yes	No	Yes	No
Industry × Quarter FE	No	Yes	No	Yes	No	Yes
N	493,385	218,914	218,914	492,511	218,797	218,797
R^2	0.7879	0.8453	0.8454	0.2894	0.3227	0.3235

Table 4
Abnormal Return around a Placebo Date and Corporate Policies

This table reports the results of panel regressions on the relationships between three-day cumulative abnormal returns around a placebo date which is one month later from the quarterly earnings announcement ($EAP^{placebo}$) and investments, cash holdings, and cash savings, respectively, the following quarter. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm and quarter or industry-quarter fixed effects, and other firm characteristics as control variables in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Dependent variable	I^{tot}/K^{tot}	Cash	Cash savings
$EAP^{placebo}$	0.158	0.885	0.022
	(0.86)	(1.64)	(0.06)
Forecast dispersion	-0.400***	-0.605***	0.359***
	(-12.68)	(-5.62)	(7.70)
Size	0.386***	-0.915***	1.154***
	(6.84)	(-4.08)	(16.38)
Debt	-0.019***	-0.112***	0.029***
	(-10.81)	(-14.38)	(10.68)
$Tobin$'s Q	0.006***	0.016***	-0.001***
	(29.28)	(16.56)	(-4.31)
Cash flow	-0.041***	0.285***	0.089***
	(-8.26)	(17.20)	(10.73)
CF volatility	2.415***	20.959***	-2.524***
	(5.41)	(12.16)	(-4.31)
Cash	0.034***		0.249***
	(20.03)		(63.53)
Firm FE	Yes	Yes	Yes
Industry × Quarter FE	Yes	Yes	Yes
N	213,833	218,830	218,713
R^2	0.6842	0.8241	0.3227

Table 5
Earnings Announcement Premium and Profitability

This table reports the results of panel regressions on the relationship between our firm-level uncertainty measures and profitability (ROA) the following quarter. In columns 1 and 2, we use our measure for earnings announcement premium, i.e. the three-day cumulative abnormal returns around quarterly earnings announcements (EAP) as the measure of uncertainty. In columns 3 and 4, we use the dispersion in analyst forecasts (*Forecast dispersion*). In columns 5 and 6, we include both. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm and quarter or industry-quarter fixed effects, and other firm characteristics as control variables in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable = ROA						
EAP_{t-1}	3.017***	2.965***			2.130***	2.164***
	(37.98)	(36.01)			(23.12)	(21.38)
Forecast dispersion$_{t-1}$			-0.501***	-0.239***	-0.510***	-0.248***
			(-13.02)	(-5.70)	(-13.27)	(-5.93)
Size	0.815***	0.890***	0.541***	0.698***	0.543***	0.699***
	(21.56)	(20.54)	(10.67)	(11.60)	(10.71)	(11.64)
$Tobin$'s Q	0.005***	0.004***	0.007***	0.007***	0.007***	0.007***
	(19.36)	(16.32)	(29.60)	(22.94)	(28.60)	(22.06)
Debt	-0.026***	-0.024***	-0.021***	-0.020***	-0.021***	-0.020***
	(-19.49)	(-16.55)	(-10.74)	(-9.56)	(-10.75)	(-9.56)
CF volatility	-3.421***	-2.705***	-1.894***	-1.192**	-1.864***	-1.170**
	(-9.27)	(-7.03)	(-3.51)	(-2.08)	(-3.46)	(-2.05)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	No	Yes	No	Yes	No
Industry × Quarter FE	No	Yes	No	Yes	No	Yes
N	446,367	435,288	213,372	202,685	213,372	202,685
R^2	0.6806	0.7284	0.7235	0.7753	0.7247	0.7763

