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Language tone in financial news media and the cross-section of stock returns

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*Language Tone in Financial News Media and
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*Language Tone in Financial News Media and the
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Language Tone in Financial News Media and the Cross-Section of Stock Returns¹

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Abstract: Based on 58,256 news articles published in the Financial Times during a 15-year period that cover companies in the DJIA, we find that a trading strategy that longs stocks with the most negative news and shorts stocks with the least negative news is not profitable. Consistent with this result, we also find that the sentiment factor derived from the negativism in the language tone in news articles is not a priced risk factor in the cross-section of stock returns. Nevertheless, the sentiment factor is significant for two-thirds of the stocks when it is added to well-known factor models.

JEL code: G01, G11, G12.

Keywords: asset pricing; factor models; Fama-French; news articles; sentiment.

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1. Introduction

The use of automated text analysis in research to better understand financial markets dates back decades. Surveys of the literature include Das (2014), Kearney and Liu (2014), Li (2010a), Loughran and McDonald (2016), Marty et al. (2019), Mitra and Mitra (2011), Nardo et al. (2016), Tetlock (2014), and Xing et al. (2018). One stream of research uses the bag-of-words methods in which the grammar and word sequences in a document are ignored but the words are categorized with the use of dictionaries as positive, negative, etc. The number of words in a certain category in a document—for example, the frequency of negative words in a news article in the financial press—could be informative from, say, an investor perspective.³

To give a taste of this growing literature, Tetlock (2007) wrote a seminal paper on the content of financial news media and the stock market that examined the influence of a column in the Wall Street Journal (WSJ), “Abreast of the Market,” on stock returns. For this purpose, Tetlock (2007) used the Harvard General Inquirer to analyze pessimism in the language tone in the WSJ column and found that the column contained information that could be used to predict short-term stock returns. Dougal et al. (2012) expanded Tetlock’s (2007) research by examining the authorship of the WSJ column and found that journalists with a pessimistic language tone were associated with negative stock returns.

Heston and Sinha (2017) used 900,754 news articles tagged with company identifiers from Thomson Reuters to test whether news predicts stock returns and found that daily news predicts stock returns one to two days ahead. Positive news increased stock returns quickly, whereas negative news spurred a delayed reaction. García (2013) analyzed two columns in the New York Times (NYT) published over a century (1905-2005), using the frequencies of both positive and negative words in the columns in the text analysis, and found that the language tone in the columns was associated with future stock returns, especially during recessions.

³ Dictionaries that are used in research include Diction (<https://www.dictionsoftware.com>), the Harvard General Inquirer (<http://www.wjh.harvard.edu/~inquirer>), Henry (2008), and Loughran and McDonald (2011).

Chen et al. (2014) analyzed 97,070 articles and 459,679 commentaries written in response to these articles published on Seeking Alpha⁴, a social media platform for investors, and found that the language tone in the articles and the commentaries was associated with future stock returns based on the frequency of negative words in the text analysis. Finally, Huang et al. (2014a) examined 363,952 analyst reports and found that investors reacted more strongly to negative than to positive text, where the opinion in the reports was measured as the difference between the frequencies of positive and negative words.

The cited research forms the inspiration for our own research because it offers applications of useful methods for examining the language tone in articles in financial news media.⁵ However, the aim of the present paper is not to provide the research community with yet another study on news and the predictability of stock returns per se. Instead, we ask two questions in the paper: (i) is a trading strategy that longs stocks with the most negative language tone in news articles in the Financial Times (FT) and shorts stocks with the least negative language tone in news articles in the same publication profitable?; and (ii) is a negative language tone in news articles in the FT—that is, negative market sentiment—a priced risk factor in the cross-section of stock returns?

Fang and Peress (2009) were, to the best of our knowledge, the first to study the relationship between media coverage (the NYT, USA Today, the WSJ, and the Washington Post) and the cross-section of stock returns using a factor model. After controlling for market, size, value, and momentum factors, they found that stocks with no media coverage earned higher returns than stocks with high media coverage. Specifically, zero-investment portfolios sorted by media coverage (no, low, and high media

⁴ See <https://seekingalpha.com>.

