Political ambiguity and the cross-section of stock returns

Abstract

We examine the relation between political ambiguity and the cross-section of stock returns. We proxy political ambiguity through the Q-index of Bialkowski et al. (JFE, 2022) which measures the quality of political signals. We measure a stock's sensitivity to the Q-index and call this Q-beta. We find an anomalous positive Q-beta effect where positive Q-beta stocks that hedge against poor political information quality, outperform negative Q-beta stocks, suggesting that investors underpay for positive Q-beta stocks. Further, we find that the positive Q-beta effect is evident only following periods of high investor sentiment, good political information quality, in times when information quality is improving, and when expected returns reside in the domain of losses. The apparent investor underpayment for positive Q-beta stocks is consistent with a) overly optimistic investors overestimating the persistence of good political information quality or its continuous improvement, b) investors increasing their risk appetite when ambiguity decreases and c) investors exhibiting a love for ambiguity in the domain of losses.

1. Introduction

Knight (1921) first made the distinction between risk and ambiguity by characterizing uncertain outcomes with known probabilities as risky, and uncertain outcomes with unknown probabilities as subject to Knightian uncertainty. Knightian uncertainty, has also since been referred to in the literature as ambiguity in Ellsberg's (1961) thought experiments formalizing the concept of ambiguity aversion as distinct from risk aversion. Further expanding on the theme of ambiguity, Page (1976) introduced its relationship to the realm of politics. He posited that vague actions and statements by politicians led to what he termed 'political ambiguity'. He argued that such ambiguity could be detrimental to public enlightenment and the democratic decision-making process.

In this paper, we focus on political ambiguity and examine its relationship with the cross-section of stock returns. We measure political ambiguity through the quality of political signals. Specifically, we use the Q-index of Bialkowski, et al. (2022) which is a newspaper-based time-varying measure of the quality of political information. Accordingly, a higher Q-index level suggests lower quality of political signals. We measure the sensitivity of a stock's rate of return to the Q-index and refer to this as Q-beta. Since positive (negative) Q-beta stocks have high (low) returns when political ambiguity is high as proxied by a high Q-index, we expect positive Q-beta stocks to earn less than negative Q-beta stocks, as ambiguity-averse investors demand higher compensation for the latter in the form of higher expected returns. Therefore, we expect a negative Q-beta effect. We test this conjecture and reach a counterintuitive result. In unconditional portfolio-sorting, we find that positive Q-beta stocks outperform (not underperform) negative Q-beta stocks, in both raw and risk-adjusted returns. This anomalous positive ambiguity effect persists in multivariate cross-sectional regressions after controlling for various firm characteristics and risk factors that are known to predict the cross-section of stock returns. These findings suggest that investors might be underpaying for positive Q-beta stocks which leads them to outperform negative Q-beta stocks.

We propose three possible explanations for investor underpayment for positive Q-beta stocks. The first is due to investors overestimating the persistence of good political information quality or its continuous improvement, the second is due to investors increasing their risk appetite when ambiguity decreases and the third is due to investors exhibiting a love for ambiguity in the domain of losses.

The first proposed explanation is behavioural, where investors become excessively optimistic when political information quality is good (i.e., political ambiguity is low) or improving, which then results to an overestimation of the persistence of either the good political information quality or its continuous improvement. This overestimation in turn leads investors to underpay for positive Q-beta stocks that hedge against the political ambiguity, consequently resulting to the positive Q-beta effect. This explanation is related to the literature on excessive optimism (e.g., Weinstein (1980), Van Den Steen (2004), Sharot, (2011, 2012), Shefrin (2018)) and extrapolative investor behavior (Barberis, et al., 2018).

A second explanation involves increased investor risk-taking when the level of ambiguity is low or when it is improving (i.e., in periods of good information quality or when it is improving). This is in line with Kostopoulos et al. (2022) who find that investors reduce risk-taking when ambiguity increases. To the extent that the converse is true, an alternative explanation of the positive Q-beta effect is that it is driven by investors increasing their risk-taking when political ambiguity declines, leading them to underpay for stocks that hedge against political ambiguity (i.e., positive Q-beta stocks).

To test these two possible explanations, we condition our results on both the level of the political ambiguity (Q-index) and on the direction of its change. Consistent with both explanations, we find that the anomalous positive ambiguity effect exists only following periods when the level of political ambiguity is low, or when the level of ambiguity is decreasing.

As a further test of the excessive optimism explanation, we first show that good political information quality is persistent. Then we condition our results on investor sentiment using Baker and Wurgler's (2006) sentiment index (SI). For robustness we also employ the U.S. Consumer Confidence Index (CCI) as an alternative measure of investor sentiment. We expect to find a strong positive (negative) Q-beta effect following periods of high (low) investor sentiment, as intuitively, excessive optimism (pessimism) would be particularly strong (weak) in periods of high (low) sentiment. Consistent with our expectation, we find that the positive Q-beta effect is strong following periods of high investor sentiment. However, we do not find a corresponding negative Q-beta effect following periods of low sentiment, instead the Q-beta effect completely disappears. To wit, we find no evidence of a symmetric excessive pessimism following periods of low sentiment. Stambaugh et al. (2012) suggest that overpricing is the primary form of mispricing which is stronger in high sentiment periods. Our results are consistent with this suggestion in so far as the mispricing occurs in high sentiment periods, however our results present a form of mispricing that is based on underpricing, not overpricing.

The results conditioned on investor sentiment are also consistent with the second explanation as intuitively, investors increase (decrease) their appetite for risk when investor sentiment is high (low). However, similar to the excessive optimism argument there is no evidence of a symmetric decrease in risk-taking following periods of low investor sentiment.

A third possible explanation for positive Q-beta effect is investor love for ambiguity in the domain of losses, which leads investors to underpay for positive Q-beta stocks when future returns are expected to reside in the domain of losses. This explanation is consistent with Brenner and Izhakian (2018) who show that investors' relative aversion to (love for) ambiguity increases with the expected probability of favorable (unfavorable) returns. In as much as down (up) market states proxy for environments of unfavorable (favorable) returns, we suggest that investors' expected probability of unfavorable (favorable) future returns increases during down (up) market states (i.e., when the monthly return of the market in the current month is lower (higher) than its 12-month moving average). Therefore, we expect investors to exhibit a love for (aversion to) ambiguity during down (up) market states and underpay (overpay) for positive Q-beta stocks. Consequently, we anticipate a significantly positive (negative) Q-beta effect following down (up) states. We find a significantly positive Q-beta effect following down states, in line with our expectations, but the Q-beta effect completely disappears following up states. Our results are consistent with investors exhibiting a love for ambiguity during down states, leading them to underpay for positive Q-beta stocks. However, we do not observe a symmetric aversion to political ambiguity and a consequent negative Q-beta effect during up states. Instead, the positive Q-beta effect simply disappears following up states suggesting that investors see no pressing need to hedge against political ambiguity (i.e., there is no excess demand for positive Q-beta stocks).

Finally, to address the concern that the Q-beta effect might be driven by economic policy uncertainty (EPU), which seems to be the underlying element of political signals, and in light of Pástor and Veronesi's (2017) suggestion that the effect of EPU is moderated by low quality of political information (i.e., high political ambiguity), we investigate if the positive Q-beta effect survives if we control for the EPU effect documented by Brogaard and Detzel (2015), and vice-versa. First, we verify the presence of a negative EPU effect, then we condition our results on EPU beta. EPU beta measures the sensitivity of a stock's return to the EPU index (Baker et al. 2016). We find that the positive Q-beta effect persists even when we control for the EPU effect. In fact, the Q-beta effect is opposite to the EPU effect. High EPU beta stocks underperform low EPU beta stocks resulting to a negative EPU beta effect, while positive Q-beta stocks outperform negative Q-beta stocks resulting to a positive Q-beta effect. Brogaard and Detzel (2015) suggest that the negative EPU beta effect is the result of intertemporal hedging demand for high EPU beta stocks that hedge against EPU. In contrast, we do not observe a corresponding hedging demand for positive Q-beta stocks, which implies that investors are more likely to seek compensation for bearing uncertainty borne out of economic policies than the ambiguity borne out of political information quality. Apparently, investors do not see a need to hedge against political ambiguity, which suggests that not all forms of uncertainty require extra compensation. To some extent, our results are consistent with Veronesi (2000) who shows that with high risk aversion and a low intertemporal elasticity of substitution, there is no premium for low information quality in a Bayesian model.

Our study is related to the literature that suggests the presence of ambiguity aversion and a consequent ambiguity premium. Veronesi (2000) develops a dynamic asset pricing model which suggests the presence of an ambiguity premium when signals are noisy as there is a part of the equity risk premium that is independent from investor's risk aversion. Chen and Epstein (2002) develop a utility framework that accommodates both aversion to ambiguity and aversion to risk and show the presence of a premium for ambiguity that is separate from a premium for risk. Focusing on information ambiguity, Epstein and Schneider (2008) develop a model of information processing when there is incomplete knowledge about information signal quality. They show that when information quality is difficult to judge, investors treat the signals as ambiguous, and ambiguity-averse investors consequently avoid assets with poor information quality and require an ambiguity premium that depends on the idiosyncratic risk in fundamentals as well as skewness in returns. Brenner and Izhakian (2018) study the relation between risk, ambiguity, and expected returns and report that ambiguity in the equity market is priced alongside risk. They also find, consistent with behavioural experiments, that aversion to ambiguity increases with the expected probability of gains while the love for ambiguity increases with the expected probability of losses.

Another strand of literature related to our study is investor behavior in the presence of ambiguity. Epstein and Schneider (2008) suggest that ambiguity-averse investors react more strongly to bad news than to good news. Antoniou (2015) shows that increases in ambiguity reduces investors' propensity to invest in equities. Consistent with Antoniou (2015), Kostopoulos et al. (2022) find an increase in investor activity and a reduction in risk-taking among investors associated with an increase in (general) ambiguity.

Our study is also related to the literature on excessive optimism, a cognitive bias that has been extensively researched in the psychology literature (see for example, Weinstein, 1980; Perloff and Fetzer, 1986; Burger and Palmer, 1992; Helweg-Larsen 1999; Helweg-Larsen and Shepperd, 2001; Sharot, 2011, 2012). This literature posits that people tend to overestimate how frequently they will experience favourable outcomes and underestimate how frequently they will experience unfavourable outcomes.

Finally, our study is related to the literature providing evidence that information quality, as a proxy for ambiguity, matters for risk premium and stock return volatility (e.g., Veronesi, 2000; Li, 2005; Epstein and Schneider, 2008; Brevik and Addona, 2010). Related to this, the increased usage of social media exposes people to fake news and misleading information and that most people have difficulty identifying fake news (Atodiresei, et al. 2018). Pástor and Veronesi (2013) document that political information quality is important for investors' learning about political signals and therefore their evaluation of political risk premium. Specifically, they show in their theoretical model that political risk premium and market volatility are correlated with investors' learning from potential shocks. Normally, investors learn and modify their expectation on stock performance based on a variety of information (e.g., economic news, political signals), and then act on the markets. However, when political information quality is low (i.e, political ambiguity is high), investors hesitate to update their beliefs and trade in the markets, resulting in lower political risk premia and market volatility (Pástor and Veronesi, 2017). Białkowski, Dang, and Wei, (2022) report that low-quality political information leads to a weaker link between expected market volatility (VIX) and economic policy uncertainty (EPU).

Our study contributes to the literature as follows. First, we add to the growing empirical literature examining the presence of an ambiguity premium in equity markets. As far as we know, we are the first to investigate the premium for aggregate political ambiguity as other studies look at firm-specific information quality (e.g., Armstrong et al. 2009). We document a sentiment-sensitive Q-beta effect that appears to be driven by investor underpayment for stocks that hedge against political ambiguity. This underpayment is consistent with a) overly optimistic investors overestimating the persistence of good political information quality or its continuous improvement, b) investors increasing their risk appetite when ambiguity decreases and c) investors exhibiting a love for ambiguity in the domain of losses. Second, we provide evidence suggesting that not all types of ambiguity require a return premium. Instead, we show that investors could exhibit a love for ambiguity that could result in mispricing in the stock market that is driven by underpricing (not overpricing). Third, we sharpen the distinction between aggregate political ambiguity proxied by the quality of political signals (Q-index) from aggregate economic policy uncertainty proxied by the EPU index, verifying that the Q-beta effect that we document is independent of the EPU-beta effect.

The rest of the paper is organised as follows. Section 2 describes the data and methods. Section 3 presents the empirical results. Section 4 concludes.

2. Data and Methods

Our sample includes all common stocks listed on AMEX, NASDAQ, and NYSE in the U.S. from January 2000 to December 2020. We obtain the daily and monthly stock data from

CRSP (e.g., market capitalization, market-to-book value, monthly closing price, return on equity, total equity, and total investment).

We follow Ince and Porter (2006) and include only traded stocks in our analysis and winsorize the data to mitigate the impact of outliers. Our final sample consists of 739,403 monthly return observations. We obtain the data on the Fama-French factors and Carhart's (1997) momentum factor from Kenneth French's website. We calculate Pástor and Stambaugh (2003)'s liquidity factor using the Amihud's (2002) illiquidity measurement. We also calculate Bali et al.'s (2017) seven factors using the Asset Growth Rate and Return on Equity (ROE). We present results for both equally-weighted and value-weighted portfolios.

2.1. Measuring the quality of political signals and Q-beta

We employ the Q-index proposed by Białkowski et al. (2022) to measure the quality of political signals. This index is constructed using an approach similar to the one used to generate the Economic Policy Uncertainty (EPU) index by Baker, Bloom, and Davis (2016).The Q-index measures the frequency of articles that contain terms related to policy, signals, and quality in ten leading U.S. nationwide newspapers, including *USA Today, The Washington Post, The Boston Globe, The New York Times, The Wall Street Journal, Tampa Bay Times, New York Post, New York Daily News, Star Tribune, and The Atlanta Journal Constitution*. To generate the index, articles related to three term categories - quality, signal, and policy - are counted on a monthly basis. The number of matched articles is then divided by the total number of articles for each newspaper each month, resulting in ten sets of monthly series. To obtain a multi-newspaper index, these series are standardized and then averaged across newspapers. The resulting index is then re-normalized to an average of 100 in the final step. The data is available from the website of Białkowski, Dang and Wei.[1] A high level of Q-index indicates an environment of low-quality signals and consequently high political ambiguity.

Following the approach of Bali et al. (2017) to estimate EPU-beta, we estimate the monthly Q-beta for each stock over the sample period with an 18-month rolling window, wherein each stock must have at least 14 observations in an 18-month period. Specifically, for a given firm, we regress its monthly excess stock returns on the Q-index over an 18-month period and refer to its coefficient as Q-beta.

2.3. Investor sentiment

To test the excessive optimism explanation, we use Baker and Wurgler's (2006) sentiment index (SI), downloaded from Jeffrey Wurgler's website. Accordingly, SI is estimated based on the first principal component of five sentiment proxies, namely the value-weighted dividend premium, first-day returns on IPOs, IPO volume, closed-end fund discount and equity share in new issues. As a robustness test, we also employ the U.S. Consumer Confidence Index (CCI) collected from Datastream as an alternative measure of investor sentiment.

2.4. Expected probability of favorable (unfavorable) returns

To test the implication of Brenner and Izhakian's (2018) theory that investors' relative aversion to (love for) ambiguity increases with the expected probability of favorable (unfavorable) returns we propose that investors' estimated probability of unfavorable (favorable) future returns is high during down (up) market states. We refer to the market state as up (down) if the current monthly return of the market is above (below) its moving average monthly return in the past 12 months. We use the value-weighted return of all CRSP firms as the proxy for the stock market.

[1] See https://qualityofpoliticalsignals.com.

2.5. Other variables

In the Fama–Macbeth two-stage regressions, we apply the standard set of firm-level control variables including firm size defined as the log of the firm's market capitalization (MV); book-to-market ratio (BTM), momentum calculated as the average cumulative return of a stock over a period of 11 months ending 1 month prior to the portfolio formation month (MOM), demand for lottery stocks (MAX), Amihud's (2002) illiquidity (ILLIQ), idiosyncratic volatility (IVOL), calculated as the standard deviation of the daily residuals in a month from the Fama–French three-factor model, monthly log closing price (CP) and short-term reversal (STR).[2]

To mitigate the concern that our results are driven by EPU rather than the Q-index, we also control for EPU effect with the widely-used EPU index developed by Baker et al. (2006). Accordingly, the EPU index reflects the frequency of articles containing terms related to "economic", "policy", and "uncertainty" reported in ten popular newspapers: *USA Today, Miami Herald*, *Chicago Tribune*, *The Washington Post*, *Los Angeles Times*, *The Boston Globe*, *San Francisco Chronicle*, *The Dallas Morning News*, *Houston Chronicle*, and *The Wall Street Journal*. The monthly count of matched articles was scaled by the respective total number of articles in a given month for each newspaper. Then the monthly series for each newspaper was standardized and normalized to an average value of 100 from January 1958. To control the EPU effect, we estimate the firm-level EPU-beta by regressing firms' excess return on EPU and use it in a double-sorting analysis.