Table 6
Dispersion in Analyst Forecast and Earnings Announcement Premium

This table presents the results of panel regressions on the relationship between the dispersion in analyst forecasts and our measure for earnings announcement premium, i.e. the three-day cumulative abnormal returns around quarterly earnings announcements (EAP). We multiply EAP by 100 for the ease of interpretation. *Forecast dispersion* is the standard deviation of earnings forecasts across analysts, normalized by the absolute value of the mean forecast. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include standardized unexpected earnings (SUE), number of analysts, size, firm age, return volatility, and firm and quarter or industry-quarter fixed effects as control variables in the specification. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = $EAP(\times 100)$				
	(1)	(2)	(3)	(4)
Forecast dispersion	0.160***	0.145***	0.192***	0.219***
	(3.51)	(3.16)	(3.78)	(4.27)
SUE				14.348***
				(25.59)
Number of analysts				-0.062***
				(-10.62)
Size				-0.464***
				(-11.63)
Firm age				0.030***
				(3.95)
Return volatility				14.002***
				(6.71)
Firm FE	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	No
Industry × Quarter FE	No	No	Yes	Yes
N	368,268	368,267	357,573	347,903
R^2	0.0492	0.0529	0.1632	0.1737

Table 7
The Role of Political Risk

Panel A reports the results of panel regressions on the relationship between political risk and our measure for earnings announcement premium, i.e., three-day cumulative abnormal returns around quarterly earnings announcements (EAP). Panel B reports the results of panel regressions on the relationship between EAP and investments, cash, and cash savings the following quarter, while including political risk as a control variable. We use a (standardized) text-based measure of political risk (*PRisk*) provided by Hassan et al. (2019). We multiply EAP by 100 for the ease of interpretation. All other variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm and quarter or industry-quarter fixed effects, and other firm characteristics as control variables in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Political risk and EAP		
Dependent variable = $EAP(\times 100)$		
	(1)	(2)
$PRisk$	0.056*	0.068**
	(1.91)	(2.19)
SUE		12.057***
		(18.49)
Size		-1.470***
		(-18.22)
$Tobin$'s Q		-0.009***
		(-19.10)
Cash flow		0.221***
		(20.88)
Return volatility		29.733***
		(9.57)
Firm FE	Yes	Yes
Industry × Quarter FE	Yes	Yes
N	127,799	125,448
R^2	0.1888	0.2105

Panel B: Corporate policies, EAP, and political risk						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	I^{tot}/K^{tot}		Cash		Cash savings	
EAP_{t-1}	-0.910***	-0.844***	1.686***	1.547***	2.297***	2.303***
	(-9.73)	(-8.48)	(4.30)	(3.49)	(10.36)	(8.91)
$PRisk_{t-1}$	-0.017	-0.031**	0.080*	0.099*	-0.010	-0.007
	(-1.53)	(-2.27)	(1.71)	(1.78)	(-0.42)	(-0.25)
Forecast dispersion$_{t-1}$	-0.216***	-0.137***	-0.228	-0.262	0.313***	0.325***
	(-6.38)	(-3.58)	(-1.48)	(-1.52)	(4.72)	(4.19)
Size	0.073	0.144**	-2.313***	-2.285***	1.506***	1.770***
	(1.16)	(2.01)	(-6.44)	(-5.63)	(13.65)	(13.55)
Debt	-0.017***	-0.014***	-0.073***	-0.060***	0.026***	0.023***
	(-8.48)	(-6.44)	(-6.16)	(-4.46)	(6.78)	(5.21)
$Tobin$'s Q	0.005***	0.005***	0.016***	0.015***	-0.001***	-0.000
	(22.41)	(22.26)	(16.41)	(15.45)	(-2.93)	(-1.44)
Cash flow	-0.021***	-0.036***	0.230***	0.251***	0.121***	0.102***
	(-3.45)	(-5.35)	(10.45)	(10.40)	(10.84)	(8.12)
Return volatility	-6.763***	-6.664***	-15.458***	-43.020***	13.150***	18.509***
	(-5.19)	(-4.48)	(-2.84)	(-6.79)	(5.59)	(6.21)
Cash	0.024***	0.023***			0.266***	0.275***
	(12.98)	(11.76)			(46.68)	(44.47)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	No	Yes	No	Yes	No
Industry × Quarter FE	No	Yes	No	Yes	No	Yes
N	87,085	82,846	88,569	84,314	88,555	84,302
R^2	0.6730	0.7233	0.8489	0.8685	0.2648	0.3474