⁵ Other examples of research that use bag-of-words methods include Ahern and Sosyura (2014), Davis et al. (2015), Davis et al. (2012), Davis and Tama-Sweet (2012), Doran et al. (2012), Feldman et al. (2010), Ferris et al. (2013), Gurun and Butler (2012), Hanley and Hoberg (2010), Huang et al. (2014b), Kothari et al. (2009), Li (2010b), Liu and McConnell (2013), Loughran and McDonald (2013, 2015), Mayew and Venkatachalam (2012), McKay Price et al. (2012), Rogers et al. (2011), Solomon (2012), Solomon et al. (2014), Tetlock et al. (2008), and Twedt and Rees (2012).

coverage) that longs stocks with no media coverage and shorts stocks with high media coverage were formed, where their results were driven by the long legs in the portfolios.

Should Fang and Peress (2009) have expected a media premium in the cross-section of stock returns? There are at least two reasons—no market frictions and well-informed investors—why the answer is negative. First, a media premium might reflect a mispricing of stocks due to market frictions that prevent arbitrageurs from exploiting the mispricing, which is the impediments-to-trade hypothesis by Fang and Peress (2009). Second, a media premium might reflect compensation for imperfect diversification because investors are not well informed about all companies, which is the investor-recognition hypothesis by Merton (1987). Hence, Fang’s and Peress’s (2009) finding suggests that there are either stock market frictions or investors who are not well informed or both.

In this paper, the sentiment factor is not about stocks being covered or not covered by media. Instead, we take the analysis in Fang and Peress (2009) one step further by concentrating the analysis on only stocks that have been covered by media. Specifically, when constructing the sentiment factor, we form zero-investment portfolios that long stocks with the most negative news and short stocks with the least negative news. We focus on the negativism in the language tone when constructing the sentiment factor because earlier research has shown that a negative language tone matters more for stock returns than, for example, a positive language tone (see, e.g., Huang et al., 2014a).

We adopt the two-stage approach in Fama and French (1993) to estimate three well-known factor models, with and without the sentiment factor, to answer the question of whether a negative market sentiment is a priced risk factor in the cross-section of stock returns. We use 58,256 articles published in the FT during a 15-year period that cover companies in the DJIA to construct the sentiment factor. Adding this factor to the Fama-French (2015) five-factor model results in the following six-factor model:

$$(1) \quad R_{i,t} - R_{F,t} = a_i + b_i(R_{M,t} - R_{F,t}) + n_i NMP_t + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + e_{i,t}$$

where $R_{i,t}$ is the return on stock i , $R_{F,t}$ is the risk-free return, $R_{M,t}$ is the return on the market portfolio, NMP_t is the return on the sentiment factor, SMB_t is the return on the size factor, HML_t is the return on

the value factor, RMW_t is the return on the profitability factor, CMA_t is the return on the investment factor, $e_{i,t}$ is the error term, where the subscript t denotes time, a_i is Jensen's alpha, and n_i, s_i, h_i, r_i and c_i are factor loadings.

SMB_t equals the difference between the returns on portfolios of stocks of firms with small and large market capitalization ("small minus big"), HML_t equals the difference between the returns on portfolios of stocks of firms with high and low book-to-market ratio ("high minus low"), RMW_t equals the difference between the returns on portfolios of stocks of firms with robust and weak profitability ("robust minus weak"), and CMA_t equals the difference between the returns on portfolios of stocks of low and high investment firms, respectively referred to as conservative and aggressive firms ("conservative minus aggressive").

The new factor in the six-factor model in (1) is the sentiment factor, NMP_t , which equals the difference between the returns on portfolios of stocks with negative and positive market sentiment ("negative minus positive"). In this paper, we analyze the negativism in the language tone in news articles in the FT, and the sentiment factor equals the difference between the returns on portfolios of stocks of firms receiving the most negative news and those with the least negative news.

Because we are interested in learning whether investors are compensated for the risk they undertake in investing in stocks with negative market sentiment, the factor loadings from the time-series regressions in (1), with one time-series regression for each stock in the sample, are used as explanatory variables for the stocks' mean excess returns in a single cross-sectional regression (Fama and French, 1993):

$$(2) \quad \bar{R}_i - \bar{R}_F = const. + \lambda_a a_i + \lambda_b b_i + \lambda_n n_i + \lambda_s s_i + \lambda_h h_i + \lambda_r r_i + \lambda_c c_i + e_i$$

where the bar symbol denotes the variable's (arithmetic) mean (over time). The mean return is a proxy for the stock's expected return. If there exists a risk premium for investing in stocks with negative market sentiment, then $\lambda_n > 0$.

