The Real Effects of Sentiment and Uncertainty*

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Abstract

The effects of sentiment should be strongest during times of heightened valuation uncertainty. As such, we document a significant amplifying role for market uncertainty in the relation between sentiment and aggregate investment. A one-standard-deviation increase in uncertainty more than doubles the effect of sentiment on investment. Moreover, allowing uncertainty-dependent sentiment effects substantially increases explanatory power (i.e., R^2). Our results are robust to many sentiment, uncertainty, and investment measures. We also document similar effects for aggregate equity issuance. Consistent with theory, we find even stronger results in the cross-section of valuation uncertainty. The evidence suggests that the importance of sentiment for corporate decisions varies over time and depends crucially on the underlying level of market uncertainty.

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1 Introduction

The question of whether stock market inefficiencies can have real effects has been of long-standing interest to economists.[1] However, empirical tests of this relation arrive at mixed conclusions.[2] In this paper, we seek to broadly understand whether the importance of sentiment for corporate decisions varies over time. In particular, we predict that in times of low market uncertainty about fundamentals, fluctuations in sentiment will have limited influence on managerial decisions. Conversely, we expect to observe a tighter relation between sentiment and real outcomes in times of high market uncertainty. Consistent with our hypotheses, we find that the level of market uncertainty is crucial in determining the relation between market sentiment and aggregate investment and aggregate corporate issuance activity. We further document empirically large cross-sectional implications, with significantly stronger effects for the subset of stocks likely to be most affected by sentiment.

Intuitively, in the absence of uncertainty about fundamentals, there will not be any scope for sentiment to influence decisions. Indeed, substantial evidence suggests that irrationality is exacerbated in settings of heightened uncertainty. A long literature in psychology provides evidence of systematic deviations from rationality in the presence of uncertainty (e.g., Kahneman and Tversky, 1973; Kahneman, 2003). In a finance context, Hirshleifer (2001) points out that psychological biases leading to mispricing should be strongest for stocks with the greatest uncertainty. Lee, Shleifer, and Thaler (1991) and Baker and Wurgler (2006), among others, provide corroborating cross-sectional evidence, showing that sentiment-induced mispricing is largest for stocks with the greatest uncertainty about valuations. Analogously, in the time series, Keynes (1936) argues that waves of optimistic and pessimistic sentiment will most likely affect the stock market when uncertainty is greatest.[3] Birru and Young (2022) of-

[1] See Keynes (1931).

[2] See, e.g., Fischer and Merton (1984), Barro (1990), Morck, Shleifer, and Vishny (1990), Blanchard, Rhee, and Summers (1993), Chirinko and Schaller (2001), Gilchrist, Himmelberg, and Huberman (2005), Lamont and Stein (2006), Arif and Lee (2014), and McLean and Zhao (2014).

[3] Keynes writes "In abnormal times in particular, when the hypothesis of an indefinite continuance of the existing state of affairs is less plausible than usual even though there are no express grounds to anticipate a definite change, the market will be subject to waves of optimistic and pessimistic sentiment, which are

fer confirming time-series evidence in an asset-pricing setting, showing that sentiment's many previously identified asset-pricing effects are strongest when market uncertainty is greatest. Motivated by this literature, we test the possibility that the real effects of sentiment may be most pronounced in times of high market uncertainty.

Figure 1 illustrates our main finding. The figure depicts the relation between market sentiment and aggregate investment conditional on low, medium, and high market uncertainty. The figure demonstrates that sentiment's explanatory power for investment is strongly increasing in uncertainty. The effect is sizable: conditioning on high uncertainty, moving from the 10th to 90th percentile of sentiment corresponds to investment more than tripling. In sharp contrast, sentiment has virtually no impact on investment when conditioning on low uncertainty.

Why might there be a relation between sentiment and corporate investment, and why might such a relation depend on the underlying level of market uncertainty? At least four potential arguments link sentiment to investment, and all should be exacerbated in times of high uncertainty. First, in the presence of rational long-run value-maximizing managers, sentiment-induced overpricing can help firms relax financing constraints and move closer to first-best investment. In the case of a financially constrained firm that is unable to fund all of its positive-NPV projects, a long-run value-maximizing manager will take advantage of irrationally cheap equity financing in times of overpricing by issuing equity to finance new investment, but will be less likely to do so in times of underpricing (Stein, 1996). Because sentiment-induced mispricing is more substantial in times of high uncertainty (Birru and Young, 2022), this channel should primarily play a role in times of high uncertainty. Conversely, sentiment-induced mispricing is relatively small in times of low uncertainty and, therefore, less likely to lead to a significantly cheaper cost of capital.

A second channel linking sentiment to investment is that myopic managers cater to investor sentiment by investing when investors are overly optimistic as a means of maximizing

unreasoning and yet in a sense legitimate where no solid basis exists for a reasonable calculation."

the short-term share price, albeit at the cost of potential long-run value (e.g., Polk and Sapienza, 2009). This channel requires managers to exploit sentiment-induced mispricing and therefore is again most likely to play a role in times of high uncertainty when the scope for sentiment-induced mispricing is greatest.

A third channel is that an empire-building manager can use overpriced equity as cover to undertake self-aggrandizing investments (Stein, 1996). Such behavior relies on sentiment-induced mispricing, again suggesting that this channel will likely play a larger role in times of higher uncertainty when investor irrationality has the most scope for influencing prices.

Finally, in the case of a less-than-fully rational manager, sentiment and investment can be linked simply because of correlated sentiment between investors and managers (Shiller, 1984). In this case, managers will invest precisely when investors are overly optimistic. As discussed in Keynes (1936), overly optimistic or pessimistic sentiment should have its greatest impact in times of high uncertainty, again suggesting this channel should play its strongest role when uncertainty is high.

While empirically distinguishing among the four channels poses a considerable identification challenge and is beyond the scope of our paper, the theories share many commonalities that offer empirical guidance. First, while each channel predicts a positive relation between sentiment and investment, each channel should be stronger in times of higher uncertainty when there is more scope for sentiment. In addition, the four channels linking sentiment to investment primarily pertain to public firms. Therefore, our analysis focuses on the aggregate investment of public firms, calculated by aggregating public firm data from Compustat. We use a comprehensive measure of investment: asset growth plus R&D, scaled by lagged assets.

We start by exploring the relation between sentiment and investment in aggregate regressions. When controlling for standard variables affecting aggregate investment, we find only modest evidence of a positive link between sentiment and investment. However, when allowing uncertainty-dependent sentiment effects by adding an additional variable capturing

the interaction of sentiment and uncertainty, we find an economically and statistically significant role for uncertainty in influencing the relation between sentiment and investment. In our baseline regressions, the effect of sentiment on investment more than doubles when uncertainty is one-standard-deviation above its mean relative to when uncertainty is at its mean. In terms of economic magnitude, when uncertainty is one-standard-deviation above its mean, a one-standard-deviation increase in sentiment is associated with a 40% increase in investment. Moreover, accounting for uncertainty's moderating effect on sentiment greatly increases the ability to explain time variation in aggregate investment. Adding only the interaction of sentiment and uncertainty to the existing eight explanatory variables in our baseline regression increases adjusted R^2 by 25%. The marginal increase in adjusted R^2 due to the interaction term is larger than for any of the standard controls we include, including Tobin's q.

We also test for potential non-linear effects of uncertainty on sentiment. Our primary analysis described above measures uncertainty as a continuous variable. When instead defining uncertainty as a binary variable that takes the value of one when uncertainty is in the top tercile of its historical distribution, we find particularly striking evidence of an amplifying role for uncertainty in influencing the effect of sentiment on corporate decisions. Specifically, we find that sentiment fails to significantly affect investment outside times of high uncertainty. In contrast, in times of high uncertainty, we find that the effect of sentiment on investment is 28 times larger than the negligible effect of sentiment outside high-uncertainty times. Overall, the evidence from aggregate regressions suggests that the effects of sentiment on aggregate corporate investment depend crucially on underlying market uncertainty.

We confirm that our results are robust to several alternative methodological choices. We estimate our baseline regressions at the monthly frequency; however, we confirm that our results are robust to regressions at the annual frequency. Our results are also robust to alternative sentiment proxies. Our main specifications use the Baker and Wurgler (2006) orthogonalized investor sentiment index but are robust to instead using the Huang, Jiang,

Tu, and Zhou (2015) aligned investor sentiment index or numerous survey-based measures of sentiment, including the University of Michigan Consumer Sentiment Index, the Conference Board Consumer Confidence Index, and the American Association of Individual Investors sentiment index. Finally, our main proxy of market uncertainty is mean stock-level idiosyncratic volatility, but our results are also robust to several alternative uncertainty proxies, including the Manela and Moreira (2017) news implied volatility index, the CBOE options implied volatility index, and mean stock-level total volatility, and our results are not affected by the inclusion of policy uncertainty or its interaction with sentiment.

Our primary measure of sentiment, the Baker and Wurgler (2006) investor sentiment index, is constructed as the first principal component of five underlying variables, including the closed-end fund discount, number of IPOs, first-day returns of IPOs, equity share in total new issues, and the dividend premium. Importantly, we use the version of their sentiment index orthogonalized to fundamentals. These fundamentals include industrial production growth, durable consumption growth, nondurable consumption growth, services consumption growth, employment growth, and a dummy for NBER recessions. Although we are unaware of theories linking the specific underlying variables in the Baker and Wurgler (2006) sentiment index to investment measured as a fraction of assets, our use of survey-based sentiment proxies described above confirms that our results are robust to sentiment proxies that are not constructed from firm-level variables.[4] We also show that our results are not due to the correlation between sentiment and uncertainty. Our main proxies for sentiment and uncertainty exhibit a correlation of 0.22, but we find similar and sometimes stronger results using several alternative sentiment and uncertainty proxies with near-zero correlations. Last, our results are robust to an alternative definition of investment based on capital expenditures instead of asset growth.[5]

[4]Our results are also inconsistent with the interpretation that sentiment proxies for fundamentals such as discount rates. Higher uncertainty should cause investment to be less responsive to fundamentals (e.g., Dixit and Pindyck, 1994; Bloom, Bond, and Van Reenen, 2007), but our results indicate that higher uncertainty is associated with increased responsiveness to sentiment.

[5]Our alternative investment measure based on capital expenditures also mitigates concerns that our main investment measure somehow captures precautionary cash savings.