3. Empirical results

3.1. Descriptive Statistics

Table 1 presents the summary of descriptive information on our test variables. The numbers are computed as the time-series averages of the cross-sectional values. We present the mean, standard deviation, skewness, minimum, median and maximum values. Q-beta ranges

[2] The description of these variables is available in Appendix I.

from -0.0162 to 0.0146 with a mean of -0.0005 so high (low) Q-beta stocks most likely have positive (negative) Q-beta. The mean market value, BM, momentum, maximum daily return, idiosyncratic volatility, illiquidity, logged closing price, and short-term reversal are 20.0409, 0.6803, 0.0120, 0.0659, 0.0255, 0.0016, 2.6744, and 0.0107, respectively.

[Insert Table 1 about here]

3.2. Univariate portfolio analysis

First, we examine the unconditional relationships between Q-beta (β^Q) and excess and risk-adjusted returns through portfolio-sorting. Table 2 shows excess and the risk-adjusted returns (α coefficient) of portfolios sorted on Q-beta. The risk-adjusted returns are alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), the Pástor-Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). From Appendix II, the low Q-beta decile has a negative Q-beta of -0.0087 while the high Q-beta decile has a positive Q-beta of 0.0076 which indicates that returns of the low (high) Q-beta decile are expected to covary negatively (positively) with the Q-Index. This suggests that the low (high) Q-beta decile is a relatively risky (safe) portfolio in relation to information quality. Panels A and B of Table 2 show the results from equal-weighted and value-weighted portfolios, respectively. Panel A shows a highly significant equal-weighted excess return spread between high- and low-β^Q stocks of 0.59% per month. The respective 3-factor, 4-factor, 5-factor, P-S, and 7-factor alpha spreads are 0.56%, 0.57%, 0.40%, 0.52%, .074%, and 0.60% per month, respectively and all statistically significant. Panel B likewise shows a highly significant value-weighted excess return spread between high- and low-β^Q stocks of 0.61% per month. The respective 3-factor, 4-factor, 5-factor, P-S, and 7-factor value-weighted alpha spreads are 0.58%, 0.59%, 0.42%, 0.54%, 0.76%, and 0.62% per month, respectively and all statistically significant. Our results suggest an anomalous positive unconditional Q-beta premium.

[Insert Table 2 about here]

3.3. Firm-level cross-sectional regressions

Next, we examine the firm-level relationship between Q-beta and stock returns through Fama-Macbeth regressions. Table 3 examines the relationship between the current excess stock returns and the lagged β^Q in univariate, bivariate, and multivariate tests. We used the following model to conduct Fama-MacBeth two-stage regressions analogous to the model of Bali et al. (2017):

$$\mathbf{R_{i,t} = \lambda_{0,t-1} + \lambda_{1,t-1}\beta^{Q}_{i,t-1} + \lambda_{2,t-1}X_{i,t-1} + \varepsilon_{i,t}}$$

where $R_{i,t}$ is the excess return of stock *i* in month *t*; $\beta^{Q}_{i,t-1}$ is the Q-beta of stock *i* in month *t-1*; and $X_{i,t}$ is a collection of control variables for stock *i* at time *t-1*.

The first column shows that the slope coefficient from the univariate regression of current excess returns on lagged β^Q is 0.5244 (t-statistics = 2.35), indicating a significantly positive relationship between stock excess returns and lagged β^Q and supportive of the positive Q-beta premium from the univariate portfolio sorts. From column 2 to column 9, the slope coefficients of β^Q from 8 bivariate regressions remain positive and significant. The last column shows the result from the multivariate regression, including all control variables. The average slope coefficient of β^Q is 0.3801 with a t-statistic of 2.11. The significantly positive relationship between current excess returns and lagged β^Q is in accord with the positive Q-beta premium in the unconditional portfolio sorting results reported in Table 2.[3]

[Insert Table 3 about here]

[3] We also include market beta as a control variable in FM regression and find similar results. These results are available upon request.

In sum, both the univariate portfolio-sorting results in section 3.2 and Fama-Macbeth regressions in this section, indicate an anomalous positive relationship between Q-beta and stock returns. These results suggest that investors tend to underpay (overpay) for positive (negative) Q-beta stocks, that hedge against (are susceptible to) political ambiguity. We propose three possible explanations for the apparent underpayment for positive Q-beta stocks. The first is due to overoptimistic investors overestimating the persistence of good political information quality or its continuous improvement leading to underpayment for positive Q-beta stocks when political information quality is good or when it is improving. The second is due to investors increasing their risk appetite when the level of ambiguity is low or when it is improving, i.e., when political information quality is good or when it is improving. The third is due to investors exhibiting a love for ambiguity in the domain of losses, leading them to underpay for positive Q-beta stocks when future returns are expected to reside in the domain of losses.

3.4. Q-beta effect conditioned on information quality

To test our first two explanations of the positive Q-beta effect, we condition our results on the aggregate political information quality prevailing in the market. We condition on the level of the Q-index and then on the change in the Q-index. First, we examine the persistence of both the level of, and the change in political information quality. Figures 1 and 2 show the autocorrelation functions of the Q-index and the change in the Q-index, respectively. Figure 1 shows that the Q-index is persistent with significant autocorrelation coefficients up to 25 lags. Figure 2 shows that the change in the Q-index is also relatively persistent though not to the same extent as the level of the Q-index, with a significantly positive autocorrelation coefficient evident as far back as 12 lags. This shows that both the level of aggregate political information quality and its improvement or deterioration are persistent, though not in the same degree.

[Insert Figures 1 and 2 about here]

Table 4 shows the results when we condition the Q-beta effect on aggregate information quality through portfolio-sorting analysis. First, we sort the sample months into high- and low Q-index periods according to the median value of the Q-index level. We then sort stocks into portfolios according to the Q-beta within each Q-index period and determine the portfolio returns in the following month. Table 4 shows the raw excess returns and the risk-adjusted returns (α coefficient) of portfolios sorted on Q-beta. The risk-adjusted returns are alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), Pástor-Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). Panels A and B report the results for the low and high Q-index levels, corresponding to low and high political ambiguity, respectively.

We find that the positive Q-beta effect is significant only following months when the Q-index is low (Panel A) and is either weak or completely disappears following months when the Q-index is high (Panel B). To the extent that the Q-beta effect is driven by investors' tendency to underpay (overpay) for positive (negative) Q-beta stocks, it appears that the underpayment for positive Q-beta stocks is evident only following periods when the Q-index level is low, i.e., when political ambiguity is low. Following periods when Q-index is high, i.e., when political ambiguity is high, the Q-beta effect does not necessarily reverse, but it is weak at best. We conjecture that in environments characterized by good information quality, investors are excessively optimistic and overestimate its persistence. This then leads them to underpay for stocks that hedge against poor information quality (i.e, positive Q-beta stocks) which results in positive Q-beta stocks outperforming in the subsequent period. However, this excessive optimism is weak or absent in environments characterized by poor information quality, hence the positive Q-beta effect is weak or non-existent.

Next, we condition the Q-beta effect on the change in the Q-index with a high (low) change signaling an increase (decrease) in the Q-index, i.e., a deterioration (improvement) in political information quality. We find that the positive Q-beta effect is significant only when the change in Q-index is low (Panel C), and completely disappears when the change in the Q-index is high (Panel D). As a further test, we also condition the Q-beta effect on positive and negative changes in political information quality. Consistent with the results when we condition of the level of change in the Q-index, we find that the positive Q-beta effect is significant only following periods when the change in Q-index is negative (Panel E), and completely disappears following periods when the change in the Q-index is positive (Panel F). These results suggest that when information quality is improving (i.e., political ambiguity is declining), investors are excessively optimistic and overestimate its persistence which leads them to underpay for stocks that hedge against political ambiguity. However, this excessive optimism is absent in environments characterized by declining political information quality, hence the positive Q-beta effect is non-existent.

[Insert Table 4 about here]

Next, we also conduct firm-level Fama-MacBeth regressions on our sample months classified according to aggregate information quality. The results are reported in Table 5. Columns 1 and 2 reports results based on the level of the Q-index. A month is classified as a low (high) Q-index month if the Q-index in that month is below (above) the median over the sample period. Consistent with the portfolio-sorting results from Table 4, we find that the coefficient of β^Q is positive and significant only following months when Q-index is low (Column 1) and is insignificant when the Q-index is high (Column 2).

We also classify months according to the change in the Q-index. A month is classified as a low (high) change in Q-index month if the change in the Q-index in that month is below (above) the median change over the sample period. Also consistent with the portfolio-sorting results from Table 4, we find that the coefficient of β^Q is positive and significant only following months when the change in the Q-index is low (Column 3) and is insignificant if the change in the Q-index is high (Column 4).

Lastly, we classify months according to whether the change in the Q-index is negative or positive. Also consistent with the portfolio-sorting results from Table 4, we find that the coefficient of β^Q is positive and significant only following months when the change in the Q-Index is negative (Column 5) and is insignificant if the change in the Q-index is positive (Column 6).

[Insert Table 5 about here]

In sum, we find that the anomalous positive relation between Q-beta and expected returns is present only following environments characterized by good political information quality or when political information quality is improving. These results support our first proposed explanation of the anomalous positive Q-beta premium suggesting that investors are excessively optimistic in periods when political ambiguity is low or when it is improving, leading them to overestimate its persistence. This overestimation in turn leads investors to underpay for positive Q-beta stocks, that hedge against political ambiguity, which results in the positive Q-beta effect in the subsequent period. These results are also consistent with our second proposed explanation that the underpayment for Q-beta stocks could also be due to increased risk-taking by investors when political ambiguity is low or when the level of ambiguity has just declined.

In the next section, we test both the excessive optimism and the increased risk-taking hypotheses further by conditioning the Q-beta effect on investor sentiment.

3.5 Q-beta effect conditioned on investor sentiment

As a further test of both the excessive optimism and increased risk-taking hypotheses, we condition the Q-beta effect on investor sentiment using Baker and Wurgler's (2006) sentiment index (SI). For robustness we also employ the U.S. Consumer Confidence Index (CCI) as an alternative measure of investor sentiment. To the extent, that the anomalous positive Q-beta effect is driven by excessive optimism, we expect to find a strong positive (negative) Q-beta effect following periods of high (low) investor sentiment as, intuitively, excessive optimism (pessimism) would be stronger in periods of high (low) sentiment.

Similarly, to the extent that the anomalous positive Q-beta effect is driven by increased risk-taking, we expect to find a strong positive (negative) Q-beta effect following periods of high (low) investor sentiment as, intuitively, increased (decreased) risk-taking would be stronger in periods of high (low) sentiment.

First, we conduct a portfolio sorting analysis and report the results in Table 6. We sort the sample months into high- and low-sentiment periods according to the median value of the SI. We then sort stocks into portfolios according to the Q-beta within each sentiment period and determine their returns in the subsequent month. Table 6 shows the excess stock returns and the risk-adjusted returns (α coefficient) of portfolios sorted on Q-beta. The risk-adjusted returns are alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), Pástor-Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). Panels A and B report the results for the high and low sentiment periods, respectively.

Consistent with our conjecture, we find that the positive Q-beta effect is significant only following periods when the SI is high (Panel A) and completely disappears following periods when the SI is low (Panel B). The EW (VW) return spread between high and low Q-beta deciles is 0.96% (0.97%) per month with a t-stat of 2.94 (2.94). Except for the FF-5 alpha, all alphas are significantly positive. The significant EW (VW) alpha spreads range from 0.80% to 0.96% (0.76% to 0.98%) per month, with t-stats ranging from 2.12 to 2.96 (2.14 to 2.96).

As a robustness test, we also use the CCI as an additional measure of sentiment. We also find that the positive Q-beta effect is significant only following periods when the CCI is high (Panel C) and completely disappears following periods when the CCI is low (Panel D). The EW (VW) return spread between high and low Q-beta deciles is 1.00% (1.03%) per month with a t-stat of 3.27 (3.33). The EW (VW) alpha spreads range from 0.70% to 1.19% (0.80% to 1.12%) per month, with t-stats ranging from 2.23 to 3.85 (2.80 to 3.87).

[Insert Table 6 about here]

Next, we conduct firm-level Fama-MacBeth regressions conditioned on sentiment. The results are reported in Table 7. Columns 1 and 2 of Table 7 report results conditioned on the level of the SI. A month is classified as a low (high) SI month if the SI in that month is below (above) the median over the sample period. Consistent with the portfolio-sorting results from Table 6, we find that the coefficient of β^Q is positive and significant only following months when SI is high and is insignificant following months when the SI is low. Columns 3 and 4 report results when we condition on the CCI. A month is classified as a low (high) CCI month if the CCI in that month is below (above) the median over the sample period. We find that the coefficient of β^Q is positive and significant only following months when the CCI is high and is insignificant following months when CCI is low.

In sum, consistent with our conjecture that the positive Q-beta effect is driven by excessive optimism and/or increased risk-taking, we find that the positive Q-beta effect is highly significant only following periods of high investor sentiment, when investors are presumably excessively optimistic and/or prone to increased risk-taking. However, we find no evidence of a matching extreme pessimism or decreased risk-taking after periods of low sentiment, thus this overreaction appears to be asymmetric. Insofar as the mispricing occurs during times of high sentiment, our results are consistent with those of Stambaugh et al. (2012);

however, our results show a type of mispricing that is based on underpricing rather than overpricing.

[Insert Table 7 about here]

3.6. Domains of gains and losses

Behavioral research indicates that people's attitudes toward ambiguity vary depending on whether they are experiencing losses or gains (e.g., Abdellaoui et al., 2005; Wakker et al., 2007). In particular, they contend that investors favor uncertainty in losses and are averse to it in gains. This idea is further refined by Brenner and Izhakian (2018), who demonstrate that investors' relative love for (dislike of) ambiguity rises with the estimated chance of unfavorable (favorable) returns. For our third possible explanation of the underpayment of positive Q-beta stocks we suggest that investors exhibit a love for ambiguity and therefore underpay for positive Q-beta stocks when future returns are expected to reside in the domain of losses. We propose that investors' estimated probability of unfavorable (favorable) future returns is high during down (up) market states. We define a month as a down (up) market state if the current monthly return is below (above) the average market return in the past 12 months. Therefore, in line with Brenner and Izhakian (2018) we anticipate that investors will show a preference for (aversion to) political ambiguity in down (up) states and underpay (overpay) for equities with a positive Q-beta. Hence we expect positive Q-beta equities to outperform (underperform) in the period following down (up) states resulting in a significantly positive (negative) Q-beta effect.

To test this conjecture, we initially conduct a portfolio sorting analysis and report the results in Table 8. We sort the sample months into up or down market states. We then sort stocks into portfolios according to the Q-beta within each month determine their returns in the subsequent month and report the results in Table 8. Table 8 shows excess and the risk-adjusted returns (α coefficient) of portfolios sorted on Q-beta. The risk-adjusted returns are alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), Pástor-Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). Panels A and B report the results for periods following down and up markets respectively.

The last two rows of Table 8 show the raw return and alpha spread of the high- and low-Q beta portfolios. Consistent with our expectations, the results indicate that the positive Q-beta effect is strong and significant following down markets but is weaker following up markets. Following down markets, the raw EW (VW) return spread is 0.60% (0.57%) per month with a t-stat of 2.79 (2.67), while the corresponding return spread following up markets is 0.42% (0.48%) per month with a t-stat of 1.84 (2.05). Following down markets, all risk-adjusted returns are significant, ranging from 0.44% to 0.71% per month, with t-stats ranging from 2.01 to 3.14. Following up markets only two (four) out of EW (VW) six alpha spreads are significant ranging from 0.18% to 0.63% (0.21% to 0.70%) per month, with t-stats ranging from 0.73 to 2.66 (0.88 to 2.05).[4]

[Insert Table 8 about here]

Next, we conduct Fama-MacBeth regressions on the down and up months and report the results in Table 9. We find a significantly positive Q-beta effect following down markets, consistent with our expectations, but the Q-beta effect completely disappears following up markets. Following down markets, the coefficient of β^Q is significantly positive at 0.3838 with

[4]Some might argue that the results—conditional on high sentiment and a downturn in the market—seem contradictory, as one might intuitively expect sentiment to be low during market downturns. To clarify the link between sentiment and market states, we present the correlation matrix of the measures in Appendix III. Notably, the correlation coefficient between sentiment and a down market state is positive, whereas the correlation between sentiment and an up-market state is negative. These correlations are consistent with our results conditional on investor sentiment and market states.

a t-stat of 2.06, while corresponding coefficient following up markets is insignificant at 0.1870 with a t-stat of 0.87.