As a complement to the two-stage approach in Fama and French (1993), where the time-series regression in (1) is the first stage and the cross-sectional regression in (2) is the second stage, we also run the following regression:

$$(3) \quad NMP_t = a + b(R_{M,t} - R_{F,t}) + s \cdot SMB_t + h \cdot HML_t + r \cdot RMW_t + c \cdot CMA_t + e_t$$

If a trading strategy that longs stocks subject to the most negative language tone in news articles and shorts stocks receiving the least negative language tone is profitable, then $a > 0$.

To summarize our main results, we find that a trading strategy that longs stocks with the most-negative news articles in the FT and shorts stocks with the least-negative news articles in the same publication is not profitable. Consistent with this result, we also find that the sentiment factor derived from the negativism in the language tone in news articles in the FT is not a priced risk factor in the cross-section of stock returns. Nevertheless, the sentiment factor is significant for two-thirds of the stocks when added to the market model, the Fama-French (1992) three-factor model, and the Fama-French (2015) five-factor model. In fact, the sentiment factor is significant for as many stocks as the size, value, profitability, and investment factors in the factor models, and only the market factor is significant for more.

The rest of the paper is organized as follows: The data set is presented in Section 2, and the empirical analyses are found in Section 3. Section 4 concludes the paper with a discussion.

2. Data set

We use the FT as our source of news coverage and use articles that were published during the period 2004-18 covering companies included in the DJIA at the end of 2018. See Table 1 for companies included in the sample and their ticker symbols.

[Table 1 about here.]

Our choice of time period means that the Great Recession, which started in the U.S. in 2007 and thereafter spread with devastating effects to the rest of the industrialized world, is covered in the analysis. For this reason, we not only estimate asset-pricing models using the full sample but also estimate

the models for a subsample that includes the Great Recession and another subsample that excludes this period of economic downturn. See Table 2 for time periods, the number of articles and the number of trading days in the data set, including the initiation sample for the construction of the sentiment factor.

[Table 2 about here.]

The number of articles per company in each year varies greatly. For example, as tabulated in Table 3, there are more than 1,000 articles about Apple in 2011-13 and 2016 and Intel in 2017. This is in stark contrast with other companies that receive no coverage in some years. Due to a lack of data, DowDuPont is excluded from the empirical analyses.⁶ Hence, the sample consists of 29 companies.

[Table 3 about here.]

The daily stock price and index data, the latter being the S&P 500, have been downloaded from Yahoo Finance⁷, and the daily data on the factors in the Fama-French (2015) five-factor model have been downloaded from Ken French's Data Library⁸. We adjust stock price and index data for both dividends and splits.

3. Empirical analyses

The construction of the sentiment factor is explained in Section 3.1. In Section 3.2, we examine whether the negativism in the language tone in financial news media, represented by the FT, is a priced risk factor, and in Section 3.3, we investigate whether a trading strategy that longs stocks with the most-negative news and shorts stocks with the least-negative news is profitable.

3.1. Sentiment factor

The return on the sentiment factor equals the difference between the returns on stocks of firms receiving the most negative and the least negative news, where the stocks included in the long and short legs of

⁶ The company DowDuPont did not exist prior to 2015.

⁷ See <https://finance.yahoo.com>.

⁸ See http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

the sentiment portfolio—or sentiment factor—are updated on a yearly basis on the first trading day in July. Hence, the sentiment factor is updated with the same frequency and on the same date as the other factors in the factor models.

An article in the FT is attributed to a company included in the sample, say, American Express (including versions of the company name; e.g., Amex), if (i) the company is mentioned at least twice in the article and (ii) no other company is mentioned more often in the article. If two or more companies are mentioned an equal number of times in the article and more often than other companies, the article is attributed to those companies. After having attributed all articles in the data set to companies included in the sample, the fractions of negative words in the articles are determined using the Loughran-McDonald Sentiment Word List.⁹

For each year starting on the first trading day in July and ending on the last trading day in June the following year, we calculate the average fraction of negative words in the articles for each company in the sample. Thereafter, we sort the companies on the average fractions of negative words during the year and construct a 30%-40%-30% zero-investment portfolio. The long leg in the portfolio contains the stocks of the top 30% of companies with the most-negative news, and the short leg contains the stocks of the top 30% of companies with the least-negative news. The return on the portfolio is calculated on a daily basis as the difference between the returns on the equally weighted long and short legs.