We also explore additional predictions. First, we exploit cross-sectional predictions to provide further evidence of the moderating role of uncertainty in influencing the effects of sentiment on investment. Existing empirical evidence indicates that sentiment should have its strongest impact on stocks with the greatest valuation uncertainty (e.g., Baker and Wurgler, 2006). Following Da, Engelberg, and Gao (2015), we examine portfolios sorted on beta and volatility. Consistent with behavioral theory, we document relatively large sentiment effects on investment among high-beta and high-volatility firms. More so, when including the interaction of sentiment and uncertainty, we find that a one-standard-deviation increase in uncertainty is associated with sentiment effects that again more than double.

Finally, we explore the link between sentiment and equity issuance. If firms issue equity in response to overvaluation, we expect to observe elevated equity issuance when both sentiment and uncertainty are high. Accordingly, we also document a significant amplifying role for uncertainty in the relation between sentiment and equity issuance. Specifically, sentiment's explanatory power for equity issuance arises exclusively during periods of heightened uncertainty. We further show evidence of cross-sectional effects for equity issuance mirroring those we document for investment.

Our work contributes to the existing literature in multiple ways. First, we add to the literature examining the implications of market sentiment or mispricing for investment. A non-exhaustive list of such papers includes Fischer and Merton (1984), Barro (1990), Morck et al. (1990), Blanchard et al. (1993), Chirinko and Schaller (2001), Gilchrist et al. (2005), Arif and Lee (2014), and McLean and Zhao (2014). This literature arrives at mixed conclusions, with Morck et al. (1990), Blanchard et al. (1993), and Chirinko and Schaller (1996) finding little role for mispricing, while others argue for the presence of a role for sentiment or mispricing. Our evidence suggests that underlying uncertainty is pivotal in determining the link between aggregate investment and sentiment. Our cross-sectional evidence is also related to the literature using firm-level mispricing proxies to examine the relation between mispricing and investment in the cross-section of firms (e.g., Baker, Stein, and Wurgler, 2003;

Polk and Sapienza, 2009; Bakke and Whited, 2010; Campello and Graham, 2013; Hau and Lai, 2013; Dong, Hirshleifer, and Teoh, 2021).

Second, we contribute to the literature examining the relation between aggregate mispricing and equity issuance. Baker and Wurgler (2000) show that aggregate equity issuance predicts market returns. Other work providing evidence of a link between equity prices and aggregate issuance activity includes Lamont and Stein (2006) and Ma (2019).

Third, we also relate to the literature examining the implications of uncertainty for investment. Most recent papers focus on political uncertainty, and we are unaware of empirical work focusing on the relation between market uncertainty and investment. Julio and Yook (2012) examine the effects of elections on investment, and Gulen and Ion (2016) explore the impact of a news-based policy uncertainty index on investment. In contrast to political uncertainty, we focus on market uncertainty and examine its indirect influence via moderating the ability of sentiment to explain investment.

The paper proceeds as follows. Section 2 discusses the data. Section 3 presents our empirical methodology and main results testing for a relation between aggregate investment and the interaction of sentiment and uncertainty. Section 4 presents robustness tests. Section 5 examines additional predictions, including cross-sectional predictions and predictions related to equity issuance. Section 6 concludes.

2 Data

2.1 Stock Sample

Our sample includes the intersection of U.S.-based common stocks listed on the NYSE, Amex, and Nasdaq from CRSP and Compustat from July 1965 to December 2021. We study public firms because the theories described in the introduction that motivate the sentiment-investment link primarily pertain to public firms. We exclude utilities (SIC codes 4900–4999), financials (6000–6999), firms labeled public service, international affairs, or non-operating

establishments (9000+), firms with negative R&D, firms with missing or non-positive sales, and firms with missing or less than $10 million in assets.[6]

We follow Baker et al. (2003) and McLean and Zhao (2014) in measuring real outcomes. We measure investment (INV) in the broadest possible way: the change in assets, plus R&D, scaled by lagged assets (McLean and Zhao, 2014). We alternatively measure investment ($INV^{\star}$) as capital expenditures, plus R&D, plus SG&A, scaled by lagged assets.[7] We measure equity issuance (EI) as the change in equity, plus the change in deferred taxes, minus the change in retained earnings, scaled by lagged assets.

We test our hypotheses both in aggregate and in the cross-section. Following Arif and Lee (2014), we aggregate the data by calculating the value-weighted averages of the accounting variables using year-end market capitalizations as weights.[8] Following Baker and Wurgler (2006) and Da et al. (2015), we use beta- and volatility-sorted portfolios to investigate the cross-section. We calculate beta and volatility using monthly data from the past year.

2.2 Measuring Sentiment

We measure sentiment using the Baker and Wurgler (2006) orthogonalized investor sentiment index ($SENT$), which is the first principal component of five measures of investor sentiment: the closed-end fund discount, the number of IPOs, the first-day returns of IPOs, the equity share in total new issues, and the dividend premium. We use the orthogonalized version of the index because it accounts for the potential impacts of various macroeconomic conditions: industrial production growth, real durable consumption growth, real nondurable consumption growth, real services consumption growth, employment growth, and recessions. We also consider four alternative well-studied sentiment proxies. The first is the Huang et al. (2015) aligned investor sentiment index ($SENT^{PLS}$), which uses partial least squares to refine

[6]Following the literature, we set missing R&D to zero, but our results are robust to not doing so.

[7]We follow the definition in Peters and Taylor (2017). Specifically, they sum capital expenditures, R&D, and 30% of SG&A.

[8]Since aggregating reduces the influence of outliers, we do not also winsorize the firm-level data. However, our conclusions remain the same if we winsorize at the 0.5% or 1% level before aggregating.

the Baker and Wurgler (2006) investor sentiment index. The other three sentiment proxies are surveys, including the University of Michigan Consumer Sentiment Index ($MICH$), the Conference Board Consumer Confidence Index (CCI), and the American Association of Individual Investors sentiment index ($AAII$). While $MICH$ and CCI survey consumers, $AAII$ surveys retail investors.

2.3 Measuring Uncertainty

Because we are interested in capturing uncertainty about fundamentals, we follow the existing literature and measure market uncertainty as mean stock-level idiosyncratic volatility ($IVOL$). We calculate $IVOL$ as the volatility of daily return residuals from the Fama and French (1993) model from the past year. We also use three alternative common uncertainty proxies. The first is the Manela and Moreira (2017) news implied volatility index ($NVIX$).[9] The second is the CBOE options implied volatility index (VXO).[10] The third is mean stock-level total volatility ($TVOL$), calculated as the volatility of daily returns from the past year.

2.4 Descriptive Statistics

Table 1 provides descriptive statistics for the many sentiment, uncertainty, and investment proxies. Panel A reports summary statistics, including the mean, median, standard deviation, and 25th and 75th percentiles. We standardize the sentiment and uncertainty proxies to have zero mean and unit standard deviation. Our main investment proxy (INV) has a mean of 20.74% and a standard deviation of 11.68 percentage points.

Panel B of Table 1 reports correlations. The correlations between $SENT$ and $SENT^{PLS}$, $MICH$, CCI, and $AAII$ are 0.55, 0.30, 0.36, and 0.37, respectively. The correlations between $IVOL$ and $NVIX^2$, VXO, and $TVOL$ are 0.39, 0.61, and 0.98, respectively. These correlations indicate that the proxies capture slightly different dimensions of noise-trader beliefs

[9] Following Manela and Moreira (2017), we use $NVIX^2$ in our empirical analyses.

[10] We use VXO instead of VIX because VXO provides a longer time series. We find similar results using VIX.

and market uncertainty. *SENT* exhibits moderate correlation with *IVOL* (0.22), very low correlations with $NVIX^2$ (−0.10) and *VXO* (−0.12), and again moderate correlation with *TVOL* (0.20). The other sentiment and uncertainty proxies exhibit similar ranges of correlations. Finally, the correlations between *INV* and *SENT*, $SENT^{PLS}$, *MICH*, *CCI*, and *AAII* are 0.42, 0.41, 0.47, 0.46, and 0.50, respectively. These univariate correlations for different measures are a preliminary indication of the positive relation between investment and sentiment. In Section 3, we formally test the relation in a multivariate setting and show it is highly dependent on prevailing market uncertainty.

3 Main Results

This section presents our main empirical findings exploring the impact of uncertainty on the relation between sentiment and investment.

3.1 Regression Evidence: Sentiment, Uncertainty, and Investment

We test the role that uncertainty plays in the sentiment-investment relation using the following regression specification:

$$INV_{t+\tau} = \beta_0 + \beta_1 SENT_t + \beta_2 IVOL_t + \beta_3 (SENT_t \times IVOL_t) + Controls_t + \epsilon_{t+\tau}, \quad (1)$$

where $INV_{t+\tau}$ is τ-month-ahead annual investment, $SENT_t$ is the Baker and Wurgler (2006) orthogonalized investor sentiment index, and $IVOL_t$ is mean stock-level idiosyncratic volatility. When $\tau = 0$, we study the contemporaneous relation (e.g., Arif and Lee, 2014; McLean and Zhao, 2014). We also consider the predictive relation up to one-quarter ahead ($\tau \in \{1, 2, 3\}$). Following Arif and Lee (2014), we include controls common to the investment literature, including Tobin's (1969) q (q), return on assets (ROA), lagged values of the term premium ($TERM$), default premium (DEF), and Treasury bill rate ($TBILL$), and the

contemporaneous market return (MKT).[11,12] To facilitate interpretation, we standardize the independent variables to have zero mean and unit standard deviation.

Since optimism (pessimism) is increasing (decreasing) in our measure of sentiment, we expect a positive relation between sentiment and investment ($\beta_1 > 0$), consistent with the four theories described in the introduction. Moreover, we expect uncertainty to amplify the positive relation ($\beta_3 > 0$). Thus, we are primarily interested in the interaction term (β_3) and the overall effect of sentiment on investment ($\beta_1 + \beta_3$). We start by graphically reporting uncertainty's role in the sentiment-investment relation. Figure 1 depicts sentiment's explanatory power for investment conditional on uncertainty, using parameter estimates from Equation (1). Low, medium, and high uncertainty correspond to the 25th, 50th, and 75th percentiles of the uncertainty distribution, respectively, while the minimum and maximum values reported on the x-axis correspond to the 10th and 90th percentiles of the sentiment distribution, respectively. Conditioning on high uncertainty, the positive slope of the long-dash line indicates that high sentiment is associated with high investment, whereas low sentiment is associated with low investment. Moving from the 10th to 90th percentile of the sentiment distribution translates to an increase in investment of more than 20 percentage points or investment more than tripling. By comparison, the practically horizontal slope of the short-dash line indicates virtually no variation in sentiment's explanatory power for investment when conditioning on low uncertainty. Last, as expected, the solid line representing medium uncertainty is positively sloped but less steep than the long-dash line representing high uncertainty, consistent with sentiment effects increasing in magnitude as uncertainty increases.