[Insert Table 9 about here]

In sum, we find that the tendency for positive Q-beta stocks to outperform negative Q-beta stocks is stronger following down than up markets. In fact, in Fama-Macbeth regressions the positive Q-beta effect completely disappears following up markets. Our results are consistent with investors exhibiting a love for ambiguity when future returns are expected to be in the domain of losses. This results in a tendency to underpay for positive Q-beta stocks, and for these stocks to outperform in the subsequent period which leads to the positive Q-beta effect. However, we find no evidence of a symmetric aversion to ambiguity when future returns are expected to be in the domain of gains hence we do not observe an excess demand for positive Q-beta equities, therefore we do not see evidence of a negative Q-beta effect. Instead, following up states, the Q-beta effect is either relatively weak or simply disappears.

3.8. Economic policy uncertainty and the Q-beta effect

Finally, in light of Pástor and Veronesi's (2017) suggestion that the impact of economic policy uncertainty is mitigated by the quality of political information, we examine if the Q-beta effect that we document survives if we control for the economic policy uncertainty (EPU) effect documented by Brogaard and Detzel, (2015). Brogaard and Detzel (2015) document a negative EPU effect where stocks with high EPU beta underperform stocks with low EPU beta. They compute EPU beta relative to Baker and Wurgler's (2006) economic policy uncertainty (EPU) index.

We control for the EPU effect and investigate if the Q-beta effect survives, by first sorting stocks into terciles according EPU-beta. We then take the highest and lowest terciles, i.e., the highest and lowest EPU-beta portfolios, respectively and within each of these terciles, we sort stocks into deciles according to their Q-beta. Finally, we combine each Q-beta decile in the highest EPU-beta tercile with its corresponding decile in the lowest EPU-beta tercile (i.e., combine decile 1 in the highest EPU-beta tercile with decile 1 in the lowest EPU-beta tercile). Table 10 shows equal- (EW) and value-weighted (VW) excess and the risk-adjusted returns (α coefficient) of these combined decile portfolios. The risk-adjusted returns are alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), Pástor -Stambaugh alpha (2003) and Bali et al.'s seven-factor model (2017).

Table 10 shows that the positive Q-beta effect persists even as we control the EPU effect. Table 10 reports an EW (VW) return spread of 0.58% (0.60%) per month, with a t-stat of 2.86 (2.89). The alpha spreads range from 0.44% to 0.77% (0.45% to 0.78%) per month, with a range in t-stats from 2.05 to 3.57 (2.09 to 3.60).

[Insert Table 10 about here]

Next, we examine if the EPU effect survives if we control for the Q-beta effect. Accordingly, first we sort stocks into terciles according to Q-beta. We then take the highest and lowest terciles, i.e., the highest and lowest Q-beta portfolios, respectively and within each of these terciles, we sort stocks into deciles according to their EPU-beta. Finally, we combine each EPU-beta decile in the highest Q-beta tercile with its corresponding decile in the lowest Q-beta tercile (i.e., combine decile 1 in the highest Q-beta tercile with decile 1 in the lowest Q-beta tercile). Table 11 shows equal-weighted (EW) and value-weighted (VW) excess and the risk-adjusted returns (α coefficient) of these combined decile portfolios. The risk-adjusted returns are alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), Pástor-Stambaugh alpha (2003) and Bali et al.'s seven-factor model (2017).

Table12 shows that except for the P-S and Bali-7 alphas, the negative EPU effect, where high EPU-beta stocks underperform low EPU-beta stocks, persists even as we control the Q-beta effect. Table 11 shows an EW (VW) return spread of -0.48% (-0.46%) per month, with a t-stat of -2.23 (-2.13). The significant EW (VW) alpha spreads range from -0.45% to -0.52% (0.43% to 0.58%) per month, with a range in t-stats from -2.09 to -2.68 (-1.98 to -2.56).

[Insert Table 11 about here]

In sum, we find that the positive Q-beta effect persists even when we control for the EPU-beta effect. Conversely, the negative EPU-beta effect persists even when we control for the Q-beta effect. These results suggest that Q-beta effect and EPU-beta effect are different and should be considered separately. To the extent that the negative EPU-beta effect is driven by intertemporal hedging demand for high EPU beta equities as suggested by Brogaard and Detzel (2015), it appears that investors are more likely to seek compensation for tolerating EPU than ambiguity borne out of poor political information quality because we do not find evidence of a commensurate hedging demand for positive Q-beta stocks. Investors do not appear to find the need to protect themselves against political ambiguity, which implies that not all types of ambiguity require compensation. Our findings are somewhat in line with Veronesi (2000) who suggests that there is no premium for poor information quality in a Bayesian model when risk aversion is high and the intertemporal elasticity of substitution is low.

4. Conclusions

In this study, we investigate the relationship between cross-sectional stock returns and political ambiguity. Political ambiguity is measured by the Q-index of Bialkowski et al. (2021), a newspaper-based time varying measure of the quality of political signals. We estimate the sensitivity of a stock's return to the Q-index and call this Q-beta. Since positive Q-beta stocks hedge against ambiguity in information quality, we anticipate positive Q-beta stocks to earn less than negative Q-beta stocks as ambiguity-averse investors demand higher compensation for the latter in the form of higher expected returns. Hence, we expect a negative Q-beta effect, but we find an anomalous positive Q-beta effect. This result is interesting as it indicates that not all types of uncertainty require a return premium. In fact, our results suggest that investors underpay for positive Q-beta stocks.

We find that the positive Q-beta effect is evident only following periods of high investor sentiment, good political information quality, in times when information quality is improving, and when expected returns reside in the domain of losses. These results are consistent with investor underpayment for positive Q-beta stocks driven by a) overly optimistic investors overestimating the persistence of good political information quality or its continuous improvement, b) investors increasing their risk appetite when ambiguity decreases and c) investors exhibiting a love for ambiguity in the domain of losses.

References

Abdellaoui, M., Vossmann, F., & Weber, M. (2005). Choice-based elicitation and decomposition of decision weights for gains and losses under uncertainty. *Management Science*, *51*(9), 1384-1399.

Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, *5*(1), 31-56.

Antoniou, C., Harris, R. D., & Zhang, R. (2015). Ambiguity aversion and stock market participation: An empirical analysis. *Journal of Banking & Finance*, *58*, 57-70.

Armstrong, C., Banerjee, S., Corona, C., Almazan, A., Core, J., Garlappi, L., & Todorov, V. (2009). Information quality, systematic risk and the cost of capital. *McCombs School of Business, University of Texas*, 1-27.

Atodiresei, C.-S., Tănăselea, A., & Iftene, A. (2018). Identifying fake news and fake users on Twitter. *Procedia Computer Science*, *126*, 451-461.

Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, *61*(4), 1645-1680.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, *131*(4), 1593-1636.

Bali, T. G., Brown, S. J., & Tang, Y. (2017). Is economic uncertainty priced in the cross-section of stock returns? *Journal of Financial Economics*, *126*(3), 471-489.

Barberis, N., Greenwood, R., Jin, L., & Shleifer, A. (2018). Extrapolation and bubbles. *Journal of Financial Economics*, *129*(2), 203-227.

Białkowski, J., Dang, H. D., & Wei, X. (2022). High policy uncertainty and low implied market volatility: An academic puzzle? *Journal of Financial Economics*, *143*(3), 1185-1208.

Brenner, M., & Izhakian, Y. (2018). Asset pricing and ambiguity: Empirical evidence. *Journal of Financial Economics*, *130*(3), 503-531.

Brevik, F., & d'Addona, S. (2010). Information quality and stock returns revisited. *Journal of Financial and Quantitative Analysis*, *45*(6), 1419-1446.

Brogaard, J., & Detzel, A. (2015). The asset-pricing implications of government economic policy uncertainty. *Management Science*, *61*(1), 3-18.

Burger, J. M., & Palmer, M. L. (1992). Changes in and generalization of unrealistic optimism following experiences with stressful events: Reactions to the 1989 California earthquake. *Personality and Social Psychology Bulletin*, *18*(1), 39-43.

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance*, *52*(1), 57-82.

Chen, Z., & Epstein, L. (2002). Ambiguity, risk, and asset returns in continuous time. *Econometrica*, *70*(4), 1403-1443.

Ellsberg, D. (1961). Risk, ambiguity, and the Savage axioms. *The Quarterly Journal of Economics*, *75*(4), 643-669.

Epstein, L. G., & Schneider, M. (2008). Ambiguity, information quality, and asset pricing. *The Journal of Finance*, *63*(1), 197-228.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3-56.

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1), 1-22.

Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy*, *81*(3), 607-636.

Helweg-Larsen, M. (1999). (The lack of) optimistic biases in response to the 1994 Northridge earthquake: The role of personal experience. *Basic and Applied Social Psychology*, *21*(2), 119-129.

Helweg-Larsen, M., & Shepperd, J. A. (2001). Do moderators of the optimistic bias affect personal or target risk estimates? A review of the literature. *Personality and Social Psychology Review*, *5*(1), 74-95.

Ince, O. S., & Porter, R. B. (2006). Individual equity return data from Thomson Datastream: Handle with care! *Journal of Financial Research*, *29*(4), 463-479.

Knight, F. H. (1921). *Risk, uncertainty and profit* (Vol. 31). Houghton Mifflin.

Kostopoulos, D., Meyer, S., & Uhr, C. (2022). Ambiguity about volatility and investor behavior. *Journal of Financial Economics*, *145*(1), 277-296.

Li, G. (2005). Information quality, learning, and stock market returns. *Journal of Financial and Quantitative Analysis*, *40*(3), 595-620.

Newey, W. K., & West, K. D. (1986). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix.

Page, B. I. (1976). The theory of political ambiguity. *American Political Science Review*, *70*(3), 742-752.

Pástor, Ľ., & Stambaugh, R. F. (2003). Liquidity risk and expected stock returns. *Journal of Political Economy*, *111*(3), 642-685.

Pástor, L., & Veronesi, P. (2017). Explaining the puzzle of high policy uncertainty and low market volatility. *Vox Column, 25*.

Pástor, Ľ., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics*, *110*(3), 520-545.

Perloff, L. S., & Fetzer, B. K. (1986). Self–other judgments and perceived vulnerability to victimization. *Journal of Personality and Social Psychology*, *50*(3), 502-510.

Sharot, T. (2011). The optimism bias. *Current Biology*, *21*(23), R941-R945.

Sharot, T. (2012). The Optimism Bias: Why we're wired to look on the bright side. *Hachette UK.*

Shefrin, H. (2018). Behavioral Corporate Finance. Mc-Graw Hill. New York.

Stambaugh, R. F., Yu, J., & Yuan, Y. (2012). The short of it: Investor sentiment and anomalies. *Journal of Financial Economics*, *104*(2), 288-302.

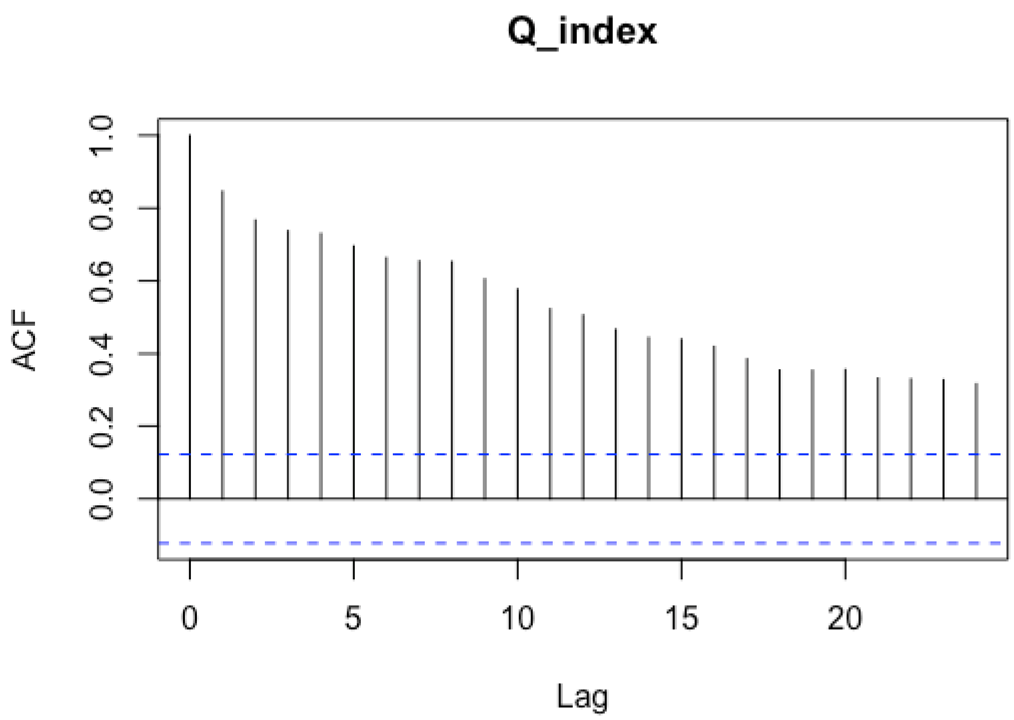
Van den Steen, E. (2004). Rational overoptimism (and other biases). *American Economic Review*, *94*(4), 1141-1151.

Veronesi, P. (2000). How does information quality affect stock returns? *The Journal of Finance*, *55*(2), 807-837.

Wakker, P. P., Timmermans, D. R., & Machielse, I. (2007). The effects of statistical information on risk and ambiguity attitudes, and on rational insurance decisions. *Management Science*, *53*(11), 1770-1784.

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, *39*(5), 806-820.

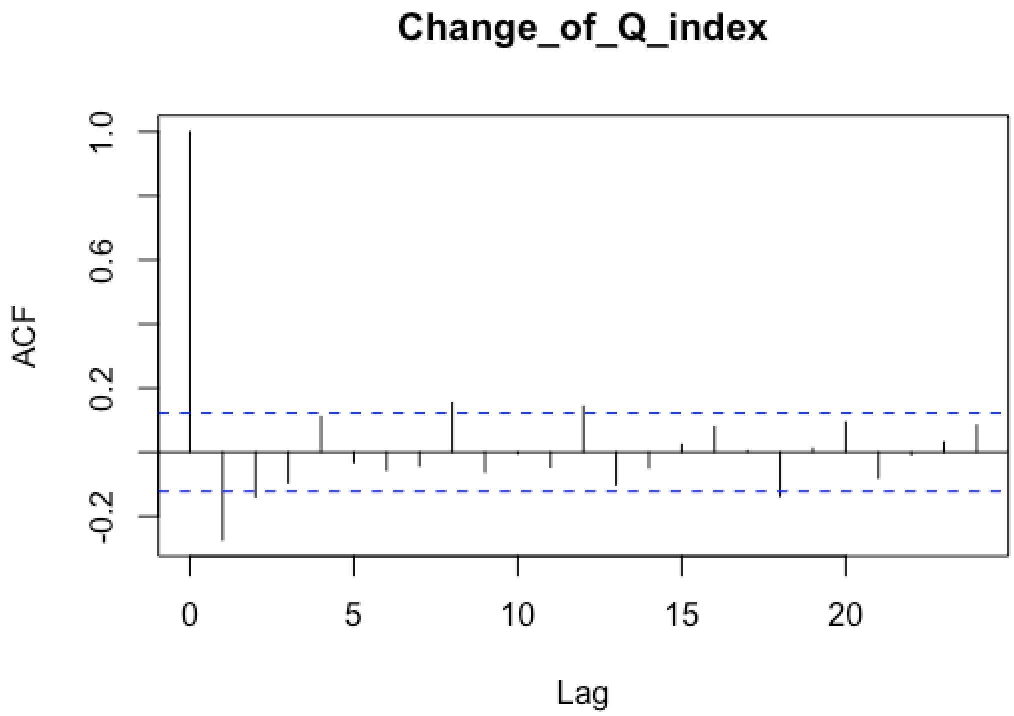
Figure 1. Persistence of Q-Index



This figure shows the autocorrelation functions of the Q-index.

.

Figure 2. Persistence of Change in Q-Index



This figure shows the autocorrelation functions of the change in the Q-index.