Stock prices and index data for the period July 1, 2004, through June 30, 2005, are used to initiate the sentiment factor. To ensure that news about stocks reaches the market before trading has ended for the day, stocks traded at date D are associated with news articles in the FT at date $D - 1$. Thus, news articles that were published during the period June 30, 2004, through June 29, 2005, are used to initiate the sentiment factor. See Table 2 for information about the initiation sample.

⁹ See <https://sraf.nd.edu/textual-analysis/resources/#LM%20Sentiment%20Word%20Lists>. The dictionary is described in Loughran and McDonald (2011).

The correlation matrixes for the factors in the models are found in Tables 4a-c. For the full sample, the sentiment factor has the strongest correlation with the value factor and the weakest with the investment factor (Table 4a). For the first subsample, the strongest correlation is with the value factor, and the weakest is with the size factor (Table 4b). For the second subsample, the strongest correlation is with the profitability factor, and the weakest is with the size factor (Table 4c).

[Tables 4a-c about here.]

3.2. Is the sentiment factor a priced risk factor?

We adopt the two-stage approach in Fama and French (1993) to examine whether the sentiment factor is a priced risk factor in the cross-section of stock returns.

In the first stage (Section 3.2.1), a time-series regression is run separately for each stock in the sample. The parameter estimates, or factor loadings, from these regressions are then used in the second stage (Section 3.2.2) as explanatory variables for the stocks' mean returns in a single cross-sectional regression. The parameter estimates in the latter regression are interpreted as risk premia for the factors, and we are interested in learning whether there exists a risk premium for the sentiment factor.

3.2.1. First-stage regressions

In addition to estimating the six-factor model in (1) for each stock using daily data, we also estimate the two-factor model with the market ($R_{M,t} - R_{F,t}$) and sentiment factors,

$$(4) \quad R_{i,t} - R_{F,t} = a_i + b_i(R_{M,t} - R_{F,t}) + n_i NMP_t + e_{i,t}$$

and the four-factor model with the market, sentiment, size, and value factors,

$$(5) \quad R_{i,t} - R_{F,t} = a_i + b_i(R_{M,t} - R_{F,t}) + n_i NMP_t + s_i SMB_t + h_i HML_t + e_{i,t}$$

for the same stocks using daily data. For comparison, we also estimate the factor models in (1) and (4)-(5) without the sentiment factor to better understand how the inclusion of this factor affects the estimation results. The estimation results from the time-series regressions using the full sample and the two subsamples are found in the Appendix.¹⁰

Two general results apply for all factor models. First, the market factor is significant at the 0.001 level for all stocks in the full sample and the subsamples. Second, Jensen's alpha is rarely a significant intercept in the regressions. Indeed, Jensen's alpha is not significant at the 0.01 level for any stock in any sample for any factor model. Focusing on the factor models with the sentiment factor, Jensen's alpha is significant in the full sample at the 0.05 level for two (two-factor model), two (four-factor model) and two stocks (six-factor model). In the first subsample, covering the Great Recession, the corresponding figures are, respectively, one, one and one stock, and in the second subsample, they are five, four and two stocks. Since Jensen's alpha should be indistinguishable from zero in a well-specified asset-pricing model, these findings are encouraging.

Market model The market model is

$$(6) \quad R_{i,t} - R_{F,t} = a_i + b_i(R_{M,t} - R_{F,t}) + e_{i,t}$$

Two-factor model Adding the sentiment factor to the market model in (6) results in the model in (4). The sentiment factor is significant at the 0.001 level for 21 stocks, significant at the 0.01 level for 22 stocks, and significant at the 0.05 level for 23 stocks in the full sample. Hence, it is significant for more than two-thirds of the stocks. The sentiment factor is significant in fewer cases in the subsamples compared with in the full sample (e.g., significant at the 0.001 level for 17 and 12 stocks, respectively).

Three-factor model In the Fama-French (1992) three-factor model,

$$(7) \quad R_{i,t} - R_{F,t} = a_i + b_i(R_{M,t} - R_{F,t}) + s_iSMB_t + h_iHML_t + e_{i,t}$$

¹⁰ See Table A.1 for the market model, Table A.2 for the two-factor model, Table A.3 for the three-factor model, Table A.4 for the four-factor model, Table A.5 for the five-factor model, and Table A.6 for the six-factor model.