Table 2 tabulates our main regression results. Columns 1–4 report contemporaneous and

[11] q is the market value of equity, minus the book value of equity, plus assets, minus deferred taxes, scaled by assets. *ROA* is income before extraordinary items, scaled by assets. *TERM* is the spread between 10-year and 1-year Treasuries. *DEF* is the spread between BAA and AAA bonds. *TBILL* is the inflation-adjusted 30-day Treasury bill rate. *MKT* is the CRSP value-weighted 12-month market return. *TERM*, *DEF*, and *TBILL* are lagged 12 months.

[12] We find similar results using Peters and Taylor's (2017) Tobin's q, which differently accounts for intangibles.

predictive regressions of investment on sentiment, uncertainty, and controls. The relation between sentiment and investment is indeed positive but modest in magnitude. For example, column 1 shows that a one-standard-deviation increase in sentiment is associated with a 2.19 percentage-point increase in investment as a fraction of assets, equal to 11% of average annual investment. However, when we allow uncertainty-dependent sentiment effects by adding the sentiment-uncertainty interaction to the specification, columns 5–8 document an economically and statistically significant (at the 1% level) amplifying role for uncertainty in the relation between sentiment and investment. For example, when uncertainty is one-standard-deviation above its mean, column 5 shows that a one-standard-deviation increase in sentiment is associated with an 8.27 (3.69 + 4.58) percentage-point increase in investment as a fraction of assets. This sentiment effect is more than two times larger than the effect for mean uncertainty and more than three times larger than the unconditional effect in column 1. Since investment has a mean of 20.74%, this change in investment due to sentiment increases investment by 40% (8.27/20.74). For comparison, a one-standard-deviation increase in q increases investment by 20%.

Since we measure investment at the monthly frequency using information that only changes annually, we expect some degree of autocorrelation and thus follow Polk and Sapienza (2009) by reporting Newey and West (1987) t-statistics adjusted for 11 lags. Additionally, in untabulated results, we test whether the estimated coefficients are biased. Specifically, we use lagged explanatory variables as instruments and estimate the coefficients using the generalized method of moments. We find similar results to those in Table 2.

We also find large differences in adjusted R^2 simply by including the sentiment-uncertainty interaction. For example, the jump in adjusted R^2 from column 1 to column 5 of Table 2 is 15 percentage points, a 25% increase. To better understand relative effects, Figure 2 plots the marginal adjusted R^2 for the sentiment-uncertainty interaction and each control in explaining investment. We calculate marginal adjusted R^2 by removing one variable at a time from Equation (1) and comparing the full specification to the reduced version. Among the

controls, only the default premium, term premium, and Tobin's q provide non-zero marginal adjusted R^2, with Tobin's q yielding the largest increase in explanatory power of 7 percentage points. Since adding the interaction between sentiment and uncertainty increases adjusted R^2 by 15 percentage points, this figure highlights the usefulness of accounting for the joint effects of sentiment and uncertainty in explaining investment.

Last, columns 6–8 of Table 2 consider one-, two-, and three-month-ahead annual investment. Examining these columns, we again find that when uncertainty is one-standard-deviation above its mean, the relation between sentiment and investment more than doubles. In sum, sentiment's explanatory power for investment is markedly stronger after allowing uncertainty-dependent sentiment effects.

Examining the level effect of uncertainty, the positive and statistically significant coefficient is consistent with the evidence in Philippon (2009), Kothari, Lewellen, and Warner (2014), and Gulen and Ion (2016), who also report a positive and statistically significant effect of market uncertainty on investment. While greater uncertainty can increase the value of the "option to wait" and delay investment, it can also decrease interest rates due to precautionary savings, making returns on investment more attractive (Kogan, 2001). Finally, we note that the control variables generally take typical signs.

A potential concern is that our findings are affected by the small yet positive correlation between our main sentiment proxy *SENT* and our main uncertainty proxy *IVOL*. Importantly, our robustness analyses show that this is not the case. Specifically, many of the alternative sentiment-uncertainty combinations we explore exhibit negative or near-zero correlations. For example, our main sentiment proxy *SENT* exhibits a correlation of −0.10 with the alternative uncertainty proxy $NVIX^2$, and a correlation of −0.12 with the alternative uncertainty proxy *VXO*. Similarly, the alternative sentiment proxy $SENT^{PLS}$ exhibits a correlation of 0.02 with our main uncertainty proxy *IVOL*. We document even stronger sentiment effects than those reported above in several of these robustness checks. We discuss these results more thoroughly in Section 4.

Uncertainty and sentiment both exhibit non-negligible within-year and within-quarter variation. We focus on monthly regressions to exploit these higher-frequency fluctuations. However, we also confirm that our results are robust to annual regressions that only include December fiscal year-end firms. The results are shown in Internet Appendix Table IA1. Column 1 indicates a lack of statistical significance for sentiment in the absence of its interaction with uncertainty. In column 2, we include the interaction term and again find an economically and statistically significant role for uncertainty in influencing the relation between sentiment and investment.

3.1.1 Excluding the Technology Bubble and Financial Crisis

Anecdotally, bubbles tend to be times of high sentiment, high uncertainty, and high investment, while financial crises tend to be times of high uncertainty, low sentiment, and low investment. During our sample period, the technology bubble of the late 1990s was a time of high sentiment, high uncertainty, and high investment, while the financial crisis of 2008 was a time of high uncertainty but low sentiment and low investment. These well-known episodes represent prominent examples that seem to align perfectly with our main hypotheses. Since our sample period includes nearly 60 years of data, it is unlikely that only two episodes drive our results; nevertheless, these episodes are clear instances of disproportionately high uncertainty and, therefore, may have a disproportionate effect on our results.

To better understand the extent to which our results are a more general phenomenon robust to excluding these events, we run our main regression while excluding the technology bubble (1995–2000) and financial crisis (2007–2009). The results are reported in Internet Appendix Table IA2. Indeed, the table shows that adjusted R^2 decreases, and the coefficients are noisier, as evidenced by smaller t-statistics. However, the interaction term between sentiment and uncertainty retains statistical and economic significance, though, unsurprisingly, it is somewhat smaller in magnitude.

3.1.2 Alternative Investment Proxy

We also confirm that our results are robust to measuring investment as capital expenditures, plus R&D, plus SG&A, scaled by lagged assets (e.g., Peters and Taylor, 2017). We continue to use the same controls as in Table 2. Table 3 presents the results. Columns 1–4 identify a positive but statistically insignificant link between sentiment and investment. Columns 5–8 include the interaction term that allows sentiment's role in explaining investment to depend on uncertainty. Consistent with our main results, we observe an economically and statistically significant effect of the interaction term at all horizons. The relative importance of uncertainty in influencing the relation between sentiment and investment is similar to our baseline results. A one-standard-deviation increase in uncertainty results in a relation between sentiment and investment that is more than two times larger than the relation when uncertainty is at its mean. For example, from column 5, when uncertainty is at its mean, a one-standard-deviation increase in sentiment is associated with a 0.72 percentage-point increase in investment as a fraction of assets, but when uncertainty is one-standard-deviation above its mean, the sentiment effect more than doubles to 1.82 percentage points (0.72 + 1.10). When measured relative to the mean of investment, the economic effect equals 9.5% of average annual investment (1.82/19.17), somewhat smaller than the economic effect documented for our main investment measure. When instead comparing coefficient estimates to the standard deviations of the investment values, we document relatively similar economic effects, because when uncertainty is one-standard-deviation above its mean, a one-standard-deviation increase in sentiment results in an increase in investment equal to 55% (71%) of a standard deviation of the alternative (main) investment variable. In addition, we continue documenting a relatively large overall increase in adjusted R^2 of 26% (0.11/0.42), which is very similar to the jump in explanatory power that we find for our main results in Table 2 (25%).

3.2 Non-Linear Effects

We also examine whether considering potential non-linear effects of uncertainty affects our conclusions. If the effects of sentiment on asset prices and corporate decisions are negligible when uncertainty is not high, then a binary variable distinguishing times of high uncertainty may be better suited than a continuous variable. Importantly, this test allows us to reaffirm whether our above results using continuous uncertainty are indeed due to times of high uncertainty, as we hypothesize. To examine the extent to which our results are confined to times of high uncertainty, we replace our main continuous uncertainty variable $IVOL$ with an uncertainty dummy variable that takes the value of one when uncertainty is in the top tercile of its historical distribution.

Table 4 presents the results using the binary uncertainty variable. Columns 1–4 repeat the analysis in the first four columns of Table 2 when measuring uncertainty as a binary instead of a continuous variable. We again find modest evidence of a positive relation between sentiment and investment. Columns 5–8 add the interaction term. The results are striking. In particular, the sentiment level term loses significance, while the interaction term is statistically significant at the 1% level and exhibits substantial economic magnitude at all horizons. In column 5, sentiment takes an insignificant value of 0.36, while the coefficient on the interaction term takes a value of 10.07, representing a magnitude 28 times larger than the coefficient on the level term. Stated differently, column 5 indicates that in times of high uncertainty, a one-standard-deviation increase in sentiment is associated with a marginal increase in investment of 49% (10.07/20.74). Overall, the results in this section confirm an economically and statistically significant role for uncertainty in amplifying the relation between sentiment and investment.

4 Robustness: Alternative Sentiment and Uncertainty Proxies

Our main results in Section 3 highlight uncertainty's moderating role in the sentiment-investment relation. In this section, we explore the extent to which our main results are robust to alternative sentiment and uncertainty proxies. Due to data availability, the sample period changes in some robustness checks.

4.1 Alternative Sentiment Proxies

We start by investigating whether our main results continue to hold when using alternative sentiment proxies. Importantly, we examine an alternative market-based sentiment proxy and three alternative survey-based proxies. One benefit of the survey-based proxies is that they help to rule out concerns that sentiment only relates to investment via market-based sentiment proxies that contain information about security issuance.