Table 8
Earnings Announcement Premium and Firm Size

This table reports the results of tests on market capitalization (*Market cap*), as a determinant of our measure for earnings announcement premium, i.e., three-day cumulative abnormal returns around quarterly earnings announcements (EAP). We multiply EAP by 100 for the ease of interpretation. In Panel A we report the results of various tests on difference in mean (median) of EAP between top-decile-size and bottom-decile-size firms. We report the mean differences in EAP, their t-statistics, and p-values. In Panel B we report the results of panel regressions on the linear relationship between EAP and (logarithmized) market capitalization. We include firm, quarter, or industry-quarter fixed effects as well as standardized unexpected earnings (SUE) and return volatility as controls in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Difference tests

Estimation method	OLS	FE	T-test	Median test
EAP_{large} - EAP_{small}	-0.5358***	-0.5358***	-0.5358***	
t-statistics (χ^2)	-5.93	-6.21	-5.93	24.38
p-value	0.00	0.00	0.00	0.00

Panel B: Regression tests

Dependent variable = $EAP(\times 100)$

	(1)	(2)	(3)
Market cap	-0.452***	-0.600***	-0.698***
	(-36.91)	(-36.07)	(-36.13)
SUE	12.718***	12.777***	12.383***
	(61.62)	(61.54)	(57.14)
Return volatility	15.222***	9.197***	6.691***
	(18.69)	(10.01)	(6.65)
Firm FE	Yes	Yes	Yes
Quarter FE	No	Yes	No
Industry × Quarter FE	No	No	Yes
N	784,302	784,302	773,323
R^2	0.0562	0.0592	0.1429

Table 9
Earnings Announcement Premium across Stock Exchanges

In this table, we report differences-in-differences results for our measure of earnings announcement premium, i.e., three-day cumulative abnormal returns around quarterly earnings announcements (EAP), from the pre-Sarbanes-Oxley (SOX) to the post-SOX periods between NYSE-listed and NASDAQ/AMEX-listed stocks. *NASDAQ/AMEX* is a dummy variable for whether the firm is listed in either NASDAQ or AMEX. *Post-SOX* is a dummy variable for the post-2003 period. We multiply EAP by 100 for the ease of interpretation. We include firm fixed effects, quarter fixed effects, standardized unexpected earnings (SUE), or firm size as control variables depending on the specification. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = $EAP(\times 100)$				
	(1)	(2)	(3)	(4)
NASDAQ/AMEX	0.039**	0.538***	0.125**	0.161***
	(2.13)	(10.46)	(2.19)	(2.84)
Post-SOX		-0.308***	-0.257**	
		(-9.17)	(-2.03)	
NASDAQ/AMEX × Post-SOX		-0.335***	-0.292***	-0.121*
		(-6.63)	(-4.66)	(-1.90)
SUE			12.510***	12.571***
			(48.76)	(48.84)
SUE × Post-SOX			-0.646*	-0.522
			(-1.66)	(-1.34)
Size			-0.301***	-0.438***
			(-17.73)	(-20.85)
Size × Post-SOX			0.032**	0.071***
			(2.16)	(4.58)
Constant	0.238***			
	(19.07)			
Firm FE	No	Yes	Yes	Yes
Quarter FE	No	No	No	Yes
N	855,771	855,117	797,659	797,659
R^2	0.0000	0.0385	0.0522	0.0557

Table 10
Earnings Announcement Premium and the Number of Business Segments

In this table, we report the results of panel regressions on the relationship between the number of business segments and our measure for earnings announcement premium, i.e., three-day cumulative abnormal returns around quarterly earnings announcements (EAP). We multiply EAP by 100 for the ease of interpretation. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include cross-divisional correlation, standardized unexpected earnings (SUE), size, and quarter fixed effects as control variables in the specification. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = $EAP(\times 100)$				
	(1)	(2)	(3)	(4)
Ln(N. of segments)	0.152***	0.161***	0.130***	0.118***
	(4.92)	(5.20)	(3.72)	(2.71)
Cross-division Corr		0.517***	0.571***	0.230*
		(4.33)	(4.76)	(1.84)
SUE			7.439***	7.518***
			(31.02)	(34.39)
Size			0.016	0.053***
			(1.43)	(3.22)
Constant	0.160***	0.158***	0.119*	
	(5.69)	(5.61)	(1.83)	
Quarter FE	No	No	No	Yes
N	211,686	211,686	206,387	206,387
R^2	0.0001	0.0002	0.0084	0.0139