There is strong support for the size and value factors in the regressions. Both factors are significant at the 0.001 level for approximately two-thirds of the stocks in the full sample, where the support is somewhat stronger for the size factor than for the value factor. There is also strong support for the size and value factors in the subsamples, especially for the size factor in the period after the Great Recession.

Four-factor model Adding the sentiment factor to the Fama-French (1992) three-factor model in (7) results in the model in (5). The sentiment factor is significant at the 0.001 level for 18 stocks, significant at the 0.01 level for 21 stocks, and significant at the 0.05 level for 22 stocks in the full sample. Thus, the sentiment factor is significant for almost as many stocks in the four-factor model as it is in the two-factor model in (4). The sentiment factor is again significant in fewer cases in the subsamples compared with the full sample (e.g., significant at the 0.001 level for 14 and 10 stocks, respectively).

There is strong support for the size and value factors in these regressions. Both factors are significant at the different significance levels for approximately the same stocks as in the Fama-French (1992) three-factor model in (7). There is also strong support for the size and value factors in the subsamples, especially for the size factor in the period after the Great Recession.

Five-factor model In the Fama-French (2015) five-factor model,

$$(8) \quad R_{i,t} - R_{F,t} = a_i + b_i(R_{M,t} - R_{F,t}) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + e_{i,t}$$

the support for the size, value, profitability, and investment factors in the regressions are rather strong. In the full sample, the factors are significant at the 0.001 level for 21, 16, 15 and 22 stocks, respectively. The corresponding figures for the subsamples are, respectively, 15, 14, 7 and 19 stocks, and 19, 18, 16 and 19 stocks. Hence, the size and investment factors are significant at the most conservative level for circa two-thirds of the stocks in each of the samples.

Six-factor model Finally, adding the sentiment factor to the Fama-French (2015) five-factor model in (8) results in the model in (1). In the full sample, the sentiment factor is significant at the 0.001 level for 17 stocks, significant at the 0.01 level for 20 stocks, and significant at the 0.05 level for 21 stocks. Thus, the sentiment factor is again significant for almost as many stocks in the six-factor model as it is in the other two factor models with the sentiment factor. This factor is again significant in fewer cases in the

subsamples compared with the full sample (e.g., significant at the 0.001 level for 14 and 10 stocks, respectively).

The support for the size, value, profitability, and investment factors in the regressions is again rather strong. In the full sample, the factors are significant at the 0.001 level for 21, 15, 15 and 21 stocks, respectively. The corresponding figures for the subsamples are, respectively, 15, 16, 7 and 19 stocks, and 19, 16, 18 and 18 stocks. These figures are more or less the same as those for the Fama-French (2015) five-factor model in (8). Hence, the size and investment factors are significant at the most conservative level for approximately two-thirds of the stocks in each of the samples.

Last, it is worth noting that the loading for the size factor in the models is, in most cases, negative. This is not surprising given that the DJIA only includes companies with large market capitalizations. Moreover, the loading for the value factor is more often negative than positive in the models, which means that growth stocks are in the majority in the sample. There is also overweighting with firms with robust profitability and/or a conservative investment style. That is, the loadings for the profitability and investment factors are more often positive than negative in the models.

3.2.2. Second-stage regressions

The factor loadings from the time-series regressions are next used in cross-sectional regressions, where the dependent variable in the cross-sectional regressions is the mean excess returns for the stocks. Specifically, for each factor model, there is a corresponding cross-sectional regression model. For example, the cross-sectional regression model in (2) corresponds to the six-factor model in (1).