4.1.1 Alternative Market-Based Sentiment Proxy

We first consider the Huang et al. (2015) aligned investor sentiment index ($SENT^{PLS}$), which is a revised version of the Baker and Wurgler (2006) investor sentiment index. Huang et al. (2015) use the same five market variables as Baker and Wurgler (2006) to construct the index, but instead use partial least squares to extract information from the variables. We also note that $SENT^{PLS}$ exhibits a correlation of only 0.02 with our primary measure of uncertainty, alleviating the possible concern that the correlation between sentiment and uncertainty biases our results. Panel A of Table 5 reports findings using $SENT^{PLS}$. The results are economically and statistically significant and similar to the main results in Table 2.

4.1.2 Alternative Survey-Based Sentiment Proxies

We next consider three popular survey-based sentiment proxies. The survey measures have the added benefit that they are not constructed from variables reflecting underlying firm fundamentals. The first two survey-based measures we consider are the University of Michigan Consumer Sentiment Index ($MICH$) and the Conference Board Consumer Confidence Index (CCI), which both capture consumer beliefs. The third survey-based measure is the American Association of Individual Investors sentiment index ($AAII$), which captures retail-investor beliefs. We construct $MICH$, CCI, and $AAII$ by taking their 12-month rolling averages to align their timing with investment.[13]

Panel B of Table 5 reports results using $MICH$. The results are consistent with the main results in Section 3. Columns 5–8 show that the interaction of sentiment and uncertainty is significant at the 1% level at all horizons. Interestingly, the sentiment level effect is never significant in explaining investment. The results using this alternative measure of sentiment suggest that the real effects of sentiment only operate at times of heightened uncertainty, indicating that uncertainty is crucial for identifying a relation between sentiment and investment.

Panel C shows results using CCI. Once again, our main results are robust, and the sentiment level effect is insignificant in all specifications, reiterating that the real effects of sentiment only arise in times of heightened uncertainty. Finally, Panel D shows that our main results are also robust to using $AAII$. In contrast to the results using $MICH$ and CCI, sentiment does enter significantly for AAII; however, the interaction term also exhibits significance at the 1% level in all specifications.

[13]This is not an issue with our main measure of sentiment $SENT$ or $SENT^{PLS}$ because they are constructed from underlying variables that are measured using data from the past 12 months, aligning them with the period over which investment is measured. For example, the underlying $SENT$ variables IPO volume and equity share sum values over the past 12 months, while the dividend premium and first-day IPO returns use $t-12$ values.

4.2 Alternative Uncertainty Proxies

We also investigate the robustness of our main results to alternative uncertainty proxies, including the Manela and Moreira (2017) news implied volatility index ($NVIX^2$), the CBOE options implied volatility index (VXO), and mean stock-level total volatility ($TVOL$). Table 6 presents the results using the alternative uncertainty proxies. As with the alternative survey-based sentiment proxies, we construct $NVIX^2$ and VXO by taking their 12-month rolling averages to align their timing with investment. $TVOL$ already uses data from the past year. As mentioned earlier, the correlations between $SENT$ and $NVIX^2$ and $SENT$ and VXO are near zero.

Panel A of Table 6 reports results using $NVIX^2$. Columns 1–4 indicate that sentiment only marginally relates to investment. Interestingly, uncertainty also loses its significance in predicting investment when using $NVIX^2$. However, columns 5–8 show that our main results are robust. The coefficients on the interaction term between sentiment and uncertainty are significant at the 1% level in all specifications, and the economic magnitudes are actually somewhat larger than our baseline results in Table 2.

Panel B examines the robustness of our findings to VXO. Columns 1–4 show that both sentiment and uncertainty exhibit positive and significant explanatory power for investment. Columns 5–8 show that the interaction term between sentiment and uncertainty is significant at the 5% or better level at all horizons in columns 5, 6, and 7 but is now insignificant at the three-month horizon in column 8. Finally, Panel C presents findings using $TVOL$ and shows that our results are again robust. In particular, the interaction term in columns 5–8 maintains its significance at the 1% level at all horizons. Relative to the main results, the economic importance of the interaction terms is of comparable, or slightly larger, significance. Overall, the evidence in this section indicates that our main results continue to hold when using several alternative sentiment and uncertainty proxies, underscoring a robust effect of market uncertainty in moderating the sentiment-investment relation.

5 Additional Predictions

In this section, we explore additional predictions. First, we test for heterogeneity in the effects of sentiment on investment in the cross-section of firms. Next, we examine whether uncertainty's amplifying role extends to the relation between sentiment and aggregate equity financing activity.

5.1 Cross-Sectional Predictions

An extensive literature shows that sentiment exhibits its strongest effects in the cross-section. In particular, assets with greater valuation uncertainty are more susceptible to sentiment effects. For example, Baker and Wurgler (2006) and Da et al. (2015) show that sorting stocks into portfolios based on beta and volatility produces substantial cross-sectional heterogeneity in sentiment-induced mispricing and future portfolio returns. To the extent that the effects of sentiment are greatest among these firms, the effects we document for investment should be stronger when sorting stocks into portfolios based on their expected sensitivity to sentiment. Existing theory and evidence (e.g., Baker and Wurgler, 2006; Da et al., 2015) predict that our results should be particularly strong for stocks with relatively high beta or volatility.

We start by sorting stocks into terciles based on beta and volatility and then aggregate investment within each tercile. We examine aggregate investment for the top and bottom terciles and the difference in aggregate investment between the top and bottom terciles. We define the control variables analogously. If stock prices and investment are more sensitive to sentiment for high-beta and high-volatility firms, we expect the top-minus-bottom tercile to be positively related to sentiment. We examine results separately for beta- and volatility-sorted portfolios.

Panel A of Table 7 follows Equation (1)'s methodology but now focuses on the average investment of high-beta firms. Columns 1–4 indicate that these firms' investment exhibits considerable sensitivity to sentiment. In columns 5–8, we include the interaction term

of sentiment and uncertainty. The results again indicate uncertainty's economically and statistically significant effects on the relation between sentiment and investment. The interaction term suggests that the impact of sentiment for investment more than doubles when uncertainty is one-standard-deviation above its mean relative to when uncertainty is at its mean.

Further consistent with predictions, Panel B shows that the investment of low-beta firms fails to exhibit a significant relation with sentiment and the interaction of sentiment with uncertainty. In Panel C, we use a dependent variable equal to the difference between the investment of high- and low-beta firms. Consistent with the results in Panels A and B, we find that sentiment is influential in explaining time-variation in the difference in investment for these firms and that the underlying level of market uncertainty plays a significant role in determining time-variation in the importance of this relation.

In Table 8, we explore the results when sorting stocks into terciles based on volatility. We find consistent and somewhat economically larger results. Columns 1–4 of Panel A again show that firms with greater valuation uncertainty exhibit a strong unconditional relation between sentiment and investment. Columns 5–8 show that this relation is heavily dependent on uncertainty, with the relation between sentiment and investment again more than doubling when uncertainty increases from its mean to one-standard-deviation above its mean. As with low-beta firms, columns 1–4 of Panel B fail to find evidence of a significant relation between sentiment and investment for low-volatility firms. However, we document statistically significant interaction terms in columns 5–8, indicating a role for uncertainty in influencing the relation between sentiment and investment for low-volatility firms, albeit a relatively minor role economically. Finally, the regressions in Panel C examining the difference in investment between high- and low-volatility firms exhibit economically and statistically significant coefficients on the interaction term, consistent with the interpretations from Panels A and B.

5.2 Equity Issuance Activity

Existing literature also presents evidence consistent with market sentiment affecting aggregate equity issuance (see, e.g., Baker and Wurgler, 2000; Lamont and Stein, 2006). We start by examining the implications of market uncertainty for the relation between sentiment and aggregate equity issuance activity and then explore implications for the cross-section of equity issuance.

We measure equity issuance (EI) as the change in equity, plus the change in deferred taxes, minus the change in retained earnings, scaled by lagged assets. We estimate regressions similar to Equation (1), except we replace investment with equity issuance. We control for variables common to issuance regressions, including Tobin's q, return on assets, leverage, and the log of assets. Moreover, using $SENT$ presents endogeneity concerns because it contains variables related to issuance activity. On the other hand, survey-based sentiment proxies are not subject to circular arguments because they simply aggregate opinions about the economy's prospects. We use $MICH$ as the main survey-based sentiment proxy in the issuance tests, although Internet Appendix Tables IA3 and IA4 confirm that our findings are robust to the alternative survey-based sentiment proxies CCI and $AAII$. We do not present robustness results using $SENT^{PLS}$ because it suffers from the same endogeneity concern as $SENT$.

Table 9 reports our equity issuance findings. Columns 1–4 show that sentiment is insignificantly related to contemporaneous and future equity issuance in the absence of the interaction of sentiment and uncertainty. In contrast, columns 5–8 add the sentiment-uncertainty interaction and indicate that sentiment does have an economically and statistically significant relation with equity issuance when conditioning on underlying market uncertainty. For example, column 5 shows that sentiment is insignificantly related to equity issuance when uncertainty is at its mean. However, when uncertainty is one-standard-deviation above its mean, a one-standard-deviation increase in sentiment is associated with a 2.86 percentage-point increase in equity issuance as a fraction of assets. Since the sample mean of equity

issuance is 4.50%, the economic magnitude of the sentiment effect is a 64% increase in equity issuance. We find similar sentiment effects at the one-, two-, and three-month horizons. Once again, the evidence points to uncertainty's crucial role, as the relation between sentiment and equity issuance exists exclusively during high-uncertainty periods.

5.2.1 Equity Issuance Activity in the Cross-Section

Finally, we examine cross-sectional predictions for equity financing activity. Following the cross-sectional investment analysis in Section 5.1, we extend our cross-sectional beta and volatility tests to equity issuance activity. Internet Appendix Tables IA5 and IA6 report equity issuance results for beta- and volatility-sorted portfolios, respectively. The findings are consistent with our earlier cross-sectional investment evidence; the amplifying impact of uncertainty on real outcomes is strongest for firms most prone to sentiment effects.