Appendix: Supplementary Tables

Table A1
Earnings Announcement Premium Before and After the Pandemic

In this table, we report the results of panel regressions for the three-day cumulative abnormal returns around quarterly earnings announcements (EAP) in the periods prior to and during the 2020 Covid-19 Pandemic. *Pandemic* is an indicator that takes a value of one for year 2020. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm fixed effects and other firm characteristics as control variables in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = $EAP(\times 100)$				
	(1)	(2)	(3)	(4)
Pandemic	0.176***	0.245***	0.698***	0.674***
	(2.64)	(3.50)	(10.08)	(9.41)
SUE			10.489***	9.998***
			(62.24)	(48.75)
Size			-0.155***	-0.629***
			(-37.79)	(-47.74)
Cash flow			0.139***	0.163***
			(58.16)	(41.52)
Constant	0.258***		1.184***	
	(30.84)		(45.79)	
Firm FE	No	Yes	No	Yes
N	856,054	855,400	780,653	780,052
R^2	0.0000	0.0379	0.0219	0.0604

Table A2

Earnings Announcement Premium and Investments: Physical vs. Intangible

This table reports the results of panel regressions on the relationship between our firm-level uncertainty measures and types of investments the following quarter, i.e. investments in physical assets (Panel A) and those in intangible assets (Panel B), respectively. The physical and intangible investments are defined based on Peters and Taylor (2017). In columns 1 and 2, we use our measure for earnings announcement premium, i.e. the three-day cumulative abnormal returns around quarterly earnings announcements (EAP) as the measure of uncertainty. In columns 3 and 4, we use the dispersion in analyst forecasts (*Forecast dispersion*). In columns 5 and 6, we include both. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm and quarter or industry-quarter fixed effects, and other firm characteristics as control variables in the specifications. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
A. Dependent variable = I^{phy}/K^{tot}						
EAP_{t-1}	-0.354***	-0.321***			-0.545***	-0.485***
	(-9.55)	(-8.45)			(-10.67)	(-9.22)
Forecast dispersion$_{t-1}$			-0.337***	-0.248***	-0.335***	-0.246***
			(-19.02)	(-13.71)	(-18.90)	(-13.59)
Size	0.140***	0.151***	-0.008	0.050**	-0.011	0.047*
	(7.84)	(8.42)	(-0.33)	(1.98)	(-0.43)	(1.87)
Debt	-0.008***	-0.007***	-0.008***	-0.007***	-0.008***	-0.007***
	(-12.59)	(-11.10)	(-8.84)	(-7.46)	(-8.80)	(-7.43)
$Tobin$'s Q	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(38.26)	(35.17)	(32.13)	(29.41)	(32.23)	(29.52)
Cash flow	0.023***	0.018***	0.023***	0.015***	0.024***	0.016***
	(16.95)	(13.01)	(11.71)	(7.91)	(12.14)	(8.30)
CF volatility	0.105	0.159	0.237	0.319	0.230	0.314
	(0.79)	(1.20)	(1.15)	(1.62)	(1.11)	(1.59)
Cash	0.002***	0.004***	0.001	0.002**	0.001	0.002**
	(3.53)	(5.96)	(0.63)	(2.48)	(0.70)	(2.54)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	No	Yes	No	Yes	No
Industry × Quarter FE	No	Yes	No	Yes	No	Yes
N	427,720	420,368	222,533	211,825	222,533	211,825
R^2	0.4136	0.4953	0.5049	0.6012	0.5052	0.6014