In addition to estimating the model in (2), we also run the following regressions:

$$(9) \quad \bar{R}_i - \bar{R}_F = \text{const.} + \lambda_a a_i + \lambda_b b_i + \lambda_n n_i + e_i$$

$$(10) \quad \bar{R}_i - \bar{R}_F = \text{const.} + \lambda_a a_i + \lambda_b b_i + \lambda_n n_i + \lambda_s s_i + \lambda_h h_i + e_i$$

where $\lambda_n > 0$ if there exists a risk premium for investing in stocks with negative market sentiment. For the sake of completeness, we also run the following regressions in which the loading for the sentiment factor, n_i , has been excluded from the models in (2) and (9)-(10):

$$(11) \quad \bar{R}_i - \bar{R}_F = \text{const.} + \lambda_a a_i + \lambda_b b_i + e_i$$

$$(12) \quad \bar{R}_i - \bar{R}_F = \text{const.} + \lambda_a a_i + \lambda_b b_i + \lambda_s s_i + \lambda_h h_i + e_i$$

$$(13) \quad \bar{R}_i - \bar{R}_F = \text{const.} + \lambda_a a_i + \lambda_b b_i + \lambda_s s_i + \lambda_h h_i + \lambda_r r_i + \lambda_c c_i + e_i$$

Estimation results from the cross-sectional regressions using the full sample and the two subsamples are found in Tables 5-10.

[Tables 5-10 about here.]

Market model The regression model in (11) corresponds to the market model in (6). In the full sample, Jensen's alpha and the loading for the market factor are significant at the 0.001 level, whereas only the loading for the market factor in the second subsample, covering the period after the Great Recession, is significant at the same level (Table 5). Jensen's alpha is significant at the 0.05 level in both subsamples.

Two-factor model The regression model in (9) corresponds to the market model augmented with the sentiment factor in (4). In the full sample, Jensen's alpha and the loading for the market factor are again significant at the 0.001 level (Table 6). The loading for the market factor is significant at the same level in the second subsample, and Jensen's alpha is significant at the 0.05 level in the same subsample.

Notably, because the loading for the sentiment factor is not significant in the full sample or in the subsamples, there is no risk premium for investing in stocks with negative market sentiment.

Three-factor model The regression model in (12) corresponds to the Fama-French (1992) three-factor model in (7). In the full sample, only Jensen's alpha and the loading for the market factor are significant at the 0.001 level, whereas the loadings for the size and value factors are not significant (Table 7). The loading for the market factor is significant at the 0.05 level in the second subsample, and Jensen's alpha is significant at the same level in the first subsample, covering the Great Recession.

Four-factor model The regression model in (10) corresponds to the Fama-French (1992) three-factor model augmented with the sentiment factor in (5). Again, only Jensen's alpha and the loading for the market factor are significant at the 0.001 level in the full sample, whereas the loadings for the size and

value factors are not significant (Table 8). The loading for the market factor is significant at the 0.05 level in the second subsample, and Jensen's alpha is significant at the same level in the first subsample.

In particular, there is no risk premium for investing in stocks with negative market sentiment, since the loading for the sentiment factor is not significant in the full sample or in the subsamples.

Five-factor model The regression model in (13) corresponds to the Fama-French (2015) five-factor model in (8). In the full sample, only Jensen's alpha and the loading for the market factor are significant at the 0.001 level, whereas the loadings for the size, profitability, and investment factors are not significant (Table 9). The loading for the value factor is significant at the 0.05 level. Moreover, the factor loadings are not significant in the subsamples, but Jensen's alpha is significant at the 0.01 level in the second subsample.

Six-factor model The regression model in (1) corresponds to the Fama-French (2015) five-factor model augmented with the sentiment factor in (2). In the full sample, only Jensen's alpha and the loading for the market factor are significant at the 0.001 level (Table 10). The loadings for the size, profitability, and investment factors are not significant, and the loading for the value factor is significant at the 0.05 level. In addition, the factor loadings are not significant in the subsamples, but Jensen's alpha is significant at the 0.01 level in the second subsample.

Finally, because the loading for the sentiment factor is not significant in the full sample or in the subsamples, there is no risk premium for investing in stocks with negative market sentiment.

Summary The main result of the regressions is that there is no risk premium for investing in stocks with negative market sentiment. This result should be contrasted with the findings in the time-series regressions, where the sentiment factor was significant at the 0.001 level for two-thirds of the stocks. How can we reconcile these two findings?

First, an inspection of the findings from the first-stage regressions reveals that the loading for the sentiment factor shifts in sign in a seemingly unsystematic way across companies in the models.¹¹ Thus,

¹¹ See the Appendix.

averaging over firms, the factor loading might be close to zero and the sentiment factor has, therefore, no impact on stock returns and is not a priced risk factor in the cross-section of stock returns. Second, we only have 29 observations in the second-stage regressions because there are only 29 companies in the sample. This might explain why there are so few significant results across the models, except for Jensen's alpha and the loading for the market factor.