Table 1. Summary Statistics

Stock Market	NYSE, AMEX, NASDAQ							
Sample Period	Jan. 2000 ~ Dec. 2020							
Stock Amount	7617 stocks in total; 3093 stocks per month in average							
Variable	Symbol	Mean	Std	Skew	Min	Median	Max	Obs.
Monthly Stock Return	Ret	0.0102	0.1399	0.6449	-0.4372	0.0058	0.6168	739403
Q-Index Beta	β^Q	-0.0005	0.0047	-0.1240	-0.0162	-0.0004	0.0146	739403
Market Value (log)	MV	20.0409	2.0784	0.1715	15.3327	19.9745	25.0445	739403
Book-to-Market Ratio	BTM	0.6803	0.5773	2.3922	0.0312	0.5407	3.5970	739403
Momentum	MOM	0.0120	0.0355	0.4842	-0.0991	0.0111	0.1523	739403
Maximum Daily Return	MAX	0.0659	0.0613	3.0569	0.0080	0.0471	0.4545	739403
Idiosyncratic Risk	IVOL	0.0255	0.0206	2.5436	0.0041	0.0194	0.1481	739403
Illiquidity	ILLIQ	0.0016	0.0013	2.5614	0.0002	0.0012	0.0094	739403
Closing Price	CP	2.6744	1.2378	-0.5691	-1.0678	2.8576	5.1599	739403
Short-term Reversal	STR	0.0107	0.1406	0.6837	-0.4373	0.0058	0.6229	739403

This table reports the descriptive statistical summary for the sample and variables, which includes stock returns (Ret), Q-index beta (β^Q), log market capitalization (MV), book-to-market ratio (BTM), momentum (MOM), highest daily return in a given month (MAX), idiosyncratic volatility (IVOL), illiquidity (ILLIQ), and log stock price (CP), stock return short-term reverse (STR),

Table 2. Univariate portfolio sorting on Q-beta

	Panel A. Equal-weighted Portfolios							Panel B. Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0010	-0.0006	-0.0005	0.0024	0.0006	-0.0035	-0.0020	0.0011	-0.0004	-0.0003	0.0025	0.0008	-0.0032	-0.0018
	(0.21)	(-0.12)	(-0.10)	(0.48)	(0.14)	(-0.69)	(-0.36)	(0.24)	(-0.09)	(-0.06)	(0.51)	(0.17)	(-0.64)	(-0.32)
2	0.0054	0.0038	0.0040	0.0066	0.0049	0.0016	0.0028	0.0053	0.0038	0.0040	0.0067	0.0050	0.0017	0.0028
	(1.29)	(0.92)	(0.97)	(1.55)	(1.19)	(0.36)	(0.57)	(1.28)	(0.92)	(0.97)	(1.56)	(1.20)	(0.38)	(0.58)
3	0.0073*	0.0059	0.0060	0.0084**	0.0069*	0.0038	0.0050	0.0072*	0.0059	0.0060	0.0084**	0.0069*	0.0039	0.0051
	(1.90)	(1.54)	(1.58)	(2.12)	(1.81)	(0.95)	(1.11)	(1.88)	(1.54)	(1.58)	(2.12)	(1.80)	(0.96)	(1.13)
4	0.0084**	0.0071**	0.0074**	0.0098***	0.0082**	0.0053	0.0068	0.0083**	0.0071**	0.0073**	0.0097***	0.0081**	0.0053	0.0068
	(2.34)	(1.99)	(2.05)	(2.62)	(2.29)	(1.39)	(1.59)	(2.32)	(1.98)	(2.04)	(2.61)	(2.27)	(1.39)	(1.60)
5	0.0084**	0.0072**	0.0074**	0.0092**	0.0081**	0.0061*	0.0070*	0.0084**	0.0072**	0.0074**	0.0092**	0.0081**	0.0061*	0.0070*
	(2.43)	(2.08)	(2.14)	(2.56)	(2.34)	(1.65)	(1.69)	(2.41)	(2.08)	(2.14)	(2.56)	(2.34)	(1.65)	(1.70)
6	0.0091***	0.0080**	0.0082**	0.0096***	0.0088***	0.0071**	0.0076*	0.0091***	0.0080**	0.0082**	0.0095***	0.0088***	0.0071**	0.0076*
	(2.77)	(2.45)	(2.48)	(2.78)	(2.66)	(2.03)	(1.95)	(2.77)	(2.45)	(2.49)	(2.79)	(2.66)	(2.05)	(1.96)
7	0.0101***	0.0091***	0.0092***	0.0101***	0.0098***	0.0082**	0.0082**	0.0100***	0.0090***	0.0091***	0.0101***	0.0097***	0.0081**	0.0082**
	(2.99)	(2.68)	(2.71)	(2.86)	(2.87)	(2.28)	(2.05)	(2.97)	(2.66)	(2.69)	(2.85)	(2.85)	(2.27)	(2.05)
8	0.0097***	0.0085**	0.0087**	0.0097***	0.0093***	0.0078**	0.0078*	0.0097***	0.0085**	0.0087**	0.0097***	0.0093***	0.0079**	0.0080*
	(2.75)	(2.41)	(2.45)	(2.62)	(2.61)	(2.09)	(1.87)	(2.77)	(2.44)	(2.47)	(2.64)	(2.63)	(2.12)	(1.92)
9	0.0098**	0.0083**	0.0085**	0.0096**	0.0091**	0.0077*	0.0075*	0.0099***	0.0085**	0.0087**	0.0098**	0.0093**	0.0079**	0.0078*
	(2.58)	(2.22)	(2.26)	(2.45)	(2.40)	(1.92)	(1.69)	(2.63)	(2.27)	(2.32)	(2.51)	(2.46)	(1.97)	(1.76)
High β^Q	0.0069	0.0050	0.0052	0.0064	0.0058	0.0040	0.0040	0.0073	0.0054	0.0056	0.0067	0.0062	0.0044	0.0044
	(1.54)	(1.13)	(1.16)	(1.36)	(1.30)	(0.83)	(0.75)	(1.62)	(1.21)	(1.25)	(1.44)	(1.38)	(0.93)	(0.84)
$High - Low$	0.0059***	0.0056***	0.0057***	0.0040*	0.0052**	0.0074***	0.0060**	0.0061***	0.0058***	0.0059***	0.0042*	0.0054***	0.0076***	0.0062**
	(2.92)	(2.73)	(2.77)	(1.89)	(2.54)	(3.47)	(2.53)	(2.99)	(2.81)	(2.85)	(1.96)	(2.61)	(3.54)	(2.59)

This table reports the performance of portfolios sorted by Q-index beta (β^Q). The stocks in our sample are grouped into decile portfolios (from Low β^q to High β^q), and the portfolios are reformed each month. The first column presents the average excess returns (Ret – Rf) as well as the risk-adjusted returns that are estimated as alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), the Pástor -Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). Panel A presents the performance of equal-weighted portfolios, and Panel B presents the performance of value-weighted portfolios. The last two rows present the performance difference between the High β^Q and Low β^Q portfolios. T-statistics are reported in parenthesis, where the significance is defined as $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

Table 3. Univariate and multivariate Fama-Macbeth Regressions

	Expected Excess Returns $(Ret - Rf)_{t+1}$									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
β^Q	0.5244**	0.5748**	0.5260**	0.5638***	0.3724*	0.4263**	0.4287**	0.5272**	0.5269**	0.3801**
	(2.35)	(2.30)	(2.34)	(2.60)	(1.93)	(2.32)	(2.22)	(2.41)	(2.30)	(2.11)
MV		-0.0007								0.0007
		(-1.65)								(1.40)
BTM			0.0129***							0.0137***
			(9.18)							(12.54)
MOM				-0.0288						0.0365**
				(-1.11)						(2.02)
MAX					-0.0375***					0.0006
					(-2.62)					(0.05)
IVOL						-0.1117**				-0.0853
						(-2.22)				(-1.34)
ILLIQ							-1.8984**			-2.6119***
							(-2.13)			(-3.05)
CP								-0.0015		-0.0027**
								(-1.53)		(-2.35)
STR									0.0002	0.0035
									(0.04)	(0.83)
Cons.	0.0095**	0.0236**	0.0014	0.0099***	0.0123***	0.0124***	0.0126***	0.0139**	0.0101***	-0.0019
	(2.51)	(2.31)	(0.38)	(2.70)	(3.89)	(3.98)	(4.15)	(2.43)	(2.75)	(-0.26)
Obs.	736677	736677	736677	736677	736677	736677	736677	736677	736677	736677
Adj.R2	0.0046	0.0121	0.0141	0.0122	0.0128	0.0158	0.0163	0.0184	0.0102	0.0451

This table reports the correlation coefficients of Q-index beta (β^Q) on the stock expected excess return $(Ret - Rf)_{t+1}$ by using Fama–Macbeth two-stage regression model. Model (1) presents the effects of β^Q on the expected excess return. Model (2) to model (10) present the effects of β^Q on expected excess return while controlling relative factors. Newey–West t-statistics are reported in parenthesis, where the significance is defined as *p < .1, ** p < .05, ***p < .01.

Table 4. Univariate portfolio sorting conditioned on information quality

Panel A. Low Q-Index	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	-0.0057	-0.0081	-0.0082	-0.0048	-0.0077	-0.0134**	-0.0126*	-0.0056	-0.0080	-0.0080	-0.0046	-0.0076	-0.0132**	-0.0124*
	(-0.93)	(-1.38)	(-1.39)	(-0.79)	(-1.32)	(-2.16)	(-1.87)	(-0.91)	(-1.35)	(-1.37)	(-0.76)	(-1.30)	(-2.13)	(-1.84)
2	-0.0001	-0.0025	-0.0025	0.0006	-0.0020	-0.0079	-0.0070	-0.0001	-0.0025	-0.0025	0.0007	-0.0020	-0.0079	-0.0070
	(-0.01)	(-0.46)	(-0.46)	(0.12)	(-0.38)	(-1.41)	(-1.15)	(-0.02)	(-0.47)	(-0.47)	(0.12)	(-0.39)	(-1.41)	(-1.15)
3	0.0009	-0.0014	-0.0013	0.0014	-0.0009	-0.0062	-0.0056	0.0008	-0.0014	-0.0014	0.0014	-0.0009	-0.0061	-0.0054
	(0.18)	(-0.28)	(-0.28)	(0.29)	(-0.19)	(-1.23)	(-1.02)	(0.16)	(-0.29)	(-0.29)	(0.30)	(-0.20)	(-1.22)	(-0.99)
4	0.0028	0.0007	0.0008	0.0036	0.0012	-0.0039	-0.0030	0.0027	0.0007	0.0007	0.0035	0.0011	-0.0039	-0.0029
	(0.57)	(0.16)	(0.17)	(0.76)	(0.26)	(-0.80)	(-0.55)	(0.55)	(0.14)	(0.15)	(0.74)	(0.25)	(-0.80)	(-0.55)
5	0.0023	0.0003	0.0004	0.0027	0.0007	-0.0034	-0.0028	0.0023	0.0003	0.0004	0.0027	0.0007	-0.0034	-0.0027
	(0.49)	(0.08)	(0.08)	(0.60)	(0.16)	(-0.72)	(-0.55)	(0.48)	(0.07)	(0.08)	(0.60)	(0.16)	(-0.72)	(-0.53)
6	0.0034	0.0016	0.0016	0.0036	0.0019	-0.0019	-0.0012	0.0033	0.0015	0.0015	0.0036	0.0018	-0.0019	-0.0012
	(0.76)	(0.38)	(0.38)	(0.84)	(0.46)	(-0.42)	(-0.25)	(0.74)	(0.36)	(0.36)	(0.84)	(0.44)	(-0.42)	(-0.25)
7	0.0045	0.0027	0.0027	0.0043	0.0030	-0.0004	-0.0006	0.0043	0.0026	0.0026	0.0042	0.0029	-0.0005	-0.0006
	(0.98)	(0.63)	(0.63)	(0.97)	(0.70)	(-0.09)	(-0.12)	(0.94)	(0.59)	(0.60)	(0.94)	(0.67)	(-0.12)	(-0.12)
8	0.0038	0.0019	0.0019	0.0037	0.0023	-0.0013	-0.0011	0.0038	0.0019	0.0020	0.0038	0.0023	-0.0012	-0.0010
	(0.80)	(0.42)	(0.43)	(0.80)	(0.50)	(-0.28)	(-0.22)	(0.80)	(0.43)	(0.44)	(0.80)	(0.51)	(-0.25)	(-0.19)
9	0.0037	0.0016	0.0017	0.0034	0.0020	-0.0012	-0.0017	0.0038	0.0018	0.0018	0.0035	0.0021	-0.0010	-0.0014
	(0.72)	(0.33)	(0.35)	(0.67)	(0.40)	(-0.22)	(-0.29)	(0.74)	(0.36)	(0.37)	(0.69)	(0.43)	(-0.19)	(-0.25)
High β^Q	0.0002	-0.0025	-0.0025	-0.0006	-0.0022	-0.0062	-0.0068	0.0004	-0.0023	-0.0022	-0.0004	-0.0019	-0.0058	-0.0065
	(0.03)	(-0.43)	(-0.42)	(-0.09)	(-0.37)	(-0.98)	(-0.98)	(0.06)	(-0.39)	(-0.38)	(-0.06)	(-0.33)	(-0.92)	(-0.95)
$High - Low$	0.0059**	0.0056**	0.0057**	0.0042*	0.0055**	0.0072***	0.0059**	0.0060**	0.0057**	0.0058**	0.0042*	0.0056**	0.0074***	0.0060**
	(2.45)	(2.32)	(2.34)	(1.67)	(2.28)	(2.78)	(2.09)	(2.48)	(2.36)	(2.38)	(1.69)	(2.32)	(2.85)	(2.11)

Panel B. High Q-Index	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0089	0.0090	0.0087	0.0100	0.0109	0.0073	0.0114	0.0091	0.0092	0.0089	0.0101	0.0111	0.0076	0.0116
	(1.21)	(1.20)	(1.16)	(1.24)	(1.42)	(0.92)	(1.22)	(1.23)	(1.22)	(1.19)	(1.26)	(1.44)	(0.95)	(1.24)
2	0.0118*	0.0119*	0.0116*	0.0128*	0.0131**	0.0113*	0.0145*	0.0118*	0.0119*	0.0117*	0.0129*	0.0131**	0.0114*	0.0146*
	(1.91)	(1.90)	(1.84)	(1.90)	(2.02)	(1.69)	(1.85)	(1.92)	(1.91)	(1.86)	(1.92)	(2.04)	(1.71)	(1.88)
3	0.0148**	0.0151**	0.0147**	0.0157**	0.0161***	0.0145**	0.0181**	0.0147**	0.0151**	0.0147**	0.0157**	0.0161***	0.0145**	0.0181**
	(2.56)	(2.57)	(2.50)	(2.49)	(2.66)	(2.32)	(2.47)	(2.56)	(2.58)	(2.50)	(2.49)	(2.67)	(2.33)	(2.48)
4	0.0150***	0.0153***	0.0151***	0.0163***	0.0165***	0.0148**	0.0187***	0.0149***	0.0152***	0.0150***	0.0162***	0.0165***	0.0148**	0.0187***
	(2.89)	(2.90)	(2.82)	(2.85)	(3.02)	(2.61)	(2.83)	(2.87)	(2.89)	(2.81)	(2.84)	(3.02)	(2.60)	(2.83)
5	0.0156***	0.0159***	0.0157***	0.0163***	0.0171***	0.0159***	0.0194***	0.0155***	0.0158***	0.0157***	0.0162***	0.0170***	0.0159***	0.0193***
	(3.07)	(3.07)	(3.00)	(2.90)	(3.17)	(2.86)	(2.97)	(3.06)	(3.08)	(3.01)	(2.91)	(3.18)	(2.87)	(2.98)
6	0.0159***	0.0162***	0.0159***	0.0158***	0.0170***	0.0164***	0.0186***	0.0158***	0.0162***	0.0159***	0.0158***	0.0170***	0.0164***	0.0186***
	(3.28)	(3.28)	(3.19)	(2.96)	(3.32)	(3.09)	(3.00)	(3.29)	(3.31)	(3.21)	(2.99)	(3.34)	(3.12)	(3.02)
7	0.0168***	0.0170***	0.0167***	0.0161***	0.0178***	0.0173***	0.0193***	0.0167***	0.0170***	0.0167***	0.0161***	0.0178***	0.0172***	0.0193***
	(3.35)	(3.34)	(3.24)	(2.92)	(3.36)	(3.15)	(3.02)	(3.36)	(3.37)	(3.27)	(2.95)	(3.40)	(3.18)	(3.06)
8	0.0167***	0.0168***	0.0166***	0.0158***	0.0175***	0.0176***	0.0191***	0.0167***	0.0168***	0.0166***	0.0159***	0.0176***	0.0176***	0.0193***
	(3.19)	(3.16)	(3.08)	(2.76)	(3.16)	(3.07)	(2.88)	(3.23)	(3.20)	(3.12)	(2.79)	(3.21)	(3.12)	(2.94)
9	0.0168***	0.0168***	0.0165***	0.0159***	0.0178***	0.0173***	0.0195***	0.0170***	0.0171***	0.0168***	0.0162***	0.0181***	0.0176***	0.0198***
	(3.07)	(3.01)	(2.93)	(2.65)	(3.07)	(2.90)	(2.80)	(3.13)	(3.08)	(3.00)	(2.71)	(3.13)	(2.96)	(2.87)
High β^Q	0.0149**	0.0145**	0.0143**	0.0136*	0.0155**	0.0151**	0.0177**	0.0154**	0.0150**	0.0149**	0.0141**	0.0160**	0.0157**	0.0184**
	(2.30)	(2.20)	(2.15)	(1.91)	(2.27)	(2.13)	(2.14)	(2.38)	(2.29)	(2.25)	(1.99)	(2.35)	(2.23)	(2.23)
$High - Low$	0.0060*	0.0055	0.0056	0.0036	0.0046	0.0078**	0.0063	0.0063*	0.0059*	0.0060*	0.0040	0.0050	0.0081**	0.0068
	(1.76)	(1.60)	(1.63)	(0.99)	(1.30)	(2.15)	(1.51)	(1.83)	(1.68)	(1.70)	(1.08)	(1.38)	(2.20)	(1.60)