	(1)	(2)	(3)	(4)	(5)	(6)
B. Dependent variable = I^{int}/K^{tot}						
EAP_{t-1}	-0.162***	-0.171***			-0.314***	-0.273***
	(-4.01)	(-4.14)			(-5.93)	(-4.95)
Forecast dispersion$_{t-1}$			-0.107***	-0.118***	-0.105***	-0.117***
			(-5.82)	(-6.00)	(-5.74)	(-5.94)
Size	0.149***	0.232***	-0.036	0.107***	-0.038	0.105***
	(6.17)	(9.36)	(-1.05)	(2.87)	(-1.09)	(2.83)
Debt	-0.011***	-0.012***	-0.009***	-0.010***	-0.009***	-0.010***
	(-14.43)	(-14.95)	(-8.38)	(-9.14)	(-8.36)	(-9.13)
$Tobin$'s Q	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(35.29)	(34.81)	(27.46)	(27.32)	(27.43)	(27.28)
Cash flow	-0.043***	-0.047***	-0.054***	-0.060***	-0.054***	-0.059***
	(-18.67)	(-20.14)	(-16.09)	(-17.20)	(-15.91)	(-17.05)
CF volatility	1.650***	1.293***	2.183***	1.567***	2.179***	1.564***
	(8.27)	(6.39)	(7.30)	(5.37)	(7.28)	(5.36)
Cash	0.015***	0.016***	0.020***	0.020***	0.020***	0.020***
	(16.99)	(18.65)	(15.99)	(16.74)	(16.01)	(16.76)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	No	Yes	No	Yes	No
Industry × Quarter FE	No	Yes	No	Yes	No	Yes
N	497,959	488,171	227,009	216,436	227,009	216,436
R^2	0.6854	0.7439	0.7750	0.8251	0.7751	0.8251

Table A3

Earnings Announcement Premium and Investments: Robustness

This table reports the results of panel regressions on the relationship between our firm-level uncertainty measures, i.e. earnings announcement premium which is defined as the three-day cumulative abnormal returns around quarterly earnings announcements (EAP), and investments the following quarter, in which we further control for negative investment-return relationships documented in the literature. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include firm and quarter or industry-quarter fixed effects, and other firm characteristics as control variables in the specifications. In columns 3 and 4, we also add the dispersion in analyst forecasts (*Forecast dispersion*) as a control variable. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent variable = I^{tot}/K^{tot}				
EAP_{t-1}	-0.548***	-0.536***	-0.878***	-0.766***
	(-8.25)	(-7.80)	(-10.18)	(-8.46)
EAP_t	0.006	-0.046	-0.047	-0.112
	(0.08)	(-0.66)	(-0.55)	(-1.20)
EAP_{t+1}	-0.098	-0.176**	-0.031	-0.138
	(-1.49)	(-2.57)	(-0.37)	(-1.54)
Size	0.320***	0.414***	-0.069	0.146***
	(9.09)	(11.75)	(-1.47)	(2.91)
Debt	-0.020***	-0.019***	-0.018***	-0.018***
	(-17.22)	(-16.19)	(-11.59)	(-10.98)
$Tobin$'s Q	0.006***	0.005***	0.006***	0.005***
	(50.20)	(47.68)	(42.50)	(39.15)
Cash flow	-0.029***	-0.040***	-0.041***	-0.056***
	(-9.03)	(-12.14)	(-8.65)	(-11.62)
CF volatility	1.862***	1.599***	2.474***	1.982***
	(6.80)	(5.82)	(6.21)	(5.02)
Cash	0.019***	0.022***	0.021***	0.023***
	(15.01)	(17.57)	(12.84)	(13.99)
Forecast dispersion$_{t-1}$			-0.460***	-0.378***
			(-16.04)	(-12.43)
Firm FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	No	Yes	No
Industry × Quarter FE	No	Yes	No	Yes
N	421,864	414,482	221,788	211,066
R^2	0.5276	0.5915	0.6313	0.7012

Table A4

Dispersion in Analyst Forecast and Earnings Announcement Premium: Without Firm Fixed Effects