That we have so few observations in the second-stage regressions motivates our investigation of a closely related question using thousands of observations: is a trading strategy that longs stocks with the most negative news and shorts stocks with the least negative news profitable?

3.3. Is identifying negative market sentiment useful from an investor perspective?

The idea behind the regression model in (3) is that one cannot make systematic profits from buying the sentiment portfolio, NMP_t , if Jensen's alpha is equal to zero, $a = 0$, under the assumption that the Fama-French (2015) five-factor model, on average, correctly describes stock returns. Hence, if Jensen's alpha is positive, $a > 0$, one is able to make systematic profits by buying the costless sentiment portfolio. That is, by shorting stocks with the least negative news and going long in stocks with the most negative news.

The corresponding regression models if stock returns are instead described by the market model or the Fama-French (1992) three-factor model are, respectively,

$$(14) \quad NMP_t = a + b(R_{M,t} - R_{F,t}) + e_t$$

and

$$(15) \quad NMP_t = a + b(R_{M,t} - R_{F,t}) + s \cdot SMB_t + h \cdot HML_t + e_t$$

Estimation results using the full sample and the two subsamples are found in Table 11.

[Table 11 about here.]

There is strong evidence against the existence of a profitable trading strategy because Jensen's alpha is not significant in any of the regression models in any of the samples. Nevertheless, most factors in the factor models on the right-hand side of the regressions in (3) and (14)-(15) are significant at the

0.001 level. For example, all factors described by the Fama-French (2015) five-factor model are significant at the most conservative level in the full sample. Thus, one cannot make systematic profits by buying the costless sentiment portfolio under the assumption that stock returns are described by the five-factor model.

4. Discussion

We know from earlier research that the language tone in articles, commentaries on articles, columns in newspapers, etc., predicts short-term stock returns (see the introduction for examples of this research). In particular, a negative language tone in news matters for future stock returns. This is also the reason we studied the effects on stock returns of a negative, and not a positive, language tone in news articles in the FT in our research.

At the same time, the ambition of our research has not been to provide the research community with yet another study on predictability of stock returns based on news. Instead, our interest has been to extend the analysis in Fang and Peress (2009). They studied media coverage of firms listed on the NYSE and NASDAQ and found that stocks with no media coverage earned higher returns than stocks with high media coverage. In fact, they found that the newspaper coverage of firms is surprisingly low. For example, more than 25% of NYSE stocks and more than 50% of NASDAQ stocks were not featured in the examined newspapers in a typical year. We noted a similar pattern in our data set; a small number of firms received high coverage in the FT, whereas other firms are not mentioned at all in some years.

In this paper, we studied stocks that actually have received media coverage, and we asked ourselves if it is profitable to adopt a trading strategy that longs stocks with the most negative news and shorts stocks with the least negative news. We studied more than 58,000 news articles published in the FT during 2004-18 and found that such a trading strategy was not profitable. For example, all factors included in the Fama-French (2015) five-factor model were significant at the 0.001 level in the full sample while Jensen's alpha was not significant.

A closely related question to the previous one is whether a negative language tone in news articles in the FT is a priced risk factor in the cross-section of stock returns. If trading the sentiment portfolio is

not a profitable strategy, one should not expect higher returns on stocks with negative market sentiment. Indeed, this is what we found in our research. However, a caveat is in order. Since our sample of firms consisted of those included in the DJIA, we had a limited number of observations at our disposal. Of course, we could have included more firms in the sample, but because of the finding that trading the sentiment portfolio was not profitable, a qualified guess is that adding more firms will not change this finding.

Are our findings surprising? Without prior knowledge of the findings in Fang and Peress (2009), one would expect that markets function well enough and investors are informed enough that there is no premium for investing in stocks with no media coverage, let alone investing in stocks associated with negative news instead of stocks associated with not-so-negative news. However, because Fang and Peress (2009) showed that there actually is a premium for investing in stocks with no media coverage, it became interesting to ask whether the same holds for stocks with negative market sentiment. We asked this question in the present paper and found that it is not the case.