Panel C. Low ΔQ-Index	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^{Q}	-0.0007	-0.0053	-0.0054	-0.0026	-0.0045	-0.0094	-0.0135*	-0.0006	-0.0052	-0.0053	-0.0025	-0.0043	-0.0092	-0.0133*
	(-0.10)	(-0.77)	(-0.78)	(-0.36)	(-0.64)	(-1.31)	(-1.72)	(-0.09)	(-0.75)	(-0.76)	(-0.35)	(-0.62)	(-1.29)	(-1.68)
2	0.0039	-0.0002	-0.0001	0.0021	0.0008	-0.0032	-0.0058	0.0037	-0.0004	-0.0002	0.0020	0.0006	-0.0032	-0.0058
	(0.65)	(-0.04)	(-0.02)	(0.32)	(0.12)	(-0.51)	(-0.83)	(0.62)	(-0.06)	(-0.04)	(0.31)	(0.10)	(-0.51)	(-0.83)
3	0.0051	0.0013	0.0011	0.0030	0.0020	-0.0019	-0.0041	0.0050	0.0013	0.0012	0.0031	0.0020	-0.0017	-0.0039
	(0.94)	(0.23)	(0.21)	(0.52)	(0.36)	(-0.32)	(-0.65)	(0.92)	(0.24)	(0.22)	(0.54)	(0.37)	(-0.30)	(-0.62)
4	0.0069	0.0036	0.0037	0.0057	0.0045	0.0010	-0.0011	0.0068	0.0036	0.0037	0.0057	0.0045	0.0010	-0.0010
	(1.36)	(0.70)	(0.72)	(1.04)	(0.86)	(0.18)	(-0.19)	(1.34)	(0.69)	(0.72)	(1.04)	(0.86)	(0.18)	(-0.17)
5	0.0071	0.0039	0.0040	0.0049	0.0046	0.0020	-0.0008	0.0070	0.0039	0.0040	0.0049	0.0046	0.0020	-0.0007
	(1.46)	(0.78)	(0.81)	(0.94)	(0.92)	(0.39)	(-0.13)	(1.43)	(0.78)	(0.81)	(0.94)	(0.92)	(0.38)	(-0.12)
6	0.0083*	0.0057	0.0057	0.0065	0.0064	0.0037	0.0013	0.0081*	0.0056	0.0057	0.0064	0.0063	0.0037	0.0013
	(1.77)	(1.19)	(1.19)	(1.28)	(1.31)	(0.74)	(0.24)	(1.75)	(1.18)	(1.18)	(1.27)	(1.30)	(0.75)	(0.23)
7	0.0093*	0.0068	0.0068	0.0066	0.0073	0.0052	0.0016	0.0091*	0.0067	0.0068	0.0065	0.0073	0.0051	0.0017
	(1.92)	(1.37)	(1.36)	(1.25)	(1.45)	(0.98)	(0.29)	(1.89)	(1.36)	(1.35)	(1.24)	(1.44)	(0.98)	(0.30)
8	0.0093*	0.0065	0.0066	0.0060	0.0071	0.0054	0.0021	0.0091*	0.0065	0.0066	0.0059	0.0071	0.0055	0.0022
	(1.85)	(1.26)	(1.28)	(1.11)	(1.36)	(1.00)	(0.36)	(1.82)	(1.26)	(1.28)	(1.09)	(1.36)	(1.01)	(0.38)
9	0.0111**	0.0085	0.0087	0.0084	0.0091	0.0074	0.0030	0.0112**	0.0087	0.0089	0.0085	0.0093	0.0076	0.0032
	(2.02)	(1.50)	(1.53)	(1.41)	(1.58)	(1.24)	(0.46)	(2.04)	(1.53)	(1.56)	(1.44)	(1.62)	(1.28)	(0.50)
High β^{Q}	0.0090	0.0050	0.0053	0.0061	0.0061	0.0030	-0.0013	0.0091	0.0053	0.0056	0.0063	0.0063	0.0035	-0.0009
	(1.36)	(0.74)	(0.78)	(0.86)	(0.89)	(0.43)	(-0.17)	(1.40)	(0.79)	(0.83)	(0.88)	(0.93)	(0.49)	(-0.12)
$High - Low$	0.0097***	0.0103***	0.0107***	0.0087***	0.0106***	0.0124***	0.0122***	0.0097***	0.0105***	0.0109***	0.0088***	0.0107***	0.0127***	0.0124***
	(3.29)	(3.37)	(3.49)	(2.68)	(3.40)	(3.91)	(3.40)	(3.26)	(3.38)	(3.50)	(2.66)	(3.40)	(3.95)	(3.39)

Panel D. High ΔQ-Index	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0027	0.0027	0.0027	0.0049	0.0043	0.0012	0.0055	0.0028	0.0029	0.0029	0.0050	0.0044	0.0015	0.0057
	(0.40)	(0.41)	(0.40)	(0.70)	(0.63)	(0.17)	(0.69)	(0.42)	(0.43)	(0.42)	(0.73)	(0.65)	(0.21)	(0.71)
2	0.0068	0.0068	0.0069	0.0092	0.0082	0.0055	0.0084	0.0069	0.0070	0.0070	0.0094	0.0083	0.0056	0.0085
	(1.16)	(1.18)	(1.17)	(1.53)	(1.38)	(0.87)	(1.20)	(1.18)	(1.20)	(1.20)	(1.57)	(1.41)	(0.89)	(1.22)
3	0.0094*	0.0095*	0.0095*	0.0117**	0.0107*	0.0086	0.0113*	0.0093*	0.0094*	0.0094*	0.0116**	0.0106*	0.0086	0.0114*
	(1.73)	(1.75)	(1.75)	(2.09)	(1.94)	(1.47)	(1.74)	(1.72)	(1.74)	(1.74)	(2.08)	(1.94)	(1.47)	(1.76)
4	0.0099*	0.0099*	0.0100*	0.0122**	0.0113**	0.0091	0.0123**	0.0098*	0.0098*	0.0099*	0.0121**	0.0111**	0.0090	0.0123**
	(1.93)	(1.96)	(1.96)	(2.33)	(2.19)	(1.65)	(2.03)	(1.92)	(1.94)	(1.95)	(2.32)	(2.18)	(1.65)	(2.04)
5	0.0097*	0.0098*	0.0099*	0.0117**	0.0109**	0.0095*	0.0123**	0.0097*	0.0097*	0.0098**	0.0117**	0.0109**	0.0095*	0.0123**
	(1.95)	(1.98)	(1.98)	(2.28)	(2.17)	(1.77)	(2.08)	(1.96)	(1.98)	(1.98)	(2.29)	(2.18)	(1.78)	(2.09)
6	0.0099**	0.0100**	0.0100**	0.0113**	0.0108**	0.0102**	0.0122**	0.0099**	0.0100**	0.0100**	0.0114**	0.0108**	0.0103**	0.0122**
	(2.13)	(2.16)	(2.14)	(2.35)	(2.30)	(2.04)	(2.19)	(2.15)	(2.17)	(2.16)	(2.37)	(2.31)	(2.05)	(2.21)
7	0.0109**	0.0109**	0.0110**	0.0121**	0.0119**	0.0109**	0.0129**	0.0108**	0.0109**	0.0109**	0.0122**	0.0119**	0.0109**	0.0129**
	(2.30)	(2.32)	(2.31)	(2.47)	(2.48)	(2.14)	(2.28)	(2.29)	(2.32)	(2.31)	(2.48)	(2.48)	(2.13)	(2.29)
8	0.0101**	0.0102**	0.0103**	0.0117**	0.0113**	0.0099*	0.0118**	0.0103**	0.0104**	0.0104**	0.0119**	0.0114**	0.0101*	0.0120**
	(2.03)	(2.06)	(2.06)	(2.28)	(2.24)	(1.84)	(1.98)	(2.08)	(2.11)	(2.10)	(2.32)	(2.28)	(1.89)	(2.03)
9	0.0084	0.0085*	0.0085	0.0100*	0.0097*	0.0082	0.0108*	0.0087*	0.0088*	0.0088*	0.0103*	0.0099*	0.0085	0.0112*
	(1.62)	(1.66)	(1.65)	(1.87)	(1.85)	(1.47)	(1.74)	(1.67)	(1.71)	(1.70)	(1.93)	(1.91)	(1.53)	(1.80)
High β^Q	0.0050	0.0051	0.0051	0.0060	0.0058	0.0053	0.0070	0.0055	0.0056	0.0056	0.0065	0.0063	0.0058	0.0076
	(0.81)	(0.84)	(0.84)	(0.94)	(0.93)	(0.81)	(0.95)	(0.89)	(0.92)	(0.92)	(1.02)	(1.01)	(0.88)	(1.02)
$High - Low$	0.0023	0.0024	0.0025	0.0011	0.0015	0.0041	0.0015	0.0027	0.0027	0.0028	0.0015	0.0019	0.0043	0.0019
	(0.84)	(0.87)	(0.90)	(0.38)	(0.57)	(1.41)	(0.46)	(0.96)	(0.99)	(1.02)	(0.52)	(0.70)	(1.48)	(0.57)

Panel E. Negative ΔQ-Index	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0008	-0.0036	-0.0035	-0.0001	-0.0024	-0.0075	-0.0114	0.0009	-0.0034	-0.0034	0.0000	-0.0023	-0.0073	-0.0111
	(0.12)	(-0.51)	(-0.50)	(-0.02)	(-0.34)	(-1.04)	(-1.43)	(0.14)	(-0.49)	(-0.48)	(0.01)	(-0.32)	(-1.01)	(-1.39)
2	0.0051	0.0011	0.0013	0.0039	0.0022	-0.0018	-0.0043	0.0050	0.0010	0.0012	0.0038	0.0021	-0.0018	-0.0043
	(0.85)	(0.17)	(0.20)	(0.59)	(0.36)	(-0.27)	(-0.61)	(0.82)	(0.15)	(0.19)	(0.58)	(0.34)	(-0.27)	(-0.61)
3	0.0065	0.0026	0.0026	0.0048	0.0035	-0.0003	-0.0027	0.0064	0.0027	0.0027	0.0050	0.0035	-0.0002	-0.0025
	(1.17)	(0.47)	(0.46)	(0.81)	(0.61)	(-0.06)	(-0.42)	(1.16)	(0.48)	(0.47)	(0.84)	(0.62)	(-0.03)	(-0.39)
4	0.0082	0.0047	0.0050	0.0073	0.0058	0.0023	0.0000	0.0081	0.0048	0.0050	0.0073	0.0058	0.0024	0.0001
	(1.58)	(0.90)	(0.93)	(1.29)	(1.07)	(0.43)	(0.01)	(1.56)	(0.90)	(0.94)	(1.30)	(1.08)	(0.43)	(0.02)
5	0.0082	0.0049	0.0051	0.0063	0.0057	0.0032	0.0002	0.0081	0.0049	0.0051	0.0063	0.0057	0.0032	0.0002
	(1.65)	(0.96)	(1.00)	(1.17)	(1.11)	(0.60)	(0.03)	(1.63)	(0.96)	(1.00)	(1.17)	(1.11)	(0.60)	(0.04)
6	0.0093*	0.0067	0.0068	0.0078	0.0075	0.0049	0.0023	0.0092*	0.0067	0.0068	0.0078	0.0074	0.0049	0.0023
	(1.97)	(1.37)	(1.39)	(1.51)	(1.51)	(0.96)	(0.41)	(1.95)	(1.37)	(1.39)	(1.51)	(1.50)	(0.97)	(0.41)
7	0.0105**	0.0081	0.0082	0.0082	0.0087*	0.0065	0.0028	0.0103**	0.0080	0.0081	0.0081	0.0086*	0.0064	0.0029
	(2.13)	(1.58)	(1.58)	(1.52)	(1.68)	(1.21)	(0.49)	(2.10)	(1.57)	(1.58)	(1.51)	(1.67)	(1.20)	(0.50)
8	0.0105**	0.0078	0.0080	0.0077	0.0085	0.0068	0.0034	0.0103**	0.0078	0.0080	0.0076	0.0085	0.0068	0.0035
	(2.06)	(1.48)	(1.51)	(1.38)	(1.59)	(1.23)	(0.56)	(2.04)	(1.48)	(1.51)	(1.37)	(1.60)	(1.24)	(0.58)
9	0.0121**	0.0095	0.0098*	0.0098	0.0103*	0.0086	0.0040	0.0122**	0.0098*	0.0101*	0.0099	0.0105*	0.0088	0.0042
	(2.16)	(1.64)	(1.68)	(1.60)	(1.74)	(1.41)	(0.60)	(2.19)	(1.68)	(1.73)	(1.64)	(1.78)	(1.45)	(0.65)
High β^Q	0.0102	0.0064	0.0069	0.0082	0.0078	0.0046	0.0003	0.0104	0.0067	0.0073	0.0084	0.0081	0.0050	0.0007
	(1.53)	(0.93)	(0.99)	(1.12)	(1.11)	(0.63)	(0.04)	(1.57)	(0.99)	(1.05)	(1.15)	(1.16)	(0.70)	(0.09)
$High - Low$	0.0094***	0.0100***	0.0104***	0.0083**	0.0102***	0.0121***	0.0117***	0.0095***	0.0102***	0.0106***	0.0083**	0.0104***	0.0124***	0.0119***
	(3.12)	(3.17)	(3.30)	(2.46)	(3.20)	(3.72)	(3.18)	(3.11)	(3.19)	(3.31)	(2.44)	(3.20)	(3.76)	(3.17)

Panel F. Positive ΔQ-Index	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0012	0.0013	0.0012	0.0032	0.0027	0.0001	0.0040	0.0013	0.0014	0.0014	0.0033	0.0028	0.0004	0.0042
	(0.18)	(0.19)	(0.19)	(0.46)	(0.40)	(0.01)	(0.50)	(0.20)	(0.21)	(0.21)	(0.48)	(0.42)	(0.05)	(0.52)
2	0.0056	0.0057	0.0057	0.0078	0.0069	0.0044	0.0072	0.0057	0.0058	0.0058	0.0079	0.0070	0.0046	0.0073
	(0.97)	(0.99)	(0.99)	(1.32)	(1.19)	(0.72)	(1.04)	(0.99)	(1.02)	(1.01)	(1.35)	(1.21)	(0.74)	(1.06)
3	0.0081	0.0081	0.0082	0.0101*	0.0093*	0.0073	0.0100	0.0080	0.0081	0.0081	0.0100*	0.0092*	0.0073	0.0101
	(1.50)	(1.52)	(1.52)	(1.83)	(1.72)	(1.27)	(1.56)	(1.49)	(1.51)	(1.51)	(1.82)	(1.71)	(1.27)	(1.57)
4	0.0087*	0.0088*	0.0088*	0.0108**	0.0101**	0.0078	0.0111*	0.0086*	0.0086*	0.0087*	0.0107**	0.0099*	0.0078	0.0111*
	(1.72)	(1.75)	(1.75)	(2.10)	(1.99)	(1.44)	(1.86)	(1.71)	(1.73)	(1.73)	(2.08)	(1.97)	(1.44)	(1.86)
5	0.0087*	0.0087*	0.0088*	0.0104**	0.0098**	0.0085	0.0113*	0.0086*	0.0087*	0.0087*	0.0104**	0.0098**	0.0085	0.0113*
	(1.77)	(1.80)	(1.79)	(2.08)	(1.99)	(1.60)	(1.94)	(1.77)	(1.80)	(1.79)	(2.08)	(2.00)	(1.61)	(1.95)
6	0.0089*	0.0090*	0.0090*	0.0102**	0.0098**	0.0092*	0.0113**	0.0089*	0.0090**	0.0090*	0.0102**	0.0098**	0.0093*	0.0113**
	(1.95)	(1.98)	(1.96)	(2.15)	(2.12)	(1.87)	(2.05)	(1.96)	(1.98)	(1.97)	(2.16)	(2.12)	(1.88)	(2.07)
7	0.0098**	0.0099**	0.0099**	0.0109**	0.0107**	0.0100**	0.0119**	0.0097**	0.0098**	0.0098**	0.0109**	0.0107**	0.0100*	0.0119**
	(2.10)	(2.13)	(2.11)	(2.26)	(2.28)	(1.98)	(2.13)	(2.09)	(2.13)	(2.11)	(2.26)	(2.28)	(1.98)	(2.14)
8	0.0090*	0.0091*	0.0091*	0.0104**	0.0101**	0.0089*	0.0108*	0.0092*	0.0093*	0.0093*	0.0106**	0.0102**	0.0091*	0.0110*
	(1.83)	(1.87)	(1.86)	(2.06)	(2.04)	(1.69)	(1.84)	(1.87)	(1.91)	(1.90)	(2.10)	(2.08)	(1.73)	(1.88)
9	0.0076	0.0077	0.0077	0.0090*	0.0088*	0.0074	0.0100	0.0078	0.0079	0.0079	0.0093*	0.0090*	0.0077	0.0103*
	(1.48)	(1.53)	(1.52)	(1.72)	(1.72)	(1.36)	(1.64)	(1.52)	(1.58)	(1.56)	(1.77)	(1.76)	(1.41)	(1.70)
High β^Q	0.0039	0.0041	0.0041	0.0048	0.0047	0.0045	0.0060	0.0044	0.0045	0.0046	0.0053	0.0052	0.0050	0.0065
	(0.65)	(0.69)	(0.68)	(0.77)	(0.77)	(0.69)	(0.82)	(0.72)	(0.76)	(0.76)	(0.85)	(0.85)	(0.76)	(0.89)
$High - Low$	0.0028	0.0028	0.0029	0.0016	0.0020	0.0044	0.0020	0.0031	0.0031	0.0032	0.0020	0.0024	0.0046	0.0023
	(1.02)	(1.05)	(1.07)	(0.59)	(0.76)	(1.52)	(0.62)	(1.12)	(1.16)	(1.18)	(0.72)	(0.88)	(1.58)	(0.73)