This table presents the results of panel regressions without firm fixed effects on the relationship between the dispersion in analyst forecasts and our measure for earnings announcement premium, i.e. the three-day cumulative abnormal returns around quarterly earnings announcements (EAP). We multiply EAP by 100 for the ease of interpretation. *Forecast dispersion* is the standard deviation of earnings forecasts across analysts, normalized by the absolute value of the mean forecast. All variables are defined in Table A7 in Appendix: Supplementary Tables. We include standardized unexpected earnings (SUE) and quarter fixed effects as control variables in the specification. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = $EAP(\times 100)$			
	(1)	(2)	(3)
Forecast dispersion	-0.259***	-0.260***	-0.066
	(-6.74)	(-6.74)	(-1.42)
SUE			14.906***
			(42.94)
Quarter FE	No	Yes	Yes
N	368,873	368,872	367,773
R^2	0.0002	0.0039	0.0137

Table A5
Robustness: Regressions Without Fixed Effects

In this table, we report regression results without fixed effects. In Panel A, we report the results of panel regressions on the relationships between three-day cumulative abnormal returns around quarterly earnings announcements (EAP) and investments, cash holdings, cash savings, and ROA, respectively, the following quarter. In Panel B, we report the results of panel regressions on firm size and political risk, respectively, as a determinant of EAP. In Panel C, we report differences-in-differences results for EAP from the pre-Sarbanes-Oxley (SOX) to the post-SOX periods between NYSE-listed and NASDAQ/AMEX-listed stocks. For the results in Panels B and C, we multiply EAP by 100 for the ease of interpretation. All variables are defined in Table A7 in Appendix: Supplementary Tables. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

A. Earnings announcement premium and corporate outcomes				
	(1)	(2)	(3)	(4)
Dependent variable	Investment	Cash	Savings	ROA
EAP_{t-1}	-0.657***	1.575***	2.612***	4.038***
	(-6.25)	(3.33)	(16.24)	(31.62)
Forecast dispersion$_{t-1}$	-0.418***	0.561***	0.323***	-0.940***
	(-19.25)	(5.69)	(9.69)	(-37.34)
Size	-0.584***	-1.221***	0.222***	0.460***
	(-112.06)	(-57.15)	(31.11)	(71.09)
Debt	-0.020***	-0.311***	0.027***	-0.012***
	(-42.21)	(-143.12)	(32.61)	(-19.43)
$Tobin$'s Q	0.006***	0.048***	-0.002***	0.003***
	(111.46)	(136.63)	(-14.63)	(31.67)
Cash flow	-0.036***	-0.774***	0.271***	
	(-13.40)	(-68.93)	(54.78)	
CF volatility	3.953***	55.780***	-4.969***	-22.017***
	(27.88)	(94.88)	(-20.92)	(-128.78)
Cash	0.018***		0.089***	
	(31.66)		(85.43)	
Constant	8.376***	20.063***	-2.997***	0.874***
	(198.92)	(109.70)	(-48.16)	(16.96)
N	223,049	229,915	229,807	213,888
R^2	0.3339	0.4650	0.1007	0.2870

B. Size, political risk, and EAP		
Dependent variable = $EAP(\times 100)$		
	(1)	(2)
Size	-0.081***	-0.088***
	(-20.15)	(-7.76)
SUE	12.602***	11.514***
	(76.53)	(27.64)
$PRisk$		0.043**
		(2.10)
$Tobin$'s Q		-0.001***
		(-5.12)
Cash flow		0.166***
		(29.15)
CF volatility		0.160
		(0.56)
Constant	0.764***	0.925***
	(29.52)	(9.14)
N	787,071	106,677
R^2	0.0145	0.0189

C. EAP across stock exchanges	
Dependent variable = $EAP(\times 100)$	
NASDAQ/AMEX	0.155***
	(6.42)
Post-SOX	-1.112***
	(-13.77)
NASDAQ/AMEX × Post-SOX	-0.098**
	(-2.46)
SUE	12.804***
	(57.97)
SUE × Post-SOX	-0.676**
	(-2.06)
Size	-0.031***
	(-4.91)
Size × Post-SOX	0.124***
	(12.65)
Constant	0.559***
	(12.13)
N	798,223
R^2	0.0150