6 Conclusion

Sentiment should exhibit its strongest influence on financial markets in settings of elevated uncertainty. Consistent with this intuition, we show that the relation between aggregate investment and sentiment is substantially elevated in times of higher market uncertainty. In addition, the ability of sentiment to explain time-series variation in investment is dramatically higher when accounting for the moderating effect of uncertainty for sentiment. In particular, we show that including an interaction term between sentiment and uncertainty offers a marginal increase in R^2 that is sizable and larger than the marginal increase in R^2 arising from each of the standard controls that we include, including Tobin's q. We also document similar findings when examining the effects of uncertainty on the relation between sentiment and aggregate equity issuance.

As theory suggests, we document the strongest sentiment effects for the subset of stocks with the greatest valuation uncertainty. Collectively, our findings significantly expand the

existing evidence supporting sentiment's influence on aggregate investment and financing activity. The real effects of sentiment are substantial but primarily concentrated in times when markets are most uncertain.

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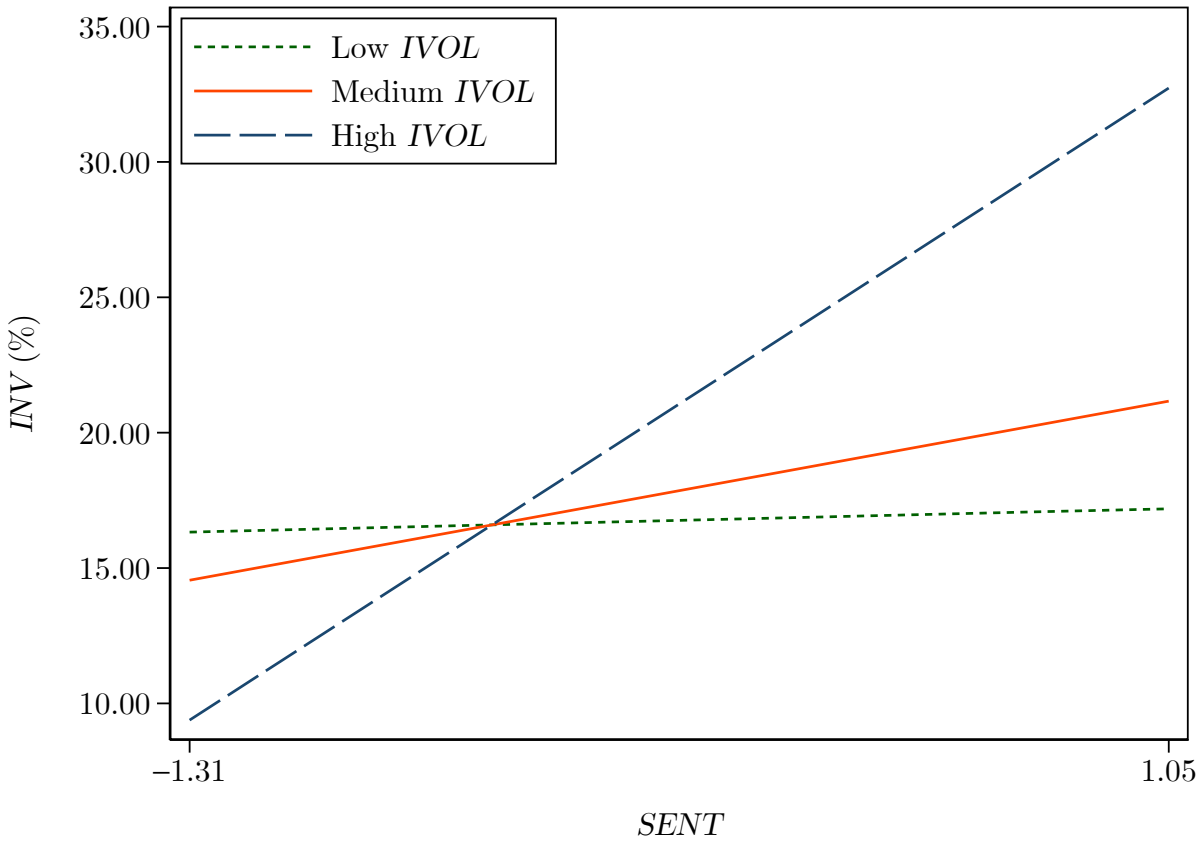
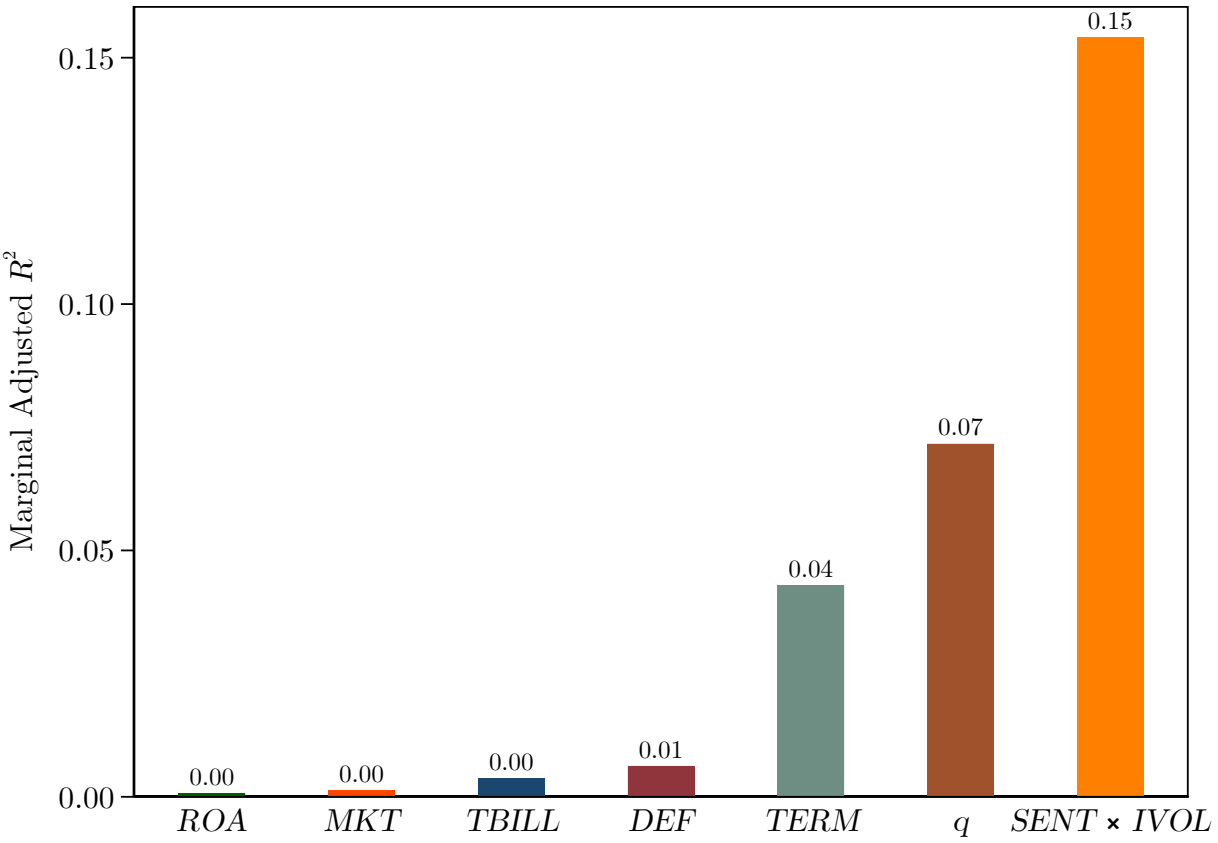
Figure 1. Sentiment and Investment Conditional on Uncertainty



This figure plots the relation between sentiment and investment conditional on low, medium, and high uncertainty, based on Equation (1)'s parameter estimates. Low, medium, and high uncertainty correspond to the distribution's 25th, 50th, and 75th percentiles, respectively. The x-axis is the range between the 10th and 90th percentiles of sentiment. *INV* is the change in assets, plus R&D, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. The sample period is July 1965 to December 2021.

Figure 2. Explaining Investment



This figure plots the marginal adjusted R^2 for the interaction between sentiment and uncertainty and each control in explaining aggregate investment. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q (q), return on assets (ROA), the term premium ($TERM$), the default premium (DEF), the Treasury bill rate ($TBILL$), and the market return (MKT). The sample period is July 1965 to December 2021.

Table 1. Descriptive Statistics

Panel A: Summary Statistics

	Mean	Median	SD	25%	75%
$SENT$	0.00	0.00	1.00	−0.45	0.53
$SENT^{PLS}$	0.00	−0.28	1.00	−0.63	0.27
$MICH$	0.00	0.08	1.00	−0.82	0.67
CCI	0.00	−0.25	1.00	−0.55	0.63
$AAII$	0.00	−0.20	1.00	−0.71	0.75
$IVOL$	0.00	−0.39	1.00	−0.82	0.86
$NVIX^2$	0.00	−0.37	1.00	−0.58	0.50
VXO	0.00	−0.18	1.00	−0.90	0.66
$TVOL$	0.00	−0.29	1.00	−0.80	0.68
INV (%)	20.74	18.28	11.68	15.32	21.10
$INV^\star$ (%)	19.17	20.19	3.33	15.70	21.61

Panel B: Correlations

	$SENT$	$SENT^{PLS}$	$MICH$	CCI	$AAII$	$IVOL$	$NVIX^2$	VXO	$TVOL$	INV	$INV^\star$
$SENT$	1.00										
$SENT^{PLS}$	0.55	1.00									
$MICH$	0.30	−0.06	1.00								
CCI	0.36	0.21	0.81	1.00							
$AAII$	0.37	0.38	0.39	0.26	1.00						
$IVOL$	0.22	0.02	0.33	0.22	0.10	1.00					
$NVIX^2$	−0.10	−0.02	−0.05	−0.15	−0.17	0.39	1.00				
VXO	−0.12	0.29	0.04	0.19	−0.01	0.61	0.68	1.00			
$TVOL$	0.20	0.03	0.29	0.20	0.05	0.98	0.51	0.72	1.00		
INV	0.42	0.41	0.47	0.46	0.50	0.51	0.02	0.24	0.47	1.00	
$INV^\star$	0.14	0.35	0.02	0.19	0.29	0.20	−0.40	0.22	0.08	0.35	1.00

This table reports descriptive statistics for the sentiment, uncertainty, and investment proxies. The sentiment proxies include the Baker and Wurgler (2006) orthogonalized investor sentiment index ($SENT$), the Huang et al. (2015) aligned investor sentiment index ($SENT^{PLS}$), the University of Michigan Consumer Sentiment Index ($MICH$), the Conference Board Consumer Confidence Index (CCI), and the American Association of Individual Investors sentiment index ($AAII$). The uncertainty proxies include mean stock-level idiosyncratic volatility ($IVOL$), the Manela and Moreira (2017) news implied volatility index ($NVIX^2$), the CBOE options implied volatility index (VXO), and mean stock-level total volatility ($TVOL$). The investment proxies include the change in assets, plus R&D, scaled by lagged assets (INV), and capital expenditures, plus R&D, plus SG&A, scaled by lagged assets ($INV^\star$). Panel A reports summary statistics, and Panel B reports correlations. We standardize the sentiment and uncertainty proxies to have zero mean and unit standard deviation. The sample period varies between July 1965 and December 2021.