This table presents the univariate sorting results conditional on the levels and changes of Q-index. The stocks in our sample are sorted into decile portfolios (from Low β^q to High β^q), and the portfolios are reformed each month. The table reports the average excess returns (Ret – Rf) as well as the risk-adjusted returns that are estimated as alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), the Pástor -Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). Panels A and B report the results conditional on low and high Q-index levels, corresponding to low and high political ambiguity, respectively. Panels C and D report the results conditional on low and high Q-index changes corresponding to improving and deteriorating political information quality, respectively. Similarly, Panels E and F report the results conditional on negative and positive changes in Q-index, corresponding to decreasing and rising political ambiguity, respectively. T-statistics are reported in parenthesis, where the significance is defined as $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

Table 5. Fama-Macbeth regressions conditioned on information quality

	Expected Excess Returns $(Ret - Rf)_{t+1}$					
	Low $Q\ index$	High $Q\ index$	Low $\Delta\ Q\ index$	High $\Delta\ Q\ index$	Negative $\Delta\ Q\ index$	Positive $\Delta\ Q\ index$
β^Q	0.3713*	0.3908	0.7338***	0.0440	0.7420***	0.0532
	(1.92)	(1.12)	(2.70)	(0.17)	(2.66)	(0.21)
MV	0.0002	0.0012*	0.0005	0.0008	0.0006	0.0007
	(0.27)	(1.81)	(0.79)	(1.23)	(0.94)	(1.10)
BTM	0.0137***	0.0136***	0.0136***	0.0138***	0.0139***	0.0135***
	(9.12)	(8.73)	(9.34)	(9.59)	(9.48)	(9.61)
MOM	0.0495*	0.0209	0.0699***	0.0046	0.0706***	0.0055
	(1.92)	(0.81)	(2.73)	(0.19)	(2.68)	(0.24)
MAX	0.0163	-0.0179	-0.0067	0.0075	-0.0040	0.0048
	(0.94)	(-1.00)	(-0.34)	(0.45)	(-0.20)	(0.29)
IVOL	-0.1845**	0.0326	-0.0889	-0.0813	-0.0965	-0.0747
	(-2.12)	(0.34)	(-0.83)	(-1.07)	(-0.88)	(-0.99)
ILLIQ	-2.2879*	-2.9846**	-2.0507*	-3.1359**	-2.0287	-3.1297**
	(-1.90)	(-2.36)	(-1.68)	(-2.56)	(-1.63)	(-2.59)
CP	-0.0021	-0.0034**	-0.0036**	-0.0018	-0.0036**	-0.0019
	(-1.34)	(-2.00)	(-2.32)	(-1.32)	(-2.27)	(-1.39)
STR	0.0060	0.0005	0.0061	0.0011	0.0053	0.0019
	(1.06)	(0.08)	(0.97)	(0.20)	(0.83)	(0.35)
Cons.	0.0020	-0.0042	0.0033	-0.0048	0.0019	-0.0033
	(0.21)	(-0.36)	(0.31)	(-0.48)	(0.17)	(-0.35)
Obs.	401656	335021	361566	375111	353092	383585
Adj.R2	0.0424	0.0483	0.0491	0.0413	0.0487	0.0419

This table reports the results when Q-index beta (β^Q) is regressed on expected excess return (Ret – Rf) $_{t+1}$ conditional on different periods of Q-index levels and changes. We separate the months into two groups based on the median value of Q-index level and changes as well as the signs of Q-index changes. Newey–West t-statistics are reported in parenthesis, where the significance is defined as $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

Table 6. Univariate portfolio sorting conditioned on sentiment

Panel A. High Sentiment	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	-0.0100	-0.0101	-0.0077	-0.0036	-0.0045	-0.0106	-0.0079	-0.0098	-0.0098	-0.0074	-0.0032	-0.0042	-0.0102	-0.0074
	(-1.57)	(-1.58)	(-1.23)	(-0.51)	(-0.69)	(-1.64)	(-1.05)	(-1.53)	(-1.54)	(-1.18)	(-0.46)	(-0.64)	(-1.58)	(-0.98)
2	-0.0030	-0.0030	-0.0008	0.0024	0.0021	-0.0034	-0.0004	-0.0030	-0.0031	-0.0008	0.0024	0.0021	-0.0033	-0.0003
	(-0.54)	(-0.55)	(-0.15)	(0.39)	(0.37)	(-0.61)	(-0.06)	(-0.54)	(-0.55)	(-0.15)	(0.40)	(0.37)	(-0.59)	(-0.04)
3	-0.0004	-0.0004	0.0016	0.0034	0.0045	-0.0009	0.0016	-0.0004	-0.0004	0.0016	0.0035	0.0045	-0.0009	0.0018
	(-0.07)	(-0.08)	(0.32)	(0.62)	(0.89)	(-0.18)	(0.27)	(-0.08)	(-0.09)	(0.32)	(0.63)	(0.88)	(-0.17)	(0.31)
4	0.0017	0.0017	0.0034	0.0058	0.0068	0.0008	0.0041	0.0017	0.0017	0.0034	0.0059	0.0069	0.0008	0.0043
	(0.37)	(0.36)	(0.73)	(1.13)	(1.43)	(0.16)	(0.75)	(0.36)	(0.35)	(0.73)	(1.13)	(1.43)	(0.17)	(0.78)
5	0.0020	0.0020	0.0033	0.0051	0.0060	0.0012	0.0033	0.0019	0.0019	0.0033	0.0051	0.0061	0.0012	0.0035
	(0.46)	(0.46)	(0.78)	(1.06)	(1.36)	(0.27)	(0.65)	(0.45)	(0.44)	(0.77)	(1.05)	(1.37)	(0.27)	(0.68)
6	0.0035	0.0035	0.0046	0.0061	0.0068	0.0030	0.0051	0.0035	0.0035	0.0046	0.0062	0.0068	0.0031	0.0052
	(0.86)	(0.86)	(1.12)	(1.34)	(1.62)	(0.72)	(1.04)	(0.86)	(0.85)	(1.13)	(1.35)	(1.62)	(0.75)	(1.06)
7	0.0052	0.0052	0.0062	0.0078	0.0085*	0.0048	0.0066	0.0051	0.0051	0.0062	0.0079*	0.0085*	0.0048	0.0068
	(1.25)	(1.24)	(1.49)	(1.66)	(1.95)	(1.11)	(1.32)	(1.24)	(1.23)	(1.48)	(1.66)	(1.96)	(1.11)	(1.35)
8	0.0044	0.0044	0.0053	0.0069	0.0075	0.0036	0.0046	0.0045	0.0045	0.0054	0.0071	0.0076*	0.0038	0.0049
	(1.03)	(1.02)	(1.22)	(1.40)	(1.65)	(0.81)	(0.89)	(1.04)	(1.04)	(1.25)	(1.43)	(1.68)	(0.85)	(0.95)
9	0.0037	0.0037	0.0048	0.0068	0.0072	0.0034	0.0050	0.0040	0.0040	0.0052	0.0071	0.0076	0.0038	0.0056
	(0.82)	(0.81)	(1.06)	(1.31)	(1.51)	(0.71)	(0.92)	(0.89)	(0.88)	(1.14)	(1.37)	(1.59)	(0.80)	(1.02)
High β^Q	-0.0005	-0.0005	0.0009	0.0021	0.0029	-0.0009	0.0001	-0.0000	-0.0001	0.0013	0.0026	0.0034	-0.0003	0.0008
	(-0.09)	(-0.09)	(0.16)	(0.34)	(0.51)	(-0.15)	(0.02)	(-0.01)	(-0.01)	(0.25)	(0.42)	(0.59)	(-0.05)	(0.12)
$High - Low$	0.0096***	0.0096***	0.0086***	0.0057	0.0074**	0.0097***	0.0080**	0.0097***	0.0098***	0.0087***	0.0058	0.0076**	0.0100***	0.0082**
	(2.94)	(2.96)	(2.68)	(1.61)	(2.20)	(2.94)	(2.12)	(2.94)	(2.96)	(2.68)	(1.61)	(2.21)	(2.94)	(2.14)

Panel B. Low Sentiment	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0094	0.0065	0.0068	0.0096	0.0066	0.0043	0.0042	0.0095	0.0066	0.0070	0.0097	0.0068	0.0046	0.0045
	(1.30)	(0.90)	(0.95)	(1.27)	(0.92)	(0.55)	(0.48)	(1.32)	(0.92)	(0.97)	(1.28)	(0.94)	(0.59)	(0.52)
2	0.0130**	0.0100	0.0103*	0.0131**	0.0101	0.0081	0.0081	0.0130**	0.0101	0.0104*	0.0132**	0.0102	0.0083	0.0083
	(2.08)	(1.62)	(1.66)	(2.01)	(1.63)	(1.21)	(1.07)	(2.10)	(1.65)	(1.69)	(2.03)	(1.66)	(1.24)	(1.10)
3	0.0134**	0.0107*	0.0110*	0.0138**	0.0109*	0.0093	0.0098	0.0134**	0.0108*	0.0111*	0.0138**	0.0109*	0.0095	0.0099
	(2.36)	(1.91)	(1.95)	(2.31)	(1.92)	(1.51)	(1.41)	(2.36)	(1.92)	(1.96)	(2.32)	(1.93)	(1.55)	(1.43)
4	0.0134**	0.0109**	0.0113**	0.0140**	0.0112**	0.0099*	0.0103	0.0132**	0.0108**	0.0113**	0.0138**	0.0112**	0.0099*	0.0103
	(2.48)	(2.03)	(2.10)	(2.48)	(2.08)	(1.68)	(1.55)	(2.47)	(2.04)	(2.11)	(2.46)	(2.08)	(1.70)	(1.57)
5	0.0130**	0.0104**	0.0108**	0.0133**	0.0107**	0.0098*	0.0100	0.0128**	0.0104**	0.0108**	0.0132**	0.0107**	0.0098*	0.0100
	(2.50)	(2.05)	(2.10)	(2.46)	(2.07)	(1.74)	(1.59)	(2.50)	(2.05)	(2.11)	(2.46)	(2.08)	(1.75)	(1.60)
6	0.0125**	0.0102**	0.0104**	0.0122**	0.0103**	0.0096*	0.0096	0.0124**	0.0101**	0.0104**	0.0121**	0.0103**	0.0096*	0.0095
	(2.58)	(2.12)	(2.15)	(2.40)	(2.13)	(1.81)	(1.61)	(2.57)	(2.12)	(2.16)	(2.40)	(2.13)	(1.83)	(1.62)
7	0.0124**	0.0101**	0.0103**	0.0118**	0.0102**	0.0091*	0.0083	0.0122**	0.0099**	0.0102**	0.0116**	0.0101**	0.0090*	0.0082
	(2.50)	(2.05)	(2.09)	(2.25)	(2.06)	(1.68)	(1.37)	(2.46)	(2.03)	(2.06)	(2.23)	(2.04)	(1.67)	(1.36)
8	0.0131**	0.0104**	0.0107**	0.0129**	0.0106**	0.0097*	0.0097	0.0129**	0.0103**	0.0106**	0.0127**	0.0105**	0.0097*	0.0097
	(2.51)	(2.03)	(2.06)	(2.36)	(2.03)	(1.71)	(1.53)	(2.49)	(2.02)	(2.06)	(2.34)	(2.03)	(1.73)	(1.54)
9	0.0127**	0.0095*	0.0098*	0.0121**	0.0098*	0.0092	0.0090	0.0126**	0.0094*	0.0098*	0.0121**	0.0097*	0.0092	0.0091
	(2.20)	(1.68)	(1.73)	(2.03)	(1.71)	(1.49)	(1.30)	(2.19)	(1.68)	(1.72)	(2.02)	(1.71)	(1.49)	(1.31)
High β^Q	0.0112	0.0069	0.0073	0.0106	0.0073	0.0066	0.0060	0.0113	0.0071	0.0075	0.0107	0.0075	0.0068	0.0062
	(1.58)	(1.01)	(1.05)	(1.45)	(1.04)	(0.86)	(0.71)	(1.59)	(1.03)	(1.08)	(1.47)	(1.07)	(0.90)	(0.73)
$High - Low$	0.0019	0.0005	0.0005	0.0010	0.0007	0.0023	0.0018	0.0019	0.0005	0.0005	0.0010	0.0007	0.0022	0.0017
	(0.69)	(0.18)	(0.18)	(0.33)	(0.24)	(0.76)	(0.55)	(0.68)	(0.19)	(0.19)	(0.34)	(0.25)	(0.76)	(0.51)

Panel C. High CCI	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	-0.0088	-0.0088	-0.0088	-0.0051	-0.0065	-0.0101	-0.0073	-0.0086	-0.0086	-0.0086	-0.0049	-0.0065	-0.0098	-0.0071
	(-1.24)	(-1.24)	(-1.24)	(-0.67)	(-0.88)	(-1.37)	(-0.86)	(-1.22)	(-1.21)	(-1.22)	(-0.65)	(-0.88)	(-1.34)	(-0.84)
2	-0.0031	-0.0031	-0.0030	0.0007	-0.0016	-0.0039	-0.0016	-0.0030	-0.0030	-0.0030	0.0008	-0.0016	-0.0038	-0.0016
	(-0.50)	(-0.50)	(-0.50)	(0.11)	(-0.25)	(-0.62)	(-0.23)	(-0.49)	(-0.49)	(-0.49)	(0.13)	(-0.26)	(-0.60)	(-0.22)
3	0.0003	0.0003	0.0003	0.0031	0.0014	-0.0002	0.0015	0.0004	0.0003	0.0004	0.0033	0.0014	-0.0002	0.0015
	(0.05)	(0.05)	(0.06)	(0.52)	(0.24)	(-0.04)	(0.22)	(0.06)	(0.06)	(0.07)	(0.55)	(0.24)	(-0.03)	(0.23)
4	0.0026	0.0026	0.0026	0.0061	0.0043	0.0017	0.0043	0.0027	0.0026	0.0027	0.0062	0.0043	0.0018	0.0043
	(0.52)	(0.52)	(0.52)	(1.14)	(0.81)	(0.33)	(0.71)	(0.53)	(0.52)	(0.52)	(1.14)	(0.81)	(0.34)	(0.71)
5	0.0041	0.0041	0.0041	0.0064	0.0053	0.0039	0.0057	0.0041	0.0041	0.0041	0.0064	0.0053	0.0039	0.0056
	(0.85)	(0.84)	(0.84)	(1.21)	(1.02)	(0.76)	(0.96)	(0.85)	(0.85)	(0.84)	(1.22)	(1.03)	(0.76)	(0.96)
6	0.0044	0.0044	0.0044	0.0062	0.0056	0.0044	0.0061	0.0045	0.0045	0.0045	0.0063	0.0057	0.0045	0.0061
	(0.95)	(0.95)	(0.95)	(1.23)	(1.14)	(0.90)	(1.08)	(0.98)	(0.98)	(0.98)	(1.26)	(1.16)	(0.93)	(1.09)
7	0.0057	0.0057	0.0057	0.0068	0.0067	0.0059	0.0073	0.0057	0.0057	0.0057	0.0069	0.0068	0.0060	0.0074
	(1.20)	(1.20)	(1.19)	(1.32)	(1.34)	(1.19)	(1.28)	(1.22)	(1.21)	(1.21)	(1.35)	(1.36)	(1.21)	(1.31)
8	0.0051	0.0051	0.0051	0.0060	0.0058	0.0057	0.0066	0.0053	0.0053	0.0053	0.0063	0.0060	0.0059	0.0068
	(1.02)	(1.02)	(1.01)	(1.11)	(1.09)	(1.08)	(1.10)	(1.07)	(1.07)	(1.06)	(1.17)	(1.14)	(1.13)	(1.15)
9	0.0055	0.0055	0.0055	0.0064	0.0064	0.0062	0.0075	0.0059	0.0059	0.0059	0.0069	0.0068	0.0066	0.0080
	(1.07)	(1.07)	(1.07)	(1.16)	(1.17)	(1.15)	(1.22)	(1.15)	(1.14)	(1.14)	(1.24)	(1.25)	(1.22)	(1.30)
High β^Q	0.0012	0.0011	0.0012	0.0020	0.0020	0.0018	0.0035	0.0017	0.0017	0.0017	0.0026	0.0026	0.0024	0.0041
	(0.20)	(0.19)	(0.20)	(0.32)	(0.32)	(0.30)	(0.49)	(0.29)	(0.29)	(0.29)	(0.42)	(0.42)	(0.39)	(0.59)
$High - Low$	0.0100***	0.0100***	0.0099***	0.0071**	0.0086***	0.0119***	0.0108***	0.0103***	0.0103***	0.0103***	0.0076**	0.0091***	0.0122***	0.0112***
	(3.27)	(3.25)	(3.26)	(2.23)	(2.69)	(3.85)	(3.08)	(3.33)	(3.32)	(3.32)	(2.32)	(2.80)	(3.87)	(3.15)