Table A6
Robustness: Regressions Without *SUE*

In this table, we report the results of panel regressions on firm size, forecast dispersion, political risk, and stock exchange, respectively, as a determinant of our measure of earnings announcement premium, i.e. three-day cumulative abnormal returns around quarterly earnings announcements (EAP), without controlling for standardized unexpected earnings (SUE). We multiply EAP by 100 for the ease of interpretation. All variables are defined in Table A7 in Appendix: Supplementary Tables. In each column, we report estimated coefficients from OLS regression and their t-statistics, calculated using heteroskedasticity-robust and firm-clustered standard errors. ***, ** , and * indicate the statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = $EAP(\times 100)$				
	(1)	(2)	(3)	(4)
Size	-0.682***	-0.514***	-1.838***	-0.522***
	(-38.38)	(-12.93)	(-18.25)	(-22.47)
Forecast dispersion		0.147***		
		(2.87)		
Number of analysts		-0.061***		
		(-10.60)		
Firm age		0.028***		
		(3.70)		
$PRisk$			0.078**	
			(2.41)	
$Tobin$'s Q			-0.009***	
			(-15.22)	
Cash flow			0.253***	
			(18.81)	
CF volatility			-3.749*	
			(-1.73)	
Size × Post-SOX				0.078***
				(3.92)
NASDAQ/AMEX				0.157***
				(2.62)
NASDAQ/AMEX × Post-SOX				-0.071
				(-0.91)
Firm FE	Yes	Yes	Yes	Yes
Industry × Quarter FE	Yes	Yes	Yes	Yes
N	830,056	349,696	101,625	844,477
R^2	0.1283	0.1665	0.2209	0.1250

Table A7
Variable Definitions

EAP	Our measure for earnings announcement premium, i.e. the three-day (-1 to +1 days) cumulative abnormal returns around quarterly earnings announcements.
SUE	Standardized unexpected earnings, i.e. the reported EPS minus the median EPS forecast, normalized by the end-of-quarter stock price. For firm-quarters without an EPS forecast, we proxy it by the reported EPS for the same quarter in the previous year.
Forecast dispersion	Standard deviation of earnings forecasts across analysts, normalized by the absolute value of the mean consensus forecast, collected from I/B/E/S Unadjusted Summary History files.
I^{tot}/K^{tot}	Total investment rates following Peters and Taylor (2017), i.e. intangible investment rates plus physical investment rates.
I^{phy}/K^{tot}	Physical investment rates following Peters and Taylor (2017), i.e. [CAPXY(t) - CAPXY(t-1)], divided by total capital stock in the previous quarter.
I^{int}/K^{tot}	Intangible investment rates following Peters and Taylor (2017), i.e. R&D + (0.3 $\times$ SG&A) divided by total capital stock in the previous quarter, where a firm's total capital stock is the sum of the book value of property, plant, and equipment, intangible assets from the balance sheet, and perpetual-inventory-method-based knowledge and organization capital.
Cash	Cash and short-term investments/total assets.
Cash saving	ΔCash/assets, i.e., [Cash(t) - cash(t-1)]/total assets(t-1).
Size	Ln(total assets).
Tobin's Q	(Total assets - book value of equity + market value of equity)/total assets.
Cash flow	Net income/total assets(t-1).
Debt	Book leverage, i.e., total debts/total assets.
ROA	EBITDA/total assets(t-1).
CF volatility	Standard deviation of annual EBITDAs at the end of each fiscal year over the past five years.
Return volatility	Standard deviation of daily stock returns over the past 60 trading days.
Firm age	The number of years the firm has been on Compustat with a non-missing stock price.
Number of analysts	The number of estimates by analysts from I/B/E/S.
Ln(N. of segments)	The natural logarithm of the number of business segments.
Cross-division Corr	The sales-weighted cross-divisional correlation in cash flows suggested by Duchin (2010).