Table 2. Sentiment and Investment

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	2.19**	2.12**	1.99**	1.82**	3.69***	3.51***	3.26***	2.95***
	(2.22)	(2.24)	(2.24)	(2.22)	(5.61)	(5.31)	(4.91)	(4.41)
IVOL	2.95**	3.05**	3.11**	3.18**	2.14**	2.29**	2.42***	2.57***
	(2.26)	(2.35)	(2.45)	(2.56)	(2.48)	(2.56)	(2.63)	(2.70)
SENT × *IVOL*					4.58***	4.29***	3.93***	3.51***
					(7.30)	(6.95)	(6.33)	(5.62)
q	6.25***	6.46***	6.65***	6.81***	4.24***	4.56***	4.90***	5.23***
	(3.25)	(3.24)	(3.21)	(3.19)	(2.98)	(2.90)	(2.83)	(2.77)
ROA	−0.05	0.47	0.77	1.06	−0.49	0.03	0.37	0.71
	(−0.04)	(0.38)	(0.67)	(0.99)	(−0.69)	(0.04)	(0.56)	(1.05)
TERM	−2.42***	−2.21***	−2.06***	−1.90***	−2.72***	−2.49***	−2.32***	−2.13***
	(−3.18)	(−3.00)	(−2.95)	(−2.85)	(−3.95)	(−3.75)	(−3.63)	(−3.42)
DEF	0.71	0.77	0.82	0.83	1.11*	1.14*	1.15*	1.12*
	(0.77)	(0.83)	(0.87)	(0.87)	(1.95)	(1.88)	(1.79)	(1.65)
TBILL	−0.36	−0.15	−0.11	0.02	−0.79**	−0.55	−0.47	−0.30
	(−0.94)	(−0.40)	(−0.28)	(0.05)	(−2.36)	(−1.64)	(−1.43)	(−0.93)
MKT	−0.39	−0.07	0.26	0.57	−0.49	−0.18	0.16	0.48
	(−0.43)	(−0.09)	(0.31)	(0.70)	(−1.04)	(−0.35)	(0.30)	(0.82)
Intercept	20.74***	20.79***	20.84***	20.89***	19.74***	19.85***	19.97***	20.11***
	(23.46)	(23.45)	(23.48)	(23.47)	(30.55)	(29.10)	(27.65)	(26.20)
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.61	0.61	0.61	0.61	0.76	0.75	0.73	0.70

This table reports aggregate results from contemporaneous and predictive regressions of investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *INV* is the change in assets, plus R&D, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q (q), return on assets (*ROA*), the term premium (*TERM*), the default premium (*DEF*), the Treasury bill rate (*TBILL*), and the market return (*MKT*). We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021.

Table 3. Sentiment and Investment: Alternative Investment Proxy

	(1) $INV_t^\star$	(2) $INV_{t+1}^\star$	(3) $INV_{t+2}^\star$	(4) $INV_{t+3}^\star$	(5) $INV_t^\star$	(6) $INV_{t+1}^\star$	(7) $INV_{t+2}^\star$	(8) $INV_{t+3}^\star$
SENT	0.37	0.37	0.35	0.34	0.72***	0.70**	0.68**	0.65**
	(1.36)	(1.33)	(1.29)	(1.22)	(2.63)	(2.52)	(2.39)	(2.21)
IVOL	1.19***	1.16***	1.13***	1.08**	0.98***	0.95***	0.92***	0.89**
	(2.77)	(2.72)	(2.64)	(2.53)	(2.86)	(2.78)	(2.67)	(2.53)
SENT × *IVOL*					1.10***	1.08***	1.04***	1.00***
					(4.70)	(4.42)	(4.10)	(3.72)
Intercept	19.17***	19.17***	19.17***	19.17***	18.93***	18.93***	18.94***	18.95***
	(61.41)	(60.79)	(60.31)	(59.87)	(63.60)	(62.52)	(61.55)	(60.52)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.42	0.41	0.41	0.40	0.53	0.52	0.51	0.49

This table reports aggregate results from contemporaneous and predictive regressions of investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. $INV^\star$ is capital expenditures, plus R&D, plus SG&A, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021.

Table 4. Sentiment and Investment: Uncertainty Dummy

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	2.13*	2.06*	1.94*	1.76*	0.36	0.39	0.41	0.43
	(1.95)	(1.94)	(1.92)	(1.87)	(0.69)	(0.73)	(0.76)	(0.77)
$IVOL^D$	2.85*	2.98*	3.09*	3.14*	2.48	2.66	2.85	2.97*
	(1.74)	(1.80)	(1.85)	(1.85)	(1.34)	(1.45)	(1.58)	(1.66)
$SENT \times IVOL^D$					10.07***	9.36***	8.45***	7.35***
					(3.10)	(3.05)	(2.94)	(2.78)
Intercept	19.80***	19.81***	19.82***	19.85***	19.08***	19.12***	19.17***	19.26***
	(20.40)	(20.39)	(20.40)	(20.38)	(25.96)	(25.17)	(24.17)	(23.06)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.58	0.58	0.58	0.58	0.68	0.67	0.65	0.63

This table reports aggregate results from contemporaneous and predictive regressions of investment on sentiment, an uncertainty dummy, and the interaction between sentiment and the uncertainty dummy. *INV* is the change in assets, plus R&D, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. $IVOL^D$ is a top-tercile uncertainty dummy corresponding to mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the continuous independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021.

Table 5. Sentiment and Investment: Alternative Sentiment Proxies

Panel A: $SENT^{PLS}$

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
$SENT^{PLS}$	3.06***	3.07***	3.06***	3.01***	3.94***	3.95***	3.92***	3.83***
	(2.65)	(2.66)	(2.64)	(2.63)	(9.60)	(9.50)	(8.91)	(8.02)
$IVOL$	3.06**	3.17**	3.30***	3.44***	2.46**	2.57**	2.71***	2.86***
	(2.42)	(2.51)	(2.64)	(2.78)	(2.50)	(2.57)	(2.67)	(2.77)
$SENT^{PLS} \times IVOL$					4.43***	4.38***	4.28***	4.08***
					(10.78)	(11.19)	(10.66)	(9.54)
Intercept	20.66***	20.71***	20.76***	20.80***	20.58***	20.62***	20.66***	20.70***
	(25.47)	(25.88)	(26.19)	(26.38)	(37.86)	(38.44)	(38.14)	(36.88)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	666	665	664	663	666	665	664	663
Adjusted R^2	0.67	0.68	0.69	0.69	0.81	0.82	0.82	0.81

Panel B: MICH

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
$MICH$	0.53	0.49	0.48	0.45	1.03	1.09	1.20	1.28
	(0.45)	(0.41)	(0.40)	(0.38)	(1.36)	(1.42)	(1.53)	(1.61)
$IVOL$	2.84**	2.95**	3.02**	3.10**	2.34***	2.44***	2.55***	2.66***
	(2.16)	(2.25)	(2.36)	(2.48)	(2.84)	(3.03)	(3.25)	(3.49)
$MICH \times IVOL$					5.22***	5.26***	5.27***	5.25***
					(5.59)	(5.81)	(5.97)	(6.12)
Intercept	20.74***	20.79***	20.83***	20.87***	19.03***	19.04***	19.06***	19.09***
	(22.72)	(22.75)	(22.83)	(22.89)	(36.85)	(36.93)	(36.85)	(36.76)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.58	0.59	0.59	0.60	0.76	0.77	0.78	0.78

(*continued*)

Table 5. *continued*

Panel C: CCI

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
CCI	−0.80	−0.85	−0.85	−0.83	0.03	0.01	0.05	0.09
	(−0.66)	(−0.71)	(−0.70)	(−0.69)	(0.03)	(0.01)	(0.04)	(0.08)
IVOL	2.59**	2.67**	2.73**	2.81**	2.61***	2.70***	2.79***	2.89***
	(2.00)	(2.09)	(2.19)	(2.32)	(2.67)	(2.80)	(2.95)	(3.12)
$CCI \times IVOL$					4.20***	4.09***	3.97***	3.83***
					(4.17)	(4.23)	(4.27)	(4.31)
Intercept	21.00***	21.04***	21.08***	21.12***	20.09***	20.13***	20.18***	20.24***
	(22.29)	(22.36)	(22.45)	(22.52)	(30.24)	(29.73)	(29.16)	(28.60)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	648	647	646	645	648	647	646	645
Adjusted R^2	0.58	0.59	0.60	0.60	0.71	0.71	0.71	0.71

Panel D: AAII

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
AAII	3.82***	3.43***	2.99**	2.50**	2.70**	2.35**	1.97*	1.55
	(3.01)	(2.72)	(2.38)	(1.99)	(2.50)	(2.12)	(1.73)	(1.34)
IVOL	3.01**	3.16**	3.33***	3.51***	3.18***	3.33***	3.51***	3.70***
	(2.26)	(2.41)	(2.60)	(2.85)	(3.00)	(3.18)	(3.39)	(3.63)
$AAII \times IVOL$					5.61***	5.49***	5.34***	5.10***
					(4.58)	(4.42)	(4.19)	(3.94)
Intercept	23.11***	23.17***	23.23***	23.29***	22.57***	22.63***	22.69***	22.77***
	(20.45)	(20.40)	(20.31)	(20.20)	(27.09)	(26.28)	(25.39)	(24.43)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	403	402	401	400	403	402	401	400
Adjusted R^2	0.72	0.73	0.72	0.73	0.81	0.81	0.81	0.80

This table reports aggregate results from contemporaneous and predictive regressions of investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. Panels A, B, C, and D present results using the Huang et al. (2015) aligned investor sentiment index ($SENT^{PLS}$), the University of Michigan Consumer Sentiment Index ($MICH$), the Conference Board Consumer Confidence Index (CCI), and the American Association of Individual Investors sentiment index ($AAII$), respectively. INV is the change in assets, plus R&D, scaled by lagged assets. $IVOL$ is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2020 (July 1965 to December 2021 for Panel B, January 1968 to December 2021 for Panel C, and June 1988 to December 2021 for Panel D).