Panel D. Low CCI	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0100	0.0058	0.0056	0.0079	0.0057	0.0016	0.0036	0.0100	0.0060	0.0058	0.0081	0.0059	0.0018	0.0038
	(1.57)	(0.92)	(0.88)	(1.19)	(0.89)	(0.23)	(0.46)	(1.58)	(0.94)	(0.91)	(1.22)	(0.92)	(0.25)	(0.49)
2	0.0130**	0.0091	0.0092	0.0112*	0.0093	0.0055	0.0074	0.0129**	0.0091	0.0093	0.0112*	0.0093	0.0055	0.0074
	(2.29)	(1.61)	(1.61)	(1.90)	(1.63)	(0.88)	(1.07)	(2.29)	(1.62)	(1.62)	(1.92)	(1.64)	(0.89)	(1.07)
3	0.0137**	0.0099*	0.0099*	0.0120**	0.0100*	0.0062	0.0084	0.0135**	0.0098*	0.0099*	0.0120**	0.0099*	0.0062	0.0084
	(2.61)	(1.91)	(1.89)	(2.24)	(1.92)	(1.08)	(1.33)	(2.58)	(1.90)	(1.88)	(2.23)	(1.91)	(1.08)	(1.33)
4	0.0137***	0.0102**	0.0104**	0.0123**	0.0105**	0.0070	0.0092	0.0135***	0.0101**	0.0103**	0.0122**	0.0103**	0.0069	0.0092
	(2.69)	(2.02)	(2.02)	(2.35)	(2.05)	(1.25)	(1.48)	(2.66)	(2.01)	(2.01)	(2.33)	(2.03)	(1.24)	(1.48)
5	0.0124**	0.0088*	0.0089*	0.0108**	0.0089*	0.0059	0.0079	0.0122**	0.0088*	0.0089*	0.0108**	0.0089*	0.0060	0.0079
	(2.50)	(1.81)	(1.79)	(2.14)	(1.81)	(1.09)	(1.31)	(2.48)	(1.81)	(1.79)	(2.14)	(1.81)	(1.10)	(1.32)
6	0.0134***	0.0101**	0.0101**	0.0118**	0.0102**	0.0077	0.0094	0.0132***	0.0100**	0.0100**	0.0116**	0.0101**	0.0077	0.0093
	(2.89)	(2.21)	(2.17)	(2.47)	(2.19)	(1.51)	(1.66)	(2.85)	(2.19)	(2.16)	(2.45)	(2.17)	(1.51)	(1.65)
7	0.0142***	0.0110**	0.0110**	0.0124**	0.0110**	0.0084	0.0095	0.0139***	0.0108**	0.0108**	0.0122**	0.0108**	0.0083	0.0094
	(2.95)	(2.29)	(2.26)	(2.47)	(2.27)	(1.58)	(1.61)	(2.89)	(2.25)	(2.22)	(2.44)	(2.23)	(1.55)	(1.59)
8	0.0139***	0.0103**	0.0103**	0.0119**	0.0103**	0.0077	0.0092	0.0138***	0.0102**	0.0102**	0.0117**	0.0102**	0.0077	0.0093
	(2.79)	(2.09)	(2.04)	(2.30)	(2.06)	(1.40)	(1.51)	(2.76)	(2.07)	(2.03)	(2.28)	(2.05)	(1.40)	(1.52)
9	0.0136**	0.0095*	0.0096*	0.0112**	0.0096*	0.0071	0.0082	0.0136**	0.0096*	0.0096*	0.0113**	0.0097*	0.0072	0.0084
	(2.48)	(1.77)	(1.73)	(1.99)	(1.74)	(1.17)	(1.22)	(2.47)	(1.77)	(1.74)	(1.99)	(1.75)	(1.18)	(1.24)
High β^Q	0.0122*	0.0067	0.0065	0.0083	0.0066	0.0036	0.0051	0.0123*	0.0069	0.0068	0.0084	0.0068	0.0039	0.0053
	(1.82)	(1.02)	(0.97)	(1.20)	(0.98)	(0.49)	(0.62)	(1.84)	(1.06)	(1.01)	(1.23)	(1.01)	(0.54)	(0.65)
$High - Low$	0.0023	0.0009	0.0009	0.0004	0.0008	0.0020	0.0014	0.0023	0.0010	0.0009	0.0004	0.0009	0.0022	0.0015
	(0.84)	(0.33)	(0.31)	(0.14)	(0.31)	(0.65)	(0.43)	(0.86)	(0.35)	(0.33)	(0.14)	(0.32)	(0.71)	(0.46)

This table presents the univariate sorting results conditional on investor sentiment levels. The stocks in our sample are sorted into decile portfolios (from Low β^q to High β^q), and the portfolios are reformed each month. The table reports the average excess returns (Ret – Rf) as well as the risk-adjusted returns that are estimated as alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), the Pástor -Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). Panels A and B report the results conditional on high and low Baker and Wurgler's (2006) sentiment (SI), respectively. Panels C and D report the results conditional on high and low U.S. Consumer Confidence Index (CCI), respectively. T-statistics are reported in parenthesis, where the significance is defined as $^*p < .1$, $^{**}p < .05$, $^{***}p < .01$.

Table 7. Fama-Macbeth regression conditioned on sentiment

	Expected Excess Returns $(Ret - Rf)_{t+1}$			
	Low Sentiment	High Sentiment	Low CCI	High CCI
β^Q	0.0413	0.6157*	0.1446	0.6409**
	(0.22)	(1.80)	(0.83)	(2.07)
MV	0.0013*	-0.0005	0.0009	0.0004
	(1.70)	(-0.73)	(1.33)	(0.61)
BTM	0.0141***	0.0146***	0.0132***	0.0142***
	(9.06)	(8.64)	(9.09)	(8.66)
MOM	-0.0125	0.0714***	0.0187	0.0560**
	(-0.46)	(2.64)	(0.68)	(2.43)
MAX	-0.0107	0.0081	-0.0065	0.0084
	(-0.74)	(0.35)	(-0.39)	(0.45)
IVOL	-0.0282	-0.1546	-0.0207	-0.1562*
	(-0.37)	(-1.36)	(-0.23)	(-1.71)
ILLIQ	-3.4580***	-1.7183	-3.7016***	-1.3961
	(-2.79)	(-1.32)	(-3.15)	(-1.11)
CP	-0.0049**	0.0003	-0.0049***	-0.0002
	(-2.57)	(0.26)	(-2.74)	(-0.19)
STR	-0.0053	0.0146**	-0.0032	0.0109*
	(-0.93)	(2.13)	(-0.54)	(1.86)
Cons.	-0.0043	0.0087	0.0031	-0.0052
	(-0.38)	(0.85)	(0.29)	(-0.53)
Obs.	348987	326800	387323	349354
Adj.R2	0.0479	0.0418	0.0472	0.0428

This table reports the results when Q-index beta (β^Q) is regressed on expected excess return $(\text{Ret} - \text{Rf})_{t+1}$ conditional on different periods of investor sentiment. We separate the months into two groups based on the median levels of Baker and Wurgler sentiment (*SI*) and *CCI*. Newey–West t-statistics are reported in parenthesis, where the significance is defined as *p < .1, **p < .05, ***p < .01.

Table 8. Univariate portfolio sorting in up and down market states

Panel A. Down Market	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	0.0031	0.0016	0.0017	0.0045	0.0030	-0.0019	-0.0001	0.0035	0.0020	0.0021	0.0050	0.0035	-0.0014	0.0003
	(0.62)	(0.31)	(0.34)	(0.89)	(0.61)	(-0.36)	(-0.02)	(0.71)	(0.40)	(0.42)	(0.96)	(0.70)	(-0.28)	(0.06)
2	0.0070	0.0054	0.0055	0.0081^{*}	0.0067	0.0020	0.0032	0.0068	0.0052	0.0053	0.0081^{*}	0.0065	0.0017	0.0028
	(1.61)	(1.25)	(1.26)	(1.79)	(1.56)	(0.43)	(0.62)	(1.54)	(1.19)	(1.21)	(1.77)	(1.50)	(0.36)	(0.55)
3	0.0097^{**}	0.0082^{**}	0.0083^{**}	0.0106^{***}	0.0093^{**}	0.0060	0.0074	0.0098^{**}	0.0083^{**}	0.0083^{**}	0.0107^{***}	0.0094^{**}	0.0059	0.0074
	(2.49)	(2.12)	(2.14)	(2.64)	(2.41)	(1.47)	(1.61)	(2.47)	(2.10)	(2.12)	(2.64)	(2.40)	(1.42)	(1.60)
4	0.0110^{***}	0.0094^{**}	0.0096^{**}	0.0121^{***}	0.0104^{***}	0.0074^{*}	0.0081^{*}	0.0110^{***}	0.0095^{**}	0.0097^{**}	0.0123^{***}	0.0105^{***}	0.0074^{*}	0.0081^{*}
	(2.91)	(2.52)	(2.57)	(3.14)	(2.77)	(1.87)	(1.82)	(2.87)	(2.50)	(2.55)	(3.13)	(2.75)	(1.85)	(1.80)
5	0.0109^{***}	0.0096^{***}	0.0098^{***}	0.0118^{***}	0.0105^{***}	0.0081^{**}	0.0080^{*}	0.0110^{***}	0.0098^{***}	0.0100^{***}	0.0121^{***}	0.0108^{***}	0.0080^{**}	0.0082^{*}
	(3.04)	(2.71)	(2.77)	(3.20)	(2.95)	(2.15)	(1.91)	(3.02)	(2.69)	(2.76)	(3.23)	(2.96)	(2.10)	(1.90)
6	0.0112^{***}	0.0101^{***}	0.0103^{***}	0.0117^{***}	0.0108^{***}	0.0092^{**}	0.0092^{**}	0.0109^{***}	0.0099^{***}	0.0101^{***}	0.0117^{***}	0.0106^{***}	0.0089^{**}	0.0091^{**}
	(3.26)	(2.95)	(2.99)	(3.29)	(3.13)	(2.52)	(2.26)	(3.14)	(2.85)	(2.90)	(3.25)	(3.04)	(2.43)	(2.22)
7	0.0115^{***}	0.0107^{***}	0.0108^{***}	0.0122^{***}	0.0115^{***}	0.0096^{***}	0.0101^{**}	0.0116^{***}	0.0107^{***}	0.0108^{***}	0.0123^{***}	0.0116^{***}	0.0096^{**}	0.0101^{**}
	(3.33)	(3.08)	(3.10)	(3.38)	(3.29)	(2.60)	(2.45)	(3.31)	(3.06)	(3.08)	(3.39)	(3.29)	(2.57)	(2.43)
8	0.0116^{***}	0.0105^{***}	0.0106^{***}	0.0117^{***}	0.0111^{***}	0.0100^{***}	0.0097^{**}	0.0118^{***}	0.0107^{***}	0.0109^{***}	0.0119^{***}	0.0112^{***}	0.0103^{***}	0.0098^{**}
	(3.26)	(2.96)	(2.98)	(3.16)	(3.08)	(2.64)	(2.30)	(3.27)	(2.98)	(3.00)	(3.17)	(3.08)	(2.67)	(2.27)
9	0.0119^{***}	0.0105^{***}	0.0106^{***}	0.0115^{***}	0.0117^{***}	0.0084^{*}	0.0091^{*}	0.0121^{***}	0.0107^{***}	0.0108^{***}	0.0118^{***}	0.0119^{***}	0.0087^{**}	0.0095^{**}
	(2.97)	(2.61)	(2.64)	(2.75)	(2.91)	(1.97)	(1.92)	(2.99)	(2.64)	(2.67)	(2.79)	(2.93)	(2.04)	(1.99)
High β^Q	0.0090^{*}	0.0073	0.0075	0.0092^{*}	0.0085^{*}	0.0052	0.0054	0.0092^{**}	0.0075	0.0077^{*}	0.0094^{*}	0.0088^{*}	0.0055	0.0059
	(1.95)	(1.58)	(1.62)	(1.92)	(1.84)	(1.06)	(1.00)	(1.98)	(1.63)	(1.67)	(1.95)	(1.90)	(1.11)	(1.08)
$High - Low$	0.0060^{***}	0.0057^{***}	0.0058^{***}	0.0047^{**}	0.0055^{**}	0.0071^{***}	0.0055^{**}	0.0057^{***}	0.0055^{**}	0.0056^{***}	0.0044^{**}	0.0053^{**}	0.0069^{***}	0.0055^{**}
	(2.79)	(2.66)	(2.74)	(2.11)	(2.58)	(3.14)	(2.21)	(2.67)	(2.57)	(2.64)	(2.01)	(2.50)	(3.07)	(2.21)

Panel B. Up Market	Equal-weighted Portfolios							Value-weighted Portfolios						
	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha	Raw Excess Return	CAPM Alpha	FF3-factor Alpha	FF5-factor Alpha	Carhart 4-factor Alpha	Stambaugh Alpha	Bali 7-factor Alpha
Low β^Q	-0.0019	-0.0041	-0.0041	-0.0016	-0.0031	-0.0063	-0.0047	-0.0015	-0.0036	-0.0036	-0.0010	-0.0025	-0.0058	-0.0040
	(-0.42)	(-0.91)	(-0.92)	(-0.33)	(-0.68)	(-1.34)	(-0.89)	(-0.33)	(-0.80)	(-0.80)	(-0.21)	(-0.56)	(-1.22)	(-0.74)
2	0.0034	0.0014	0.0016	0.0036	0.0021	0.0003	0.0004	0.0037	0.0019	0.0020	0.0040	0.0025	0.0009	0.0009
	(0.86)	(0.37)	(0.40)	(0.88)	(0.53)	(0.07)	(0.09)	(0.93)	(0.48)	(0.51)	(0.97)	(0.64)	(0.21)	(0.20)
3	0.0040	0.0025	0.0026	0.0046	0.0032	0.0009	0.0014	0.0041	0.0027	0.0028	0.0048	0.0034	0.0013	0.0016
	(1.14)	(0.72)	(0.73)	(1.24)	(0.91)	(0.25)	(0.33)	(1.15)	(0.76)	(0.78)	(1.28)	(0.94)	(0.34)	(0.37)
4	0.0045	0.0029	0.0031	0.0048	0.0037	0.0019	0.0025	0.0047	0.0031	0.0032	0.0050	0.0038	0.0019	0.0024
	(1.32)	(0.88)	(0.91)	(1.35)	(1.08)	(0.53)	(0.61)	(1.35)	(0.92)	(0.93)	(1.40)	(1.11)	(0.52)	(0.59)
5	0.0051	0.0033	0.0034	0.0050	0.0040	0.0023	0.0031	0.0052	0.0035	0.0036	0.0053	0.0042	0.0025	0.0037
	(1.62)	(1.09)	(1.11)	(1.56)	(1.29)	(0.71)	(0.84)	(1.64)	(1.11)	(1.14)	(1.63)	(1.34)	(0.76)	(0.98)
6	0.0050	0.0032	0.0033	0.0040	0.0037	0.0033	0.0039	0.0053	0.0036	0.0037	0.0046	0.0041	0.0036	0.0043
	(1.57)	(1.03)	(1.05)	(1.22)	(1.17)	(1.00)	(1.05)	(1.64)	(1.14)	(1.15)	(1.39)	(1.27)	(1.08)	(1.13)
7	0.0052	0.0032	0.0033	0.0039	0.0037	0.0030	0.0032	0.0056*	0.0036	0.0037	0.0044	0.0041	0.0035	0.0038
	(1.62)	(1.02)	(1.05)	(1.21)	(1.18)	(0.92)	(0.88)	(1.73)	(1.16)	(1.17)	(1.33)	(1.30)	(1.05)	(1.03)
8	0.0058*	0.0040	0.0040	0.0049	0.0047	0.0038	0.0046	0.0065**	0.0048	0.0048	0.0056*	0.0054*	0.0045	0.0055
	(1.84)	(1.31)	(1.31)	(1.52)	(1.50)	(1.15)	(1.26)	(2.01)	(1.52)	(1.52)	(1.69)	(1.71)	(1.35)	(1.47)
9	0.0056	0.0033	0.0035	0.0044	0.0038	0.0038	0.0047	0.0060*	0.0037	0.0039	0.0049	0.0042	0.0042	0.0049
	(1.58)	(0.98)	(1.02)	(1.23)	(1.12)	(1.06)	(1.17)	(1.68)	(1.10)	(1.14)	(1.35)	(1.22)	(1.15)	(1.20)
High β^Q	0.0023	-0.0007	-0.0005	0.0002	-0.0003	-0.0001	0.0001	0.0033	0.0004	0.0005	0.0012	0.0008	0.0012	0.0013
	(0.53)	(-0.16)	(-0.13)	(0.04)	(-0.07)	(-0.01)	(0.03)	(0.74)	(0.10)	(0.13)	(0.26)	(0.18)	(0.26)	(0.26)
$High - Low$	0.0042*	0.0034	0.0036	0.0018	0.0028	0.0063***	0.0049*	0.0048**	0.0040*	0.0042*	0.0021	0.0033	0.0070***	0.0053*
	(1.84)	(1.48)	(1.56)	(0.73)	(1.22)	(2.66)	(1.84)	(2.05)	(1.72)	(1.78)	(0.88)	(1.43)	(2.91)	(1.96)