Table 6. Sentiment and Investment: Alternative Uncertainty Proxies

Panel A: $NVIX^2$

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	2.01*	1.84	1.64	1.41	4.84***	4.45***	3.98***	3.46***
	(1.73)	(1.65)	(1.54)	(1.40)	(5.38)	(5.26)	(4.93)	(4.43)
$NVIX^2$	−0.70	−0.84	−0.96	−1.03	1.25*	0.96	0.65	0.38
	(−1.05)	(−1.27)	(−1.46)	(−1.59)	(1.81)	(1.40)	(0.95)	(0.53)
$SENT \times NVIX^2$					6.98***	6.45***	5.77***	5.04***
					(5.41)	(5.51)	(5.35)	(5.02)
Intercept	20.87***	20.90***	20.92***	20.93***	21.54***	21.51***	21.46***	21.41***
	(23.82)	(23.92)	(23.97)	(23.90)	(29.73)	(28.97)	(28.10)	(27.18)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	609	608	607	606	609	608	607	606
Adjusted R^2	0.67	0.68	0.68	0.68	0.77	0.76	0.74	0.73

Panel B: VXO

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	6.34***	5.95***	5.41***	4.82***	5.01***	4.80***	4.52***	4.19***
	(6.22)	(6.45)	(6.37)	(5.99)	(5.45)	(5.26)	(4.93)	(4.52)
VXO	2.66***	2.80***	3.00***	3.24***	3.63***	3.64***	3.66***	3.71***
	(2.89)	(2.96)	(2.99)	(3.04)	(3.59)	(3.56)	(3.38)	(3.22)
$SENT \times VXO$					2.68***	2.32***	1.81**	1.28
					(3.59)	(3.07)	(2.29)	(1.50)
Intercept	22.90***	22.98***	23.06***	23.12***	23.21***	23.26***	23.28***	23.28***
	(27.08)	(26.97)	(26.45)	(25.57)	(29.60)	(28.84)	(27.64)	(26.33)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	410	409	408	407	410	409	408	407
Adjusted R^2	0.82	0.82	0.82	0.81	0.84	0.84	0.83	0.81

(*continued*)

Table 6. *continued*

Panel C: TVOL

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	2.16**	2.10**	1.97**	1.80**	3.91***	3.73***	3.47***	3.15***
	(2.08)	(2.08)	(2.06)	(2.03)	(5.55)	(5.27)	(4.88)	(4.40)
TVOL	2.12*	2.16*	2.18*	2.24*	2.05***	2.10***	2.13***	2.19***
	(1.75)	(1.79)	(1.84)	(1.93)	(2.66)	(2.66)	(2.66)	(2.67)
SENT × *TVOL*					4.68***	4.41***	4.06***	3.65***
					(6.99)	(6.81)	(6.36)	(5.80)
Intercept	20.74***	20.79***	20.84***	20.89***	19.82***	19.92***	20.03***	20.16***
	(22.87)	(22.79)	(22.75)	(22.70)	(30.16)	(28.71)	(27.25)	(25.79)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.59	0.59	0.59	0.59	0.75	0.73	0.71	0.69

This table reports aggregate results from contemporaneous and predictive regressions of investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. Panels A, B, and C present results using the Manela and Moreira (2017) news implied volatility index ($NVIX^2$), the CBOE options implied volatility index (VXO), and mean stock-level total volatility ($TVOL$), respectively. INV is the change in assets, plus R&D, scaled by lagged assets. $SENT$ is the Baker and Wurgler (2006) orthogonalized investor sentiment index. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to March 2016 (December 1986 to January 2021 for Panel B and July 1965 to December 2021 for Panel C).

Table 7. Sentiment and Investment: Beta-Sorted Portfolios

Panel A: High Beta

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	4.53***	4.28***	3.92***	3.50***	8.65***	8.13***	7.45***	6.68***
	(2.90)	(2.92)	(2.83)	(2.66)	(4.65)	(4.47)	(4.15)	(3.73)
IVOL	4.39**	4.52**	4.56***	4.65***	3.59**	3.77**	3.88**	4.04**
	(2.47)	(2.56)	(2.60)	(2.62)	(2.24)	(2.29)	(2.31)	(2.33)
SENT × *IVOL*					9.22***	8.67***	7.96***	7.17***
					(4.74)	(4.60)	(4.39)	(4.09)
Intercept	31.32***	31.43***	31.52***	31.60***	29.31***	29.52***	29.76***	30.02***
	(17.81)	(18.59)	(19.17)	(19.66)	(20.47)	(20.59)	(20.20)	(19.64)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.69	0.71	0.72	0.72	0.78	0.78	0.78	0.78

Panel B: Low Beta

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	0.23	0.21	0.22	0.21	0.31	0.27	0.26	0.22
	(0.59)	(0.55)	(0.60)	(0.58)	(0.77)	(0.69)	(0.70)	(0.60)
IVOL	0.70	0.74	0.84	0.93*	0.62	0.68	0.80	0.91
	(1.16)	(1.26)	(1.47)	(1.67)	(1.05)	(1.16)	(1.39)	(1.60)
SENT × *IVOL*					0.29	0.22	0.16	0.06
					(0.82)	(0.67)	(0.50)	(0.20)
Intercept	16.90***	16.92***	16.95***	16.97***	16.84***	16.87***	16.91***	16.96***
	(30.90)	(31.27)	(31.69)	(31.88)	(30.53)	(30.81)	(31.09)	(31.10)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.35	0.34	0.34	0.33	0.35	0.34	0.34	0.33

(*continued*)

Table 7. *continued*

Panel C: High−Low Beta

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	4.59***	4.57***	4.46***	4.28***	8.21***	8.18***	7.99***	7.70***
	(2.63)	(2.70)	(2.70)	(2.65)	(5.10)	(5.15)	(5.05)	(4.83)
IVOL	2.22	2.59	2.84	3.08	1.48	1.86	2.12	2.39
	(1.25)	(1.43)	(1.52)	(1.61)	(1.00)	(1.17)	(1.26)	(1.34)
SENT × *IVOL*					9.12***	9.11***	8.92***	8.65***
					(5.73)	(5.77)	(5.75)	(5.71)
Intercept	14.42***	14.49***	14.54***	14.59***	12.43***	12.49***	12.59***	12.70***
	(8.39)	(8.49)	(8.46)	(8.34)	(8.83)	(8.78)	(8.50)	(8.11)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.64	0.63	0.62	0.61	0.75	0.74	0.72	0.70

This table reports cross-sectional results from contemporaneous and predictive regressions of beta-sorted investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. Panels A, B, and C present results for high beta, low beta, and high−low beta, respectively. *INV* is the change in assets, plus R&D, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021.

Table 8. Sentiment and Investment: Volatility-Sorted Portfolios

Panel A: High Volatility

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	11.30**	10.69**	9.56**	8.22**	19.25***	18.21***	16.23***	13.87***
	(2.57)	(2.53)	(2.54)	(2.55)	(4.76)	(4.55)	(4.19)	(3.62)
IVOL	11.91***	10.95***	10.51***	10.53***	9.44***	8.72***	8.56***	8.89***
	(2.71)	(2.82)	(2.95)	(3.07)	(3.17)	(3.04)	(2.99)	(3.05)
SENT × *IVOL*					20.38***	19.36***	17.22***	14.61***
					(4.25)	(4.08)	(3.62)	(2.97)
Intercept	50.41***	50.72***	50.93***	51.14***	45.97***	46.45***	47.12***	47.89***
	(15.66)	(16.71)	(17.62)	(18.35)	(20.59)	(20.56)	(20.63)	(20.79)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.68	0.70	0.70	0.69	0.81	0.82	0.80	0.76

Panel B: Low Volatility

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	0.28	0.19	0.09	−0.05	0.82**	0.69	0.53	0.32
	(0.62)	(0.44)	(0.21)	(−0.12)	(1.99)	(1.64)	(1.24)	(0.76)
IVOL	1.27*	1.28*	1.30*	1.32*	0.98*	1.02*	1.06*	1.12*
	(1.81)	(1.80)	(1.82)	(1.86)	(1.83)	(1.82)	(1.83)	(1.87)
SENT × *IVOL*					1.71***	1.58***	1.40***	1.17**
					(3.72)	(3.30)	(2.83)	(2.31)
Intercept	15.93***	15.95***	15.97***	15.99***	15.56***	15.61***	15.66***	15.73***
	(33.00)	(32.76)	(32.63)	(32.48)	(37.66)	(36.84)	(36.15)	(35.47)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.41	0.40	0.40	0.39	0.52	0.49	0.47	0.44

(*continued*)

Table 8. *continued*

Panel C: High−Low Volatility

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	11.98**	11.46**	10.46**	9.32**	19.59***	18.79***	17.14***	15.19***
	(2.45)	(2.43)	(2.44)	(2.46)	(4.69)	(4.57)	(4.27)	(3.78)
IVOL	12.08**	11.27***	10.96***	11.13***	9.03***	8.41***	8.37***	8.86***
	(2.53)	(2.64)	(2.75)	(2.83)	(3.03)	(2.87)	(2.77)	(2.78)
$SENT \times IVOL$					20.30***	19.65***	17.92***	15.79***
					(4.26)	(4.13)	(3.69)	(3.10)
Intercept	34.48***	34.73***	34.89***	35.04***	30.05***	30.41***	30.94***	31.56***
	(10.85)	(11.36)	(11.75)	(12.01)	(13.68)	(13.49)	(13.51)	(13.58)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.63	0.64	0.64	0.63	0.78	0.79	0.76	0.72

This table reports cross-sectional results from contemporaneous and predictive regressions of volatility-sorted investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. Panels A, B, and C present results for high volatility, low volatility, and high−low volatility, respectively. *INV* is the change in assets, plus R&D, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021.

Table 9. Sentiment and Equity Issuance

	(1) EI_t	(2) EI_{t+1}	(3) EI_{t+2}	(4) EI_{t+3}	(5) EI_t	(6) EI_{t+1}	(7) EI_{t+2}	(8) EI_{t+3}
MICH	0.07	−0.01	−0.08	−0.12	0.17	0.13	0.11	0.11
	(0.11)	(−0.02)	(−0.12)	(−0.18)	(0.33)	(0.26)	(0.20)	(0.19)
IVOL	2.35**	2.35**	2.31**	2.30**	1.99**	1.98***	1.96***	1.96***
	(2.09)	(2.20)	(2.34)	(2.50)	(2.57)	(2.79)	(3.03)	(3.29)
MICH × *IVOL*					2.86***	2.90***	2.91***	2.92***
					(3.76)	(3.84)	(3.87)	(3.84)
Intercept	4.50***	4.52***	4.54***	4.56***	3.56***	3.56***	3.57***	3.58***
	(7.15)	(7.15)	(7.15)	(7.10)	(9.42)	(9.46)	(9.48)	(9.49)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.58	0.58	0.58	0.58	0.68	0.69	0.69	0.69

This table reports aggregate results from contemporaneous and predictive regressions of equity issuance on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *EI* is the change in equity, plus the change in deferred taxes, minus the change in retained earnings, scaled by lagged assets. *MICH* is the University of Michigan Consumer Sentiment Index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, leverage, and the log of assets. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021

Internet Appendix:

The Real Effects of Sentiment and Uncertainty

Table IA1. Sentiment and Investment: Annual

	(1) INV_t	(2) INV_t
SENT	0.66	2.35*
	(0.43)	(1.83)
IVOL	3.32	0.95
	(1.31)	(0.67)
$SENT \times IVOL$		5.23***
		(3.91)
Intercept	20.13***	18.48***
	(12.37)	(12.58)
Controls	Yes	Yes
N	57	57
Adjusted R^2	0.47	0.67

This table reports aggregate results from contemporaneous regressions of investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *INV* is the change in assets, plus R&D, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1965 to 2021.

Table IA2. Sentiment and Investment: Excluding the Technology Bubble (1995–2000) and Financial Crisis (2007–2009)

	(1) INV_t	(2) INV_{t+1}	(3) INV_{t+2}	(4) INV_{t+3}	(5) INV_t	(6) INV_{t+1}	(7) INV_{t+2}	(8) INV_{t+3}
SENT	2.15**	2.13**	2.07**	1.96**	3.29***	3.17***	3.04***	2.85***
	(2.37)	(2.39)	(2.43)	(2.48)	(4.86)	(4.79)	(4.76)	(4.74)
IVOL	3.24*	3.18*	3.05**	2.95**	0.95	1.02	1.05	1.13
	(1.91)	(1.96)	(2.01)	(2.06)	(0.94)	(1.04)	(1.12)	(1.24)
SENT × *IVOL*					4.44***	4.17***	3.89***	3.55***
					(5.35)	(5.22)	(5.08)	(5.06)
Intercept	19.22***	19.15***	19.07***	18.99***	18.17***	18.15***	18.12***	18.12***
	(23.40)	(24.34)	(25.66)	(27.05)	(32.54)	(33.76)	(35.30)	(36.62)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	570	567	564	561	570	567	564	561
Adjusted R^2	0.51	0.51	0.50	0.50	0.73	0.73	0.72	0.70

This table reports aggregate results from contemporaneous and predictive regressions of investment on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *INV* is the change in assets, plus R&D, scaled by lagged assets. *SENT* is the Baker and Wurgler (2006) orthogonalized investor sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, the term premium, the default premium, the Treasury bill rate, and the market return. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021, excluding the technology bubble (1995–2000) and financial crisis (2007–2009).

Table IA3. Sentiment and Equity Issuance: Alternative Sentiment Proxy *CCI*

	(1) EI_t	(2) EI_{t+1}	(3) EI_{t+2}	(4) EI_{t+3}	(5) EI_t	(6) EI_{t+1}	(7) EI_{t+2}	(8) EI_{t+3}
CCI	−0.27	−0.43	−0.55	−0.64	−0.24	−0.37	−0.48	−0.56
	(−0.45)	(−0.66)	(−0.80)	(−0.89)	(−0.36)	(−0.54)	(−0.68)	(−0.77)
IVOL	2.23**	2.21**	2.16**	2.13**	2.05**	2.03***	2.00***	1.99***
	(2.06)	(2.17)	(2.29)	(2.43)	(2.51)	(2.68)	(2.85)	(3.03)
CCI × *IVOL*					2.23***	2.20***	2.15***	2.11***
					(3.14)	(3.21)	(3.23)	(3.20)
Intercept	4.62***	4.65***	4.67***	4.68***	4.14***	4.16***	4.18***	4.21***
	(7.31)	(7.34)	(7.35)	(7.30)	(8.93)	(8.93)	(8.87)	(8.77)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	648	647	646	645	648	647	646	645
Adjusted R^2	0.61	0.61	0.61	0.61	0.67	0.68	0.67	0.67

This table reports aggregate results from contemporaneous and predictive regressions of equity issuance on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *EI* is the change in equity, plus the change in deferred taxes, minus the change in retained earnings, scaled by lagged assets. *CCI* is the Conference Board Consumer Confidence Index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, leverage, and the log of assets. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is January 1968 to December 2021.

Table IA4. Sentiment and Equity Issuance: Alternative Sentiment Proxy *AAII*

	(1) EI_t	(2) EI_{t+1}	(3) EI_{t+2}	(4) EI_{t+3}	(5) EI_t	(6) EI_{t+1}	(7) EI_{t+2}	(8) EI_{t+3}
AAII	0.42	0.28	0.20	0.17	0.43	0.30	0.23	0.20
	(0.69)	(0.45)	(0.31)	(0.26)	(0.56)	(0.38)	(0.29)	(0.25)
IVOL	1.14	1.00	0.86	0.81	1.26*	1.12*	0.98	0.92
	(1.48)	(1.52)	(1.44)	(1.33)	(1.88)	(1.83)	(1.60)	(1.41)
AAII × *IVOL*					2.30**	2.05**	1.83*	1.65
					(2.22)	(1.97)	(1.71)	(1.52)
Intercept	5.90***	5.96***	5.99***	6.03***	5.68***	5.75***	5.81***	5.86***
	(7.54)	(7.77)	(7.93)	(7.96)	(8.17)	(8.29)	(8.38)	(8.37)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	403	402	401	400	403	402	401	400
Adjusted R^2	0.73	0.75	0.75	0.75	0.76	0.77	0.77	0.76

This table reports aggregate results from contemporaneous and predictive regressions of equity issuance on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *EI* is the change in equity, plus the change in deferred taxes, minus the change in retained earnings, scaled by lagged assets. *AAII* is the American Association of Individual Investors sentiment index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, leverage, and the log of assets. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is June 1988 to December 2021.

Table IA5. Sentiment and Equity Issuance: Beta-Sorted Portfolios

	(1) EI_t	(2) EI_{t+1}	(3) EI_{t+2}	(4) EI_{t+3}	(5) EI_t	(6) EI_{t+1}	(7) EI_{t+2}	(8) EI_{t+3}
MICH	0.56	0.62	0.78	0.97	0.66	0.80	1.01	1.26
	(0.41)	(0.47)	(0.58)	(0.71)	(0.46)	(0.58)	(0.75)	(0.95)
IVOL	1.97	2.10	2.16	2.25*	2.18*	2.34**	2.44**	2.55**
	(1.42)	(1.58)	(1.65)	(1.70)	(1.81)	(2.05)	(2.21)	(2.32)
MICH × *IVOL*					6.82***	7.41***	7.89***	8.30***
					(3.16)	(3.36)	(3.51)	(3.61)
Intercept	8.25***	8.30***	8.35***	8.40***	6.01***	5.86***	5.73***	5.63***
	(4.74)	(4.80)	(4.85)	(4.87)	(5.31)	(5.30)	(5.22)	(5.11)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.54	0.54	0.54	0.54	0.60	0.61	0.63	0.63

This table reports cross-sectional results from contemporaneous and predictive regressions of high−low beta-sorted equity issuance on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *EI* is the change in equity, plus the change in deferred taxes, minus the change in retained earnings, scaled by lagged assets. *MICH* is the University of Michigan Consumer Sentiment Index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, leverage, and the log of assets. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021.

Table IA6. Sentiment and Equity Issuance: Volatility-Sorted Portfolios

	(1) EI_t	(2) EI_{t+1}	(3) EI_{t+2}	(4) EI_{t+3}	(5) EI_t	(6) EI_{t+1}	(7) EI_{t+2}	(8) EI_{t+3}
MICH	5.32	5.30	5.52*	5.84*	3.90	4.10	4.46	4.91*
	(1.43)	(1.54)	(1.68)	(1.82)	(1.20)	(1.33)	(1.52)	(1.73)
IVOL	10.06	9.54*	9.15*	9.06*	8.85*	8.43*	8.08*	8.03**
	(1.58)	(1.65)	(1.74)	(1.86)	(1.76)	(1.84)	(1.95)	(2.09)
MICH × *IVOL*					14.04**	14.06**	14.05**	14.13**
					(2.05)	(2.15)	(2.28)	(2.44)
Intercept	23.56***	23.74***	23.87***	23.99***	18.95***	19.07***	19.17***	19.23***
	(6.26)	(6.54)	(6.84)	(7.13)	(9.31)	(9.48)	(9.54)	(9.62)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	678	677	676	675	678	677	676	675
Adjusted R^2	0.44	0.47	0.50	0.51	0.52	0.55	0.58	0.59

This table reports cross-sectional results from contemporaneous and predictive regressions of high−low volatility-sorted equity issuance on sentiment, uncertainty, and the interaction between sentiment and uncertainty. *EI* is the change in equity, plus the change in deferred taxes, minus the change in retained earnings, scaled by lagged assets. *MICH* is the University of Michigan Consumer Sentiment Index. *IVOL* is mean stock-level idiosyncratic volatility. Controls include Tobin's q, return on assets, leverage, and the log of assets. We standardize the independent variables to have zero mean and unit standard deviation. Newey and West (1987) t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The sample period is July 1965 to December 2021.