This table presents the univariate sorting results conditional on the market states. A month is defined as a down (up) market state if the current monthly return is below (above) the average market return in the past 12 months. The stocks in our sample are sorted into decile portfolios (from Low β^q to High β^q), and the portfolios are reformed each month. The table reports the average excess returns (Ret – Rf) as well as the risk-adjusted returns that are estimated as alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), the Pástor -Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). Panels A and B report the results conditional down and up market states, respectively. T-statistics are reported in parenthesis, where the significance is defined as *p < .1, **p < .05, ***p < .01.

Table 9. Fama-Macbeth regressions in up and down market states

	Expected Excess Returns $(Ret - Rf)$_(t+1)	
	Down	Up
β^Q	0.3838**	0.1870
	(2.06)	(0.87)
MV	0.0006	0.0007
	(1.08)	(1.54)
BTM	0.0143***	0.0125***
	(12.12)	(10.16)
MOM	0.0462**	0.0307
	(2.38)	(1.44)
MAX	-0.0196	0.0297
	(-1.29)	(1.60)
IVOL	-0.2060***	0.0061
	(-3.36)	(0.06)
ILLIQ	1.9894*	-7.6004***
	(1.84)	(-6.49)
CP	-0.0010	-0.0044***
	(-0.84)	(-4.05)
STR	0.0014	0.0055
	(0.31)	(1.13)
Cons.	-0.0066	0.0031
	(-0.82)	(0.38)
Obs.	388479	348198
Adj.R2	0.0464	0.0501

This table reports the results when Q-index beta (β^Q) is regressed on expected excess return (Ret – Rf) $_{t+1}$ conditional on different market states. A month is defined as a down (up) market state if the current monthly return is below (above) the average market return in the past 12 months. Newey–West t-statistics are reported in parenthesis, where the significance is defined as $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

Table 10. Double sorting on EPU Beta and Q-index Beta (Dependent Sorting)

	Equal-weighted portfolios							Value-weighted portfolios						
	Ave. Raw Return	Ave. CAPM α	Ave. FF-3 α	Ave. FF-5 α	Ave. Carhart-4 α	Ave. PS α	Ave. Bali-7 α	Ave. Raw Return	Ave. CAPM α	Ave. FF-3 α	Ave. FF-5 α	Ave. Carhart-4 α	Ave. PS α	Ave. Bali-7 α
Low Q-beta	0.0008	-0.0008	-0.0010	0.0015	0.0002	-0.0035	-0.0014	0.0009	-0.0006	-0.0008	0.0016	0.0003	-0.0032	-0.0013
	(0.16)	(-0.16)	(-0.21)	(0.30)	(0.04)	(-0.69)	(-0.26)	(0.19)	(-0.13)	(-0.18)	(0.33)	(0.06)	(-0.65)	(-0.22)
2	0.0052	0.0038	0.0037	0.0062	0.0047	0.0017	0.0029	0.0051	0.0038	0.0037	0.0061	0.0046	0.0017	0.0030
	(1.24)	(0.91)	(0.89)	(1.41)	(1.11)	(0.38)	(0.59)	(1.22)	(0.90)	(0.88)	(1.41)	(1.10)	(0.39)	(0.60)
3	0.0070*	0.0055	0.0054	0.0076*	0.0063	0.0036	0.0050	0.0069*	0.0055	0.0054	0.0077*	0.0063	0.0037	0.0051
	(1.78)	(1.40)	(1.39)	(1.89)	(1.62)	(0.88)	(1.09)	(1.77)	(1.41)	(1.40)	(1.90)	(1.62)	(0.89)	(1.11)
4	0.0085**	0.0072*	0.0071*	0.0089**	0.0079**	0.0057	0.0068	0.0083**	0.0071*	0.0070*	0.0088**	0.0078**	0.0057	0.0068
	(2.25)	(1.92)	(1.90)	(2.29)	(2.10)	(1.44)	(1.54)	(2.23)	(1.91)	(1.89)	(2.28)	(2.09)	(1.44)	(1.55)
5	0.0081**	0.0068*	0.0069*	0.0087**	0.0076**	0.0057	0.0069*	0.0080**	0.0068*	0.0068*	0.0086**	0.0075**	0.0057	0.0068*
	(2.30)	(1.96)	(1.96)	(2.38)	(2.16)	(1.53)	(1.67)	(2.28)	(1.95)	(1.96)	(2.37)	(2.15)	(1.53)	(1.65)
6	0.0088**	0.0076**	0.0076**	0.0089**	0.0083**	0.0066*	0.0074*	0.0088**	0.0076**	0.0076**	0.0088**	0.0083**	0.0066*	0.0074*
	(2.54)	(2.21)	(2.19)	(2.45)	(2.39)	(1.79)	(1.82)	(2.53)	(2.21)	(2.19)	(2.45)	(2.39)	(1.80)	(1.82)
7	0.0097***	0.0086**	0.0086**	0.0095***	0.0092***	0.0076**	0.0079*	0.0096***	0.0085**	0.0086**	0.0095***	0.0092***	0.0076**	0.0080*
	(2.80)	(2.49)	(2.49)	(2.64)	(2.67)	(2.08)	(1.95)	(2.79)	(2.49)	(2.48)	(2.65)	(2.66)	(2.09)	(1.97)
8	0.0087**	0.0075**	0.0074**	0.0082**	0.0080**	0.0068*	0.0070	0.0087**	0.0075**	0.0074**	0.0082**	0.0081**	0.0069*	0.0071*
	(2.43)	(2.09)	(2.06)	(2.19)	(2.22)	(1.78)	(1.65)	(2.44)	(2.11)	(2.08)	(2.21)	(2.24)	(1.81)	(1.69)
9	0.0091**	0.0075**	0.0076**	0.0083**	0.0082**	0.0067*	0.0065	0.0092**	0.0077**	0.0077**	0.0085**	0.0083**	0.0069*	0.0068
	(2.38)	(2.00)	(2.00)	(2.11)	(2.15)	(1.67)	(1.47)	(2.42)	(2.05)	(2.05)	(2.16)	(2.20)	(1.72)	(1.52)
High Q-beta	0.0066	0.0048	0.0049	0.0058	0.0056	0.0042	0.0051	0.0069	0.0051	0.0052	0.0061	0.0059	0.0046	0.0055
	(1.48)	(1.09)	(1.10)	(1.26)	(1.25)	(0.89)	(0.97)	(1.54)	(1.16)	(1.17)	(1.32)	(1.32)	(0.97)	(1.04)
$High - Low$	0.0058***	0.0056***	0.0059***	0.0044**	0.0054***	0.0077***	0.0065***	0.0060***	0.0058***	0.0060***	0.0045**	0.0056***	0.0078***	0.0067***
	(2.86)	(2.73)	(2.86)	(2.05)	(2.64)	(3.57)	(2.74)	(2.89)	(2.77)	(2.90)	(2.09)	(2.67)	(3.60)	(2.78)

This table presents the double sorting results to control for the EPU-beta effect. The stocks in our sample are first into terciles according EPU-beta, and then sorted into deciles according to their Q-beta. Portfolios are reformed each month. The table reports the average excess returns (Ret – Rf) as well as the risk-adjusted returns that are estimated as alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), the Pástor -Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). T-statistics are reported in parenthesis, where the significance is defined as $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

Table 11. Double sorting on Q-index Beta and EPU Beta (Dependent Sorting)

	Equal-weighted portfolios							Value-weighted portfolios						
	Ave. Raw Return	Ave. CAPM α	Ave. FF-3 α	Ave. FF-5 α	Ave. Carhart-4 α	Ave. PS α	Ave. Bali-7 α	Ave. Raw Return	Ave. CAPM α	Ave. FF-3 α	Ave. FF-5 α	Ave. Carhart-4 α	Ave. PS α	Ave. Bali-7 α
Low β^{EPU}	0.0078*	0.0058	0.0060	0.0090*	0.0075	0.0026	0.0040	0.0079*	0.0059	0.0061	0.0091*	0.0076	0.0028	0.0042
	(1.66)	(1.26)	(1.29)	(1.86)	(1.61)	(0.53)	(0.73)	(1.68)	(1.27)	(1.31)	(1.88)	(1.62)	(0.56)	(0.76)
2	0.0082**	0.0067	0.0068*	0.0088**	0.0078*	0.0047	0.0055	0.0082**	0.0067*	0.0069*	0.0089**	0.0079*	0.0049	0.0057
	(2.01)	(1.65)	(1.68)	(2.09)	(1.93)	(1.10)	(1.15)	(2.02)	(1.66)	(1.69)	(2.10)	(1.94)	(1.13)	(1.19)
3	0.0080**	0.0067*	0.0068*	0.0087**	0.0077**	0.0055	0.0064	0.0080**	0.0066*	0.0068*	0.0087**	0.0077**	0.0055	0.0065
	(2.16)	(1.80)	(1.85)	(2.26)	(2.08)	(1.39)	(1.46)	(2.15)	(1.80)	(1.84)	(2.25)	(2.07)	(1.40)	(1.47)
4	0.0086**	0.0073**	0.0075**	0.0092**	0.0082**	0.0063*	0.0069	0.0085**	0.0074**	0.0075**	0.0092**	0.0082**	0.0063*	0.0070*
	(2.39)	(2.05)	(2.10)	(2.46)	(2.27)	(1.66)	(1.63)	(2.40)	(2.07)	(2.11)	(2.48)	(2.29)	(1.68)	(1.66)
5	0.0086**	0.0073**	0.0075**	0.0087**	0.0082**	0.0066*	0.0074*	0.0086**	0.0073**	0.0075**	0.0087**	0.0082**	0.0066*	0.0074*
	(2.51)	(2.14)	(2.20)	(2.44)	(2.40)	(1.83)	(1.83)	(2.50)	(2.15)	(2.21)	(2.45)	(2.41)	(1.84)	(1.84)
6	0.0077**	0.0065*	0.0067*	0.0084**	0.0075**	0.0051	0.0059	0.0078**	0.0066*	0.0068*	0.0084**	0.0075**	0.0052	0.0060
	(2.23)	(1.88)	(1.93)	(2.33)	(2.15)	(1.39)	(1.43)	(2.25)	(1.92)	(1.96)	(2.35)	(2.18)	(1.44)	(1.48)
7	0.0090**	0.0077**	0.0079**	0.0093**	0.0085**	0.0066*	0.0069*	0.0089**	0.0077**	0.0078**	0.0093**	0.0084**	0.0065*	0.0069*
	(2.57)	(2.21)	(2.25)	(2.55)	(2.42)	(1.78)	(1.67)	(2.55)	(2.20)	(2.25)	(2.55)	(2.41)	(1.78)	(1.67)
8	0.0083**	0.0070*	0.0072*	0.0086**	0.0078**	0.0059	0.0060	0.0084**	0.0071*	0.0072*	0.0087**	0.0078**	0.0060	0.0061
	(2.24)	(1.90)	(1.94)	(2.22)	(2.09)	(1.50)	(1.37)	(2.26)	(1.93)	(1.97)	(2.25)	(2.11)	(1.53)	(1.40)
9	0.0068*	0.0053	0.0055	0.0073*	0.0062	0.0044	0.0051	0.0069*	0.0054	0.0056	0.0074*	0.0063	0.0046	0.0053
	(1.73)	(1.35)	(1.40)	(1.78)	(1.57)	(1.06)	(1.09)	(1.75)	(1.39)	(1.44)	(1.81)	(1.60)	(1.10)	(1.13)
High β^{EPU}	0.0031	0.0013	0.0015	0.0030	0.0023	-0.0002	0.0008	0.0033	0.0016	0.0018	0.0033	0.0026	0.0002	0.0012
	(0.67)	(0.29)	(0.32)	(0.63)	(0.50)	(-0.04)	(0.15)	(0.72)	(0.35)	(0.39)	(0.69)	(0.57)	(0.04)	(0.22)
$High - Low$	-0.0048**	-0.0045**	-0.0046**	-0.0061***	-0.0052**	-0.0028	-0.0032	-0.0046**	-0.0044**	-0.0043**	-0.0058**	-0.0050**	-0.0026	-0.0030
	(-2.23)	(-2.10)	(-2.09)	(-2.68)	(-2.38)	(-1.21)	(-1.24)	(-2.13)	(-2.00)	(-1.98)	(-2.56)	(-2.27)	(-1.12)	(-1.17)

This table presents the double sorting results to examine if the EPU-beta effect remains after controlling for Q-beta. The stocks in our sample are first into terciles according to Q-beta, and then sorted into deciles according to their EPU-beta. Portfolios are reformed each month. The table reports the average excess returns (Ret – Rf) as well as the risk-adjusted returns that are estimated as alphas from the Fama-French three-factor model (1993), the Fama-French five-factor model (2015), the Carhart four-factor model (1997), the Pástor -Stambaugh model (2003) and Bali et al.'s seven-factor model (2017). T-statistics are reported in parenthesis, where the significance is defined as $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

Appendix I. Variable definitions

Variable	**Description**
Q-Index Beta	Monthly Q-beta is estimated by employing an 18-month rolling regression of excess stock returns on the Q- index.
MV	Log of the firm's market capitalization
BTM	Firm's book-to-market ratio
MOM	The average cumulative return of a stock over a period of 11 months ending 1 month prior to the portfolio formation month
MAX	Stock's highest daily return in a given month
IVOL	The standard deviation of the daily residuals in a month from Fama–French three-factor model
ILLIQ	Amihud (2002) illiquidity date
CP	Log of monthly closing stock price
STR	Short-term reversal measured as the return on the stock in previous month.

Appendix II. Average Q-beta levels by deciles

Low β^Q	2	3	4	5	6	7	8	9	High β^Q	$High - Low$
-0.0087***	-0.0048***	-0.0031***	-0.0019***	-0.0010***	-0.0001	0.0008***	0.0019***	0.0035***	0.0076***	0.0163***
(-38.34)	(-28.18)	(-22.81)	(-17.02)	(-9.90)	(-1.20)	(8.33)	(17.09)	(24.42)	(39.55)	(45.75)

This table presents the mean of β^Q for each decile portfolio sorted by β^Q.

Appendix III. Correlation of investor sentiment and market states.

	SI	CCI	Up	$Down$
SI	1.0000			
CCI	0.4667	1.0000		
Up	-0.1054	-0.0960	1.0000	
$Down$	0.1054	0.0960	-1.0000	1.0000

This table presents the correlation matrix of sentiment and market states. *SI* is the Baker and Wurgler sentiment (*SI*) and *CCI* is the U.S. Consumer Confidence Index. A month is defined as a down (up) market state if the current monthly return is below (above) the average market return in the past 12 months.