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Tables

Company	Ticker symbol
3M	MMM
American Express	AXP
Apple Inc.	AAPL
Boeing	BA
Caterpillar Inc.	CAT
Chevron Corporation	CVX
Cisco Systems	CSCO
The Coca-Cola Company	KO
DowDuPont	DWDP
ExxonMobil	XOM
Goldman Sachs	GS
The Home Depot	HD
IBM	IBM
Intel	INTC
Johnson & Johnson	JNJ
JPMorgan Chase	JPM
McDonald's	MCD
Merck & Co.	MRK
Microsoft	MSFT
Nike	NKE
Pfizer	PFE
Procter & Gamble	PG
The Travelers Companies	TRV
UnitedHealth Group	UNH
United Technologies	UTX
Verizon	VZ
Visa Inc.	V
Walgreens Boots Alliance	WBA
Walmart	WMT
The Walt Disney Company	DIS

Table 1: Companies and their ticker symbols.

Time period	Dates	Number of articles	Number of trading days
Initiation sample	July 1, 2004 – June 30, 2005	2,196	253
Full sample	July 1, 2005 – December 31, 2018	56,060	3,359
First subsample	July 1, 2005 – December 31, 2009	15,037	1,134
Second subsample	January 1, 2010 – December 31, 2018	41,023	2,225

Table 2: Dates for time periods, number of articles and number of trading days.

Note: The number of articles for the full sample equals the number of articles for the two subsamples, not including the initiation sample, and the number of trading days for the full sample equals the number of trading days for the two subsamples, not including the initiation sample.

Ticker	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AAPL	42	191	253	395	293	470	781	1,073	1,189	1,186	975	998	1,009	896	834
AXP	2	21	27	20	40	50	23	20	19	21	37	27	12	26	22
BA	37	121	128	138	174	127	184	157	149	262	212	146	158	185	145
CAT	6	7	26	16	16	30	46	39	43	55	30	35	31	22	29
CSCO	32	66	105	153	135	160	170	144	158	203	218	195	192	198	176
CVX	1	48	30	29	45	49	73	74	137	115	60	47	55	52	33
DIS	65	101	92	68	70	81	90	87	91	76	80	103	107	159	238
DWDP	-	-	-	-	-	-	-	-	-	-	-	5	1	6	6
GS	41	185	252	333	361	388	499	319	320	279	285	252	306	267	322
HD	3	16	35	71	14	17	10	15	15	22	33	13	10	19	14
IBM	66	185	127	105	108	186	115	114	83	115	135	81	83	71	73
INTC	208	649	634	635	678	779	824	822	730	959	880	832	933	1,167	989
JNJ	1	9	12	5	4	12	7	20	13	16	17	13	12	13	10
JPM	28	119	173	289	435	378	420	432	651	721	593	477	437	426	476
KO	24	31	35	38	50	66	70	52	63	85	87	78	59	42	57
MCD	20	65	77	77	108	93	130	129	181	163	209	259	191	186	188
MMM	104	260	263	504	403	511	579	494	528	468	505	521	410	475	413
MRK	29	78	87	62	27	74	48	40	26	35	58	57	30	47	36
MSFT	124	380	462	365	545	468	362	392	335	449	337	228	244	212	169
NKE	6	25	40	59	32	23	43	37	50	64	77	79	71	64	59
PFE	20	56	71	44	27	73	59	68	59	48	348	152	111	65	76
PG	5	9	11	8	6	8	9	22	21	9	11	8	4	11	9
TRV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNH	0	2	8	7	5	1	1	1	9	6	4	12	6	7	9
UTX	1	0	2	0	1	1	4	8	4	5	3	17	18	12	7
V	31	87	124	113	144	149	184	215	242	282	254	230	289	257	237
VZ	20	129	93	109	75	76	111	115	82	238	106	66	87	96	40
WBA	0	0	2	0	3	1	8	2	16	10	33	19	25	27	31
WMT	44	135	204	149	166	101	150	162	176	159	119	122	71	112	130
XOM	4	19	37	36	41	39	43	46	52	40	39	23	33	45	26

Table 3: Number of articles per company in each year.

Note: The company DowDuPont did not exist prior to 2015.

	$R_M - R_F$	<i>NMP</i>	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
$R_M - R_F$	1.000	0.340	0.262	0.353	-0.378	-0.162
<i>NMP</i>	0.340	1.000	0.057	0.390	-0.299	-0.052
<i>SMB</i>	0.262	0.057	1.000	0.095	-0.289	-0.005
<i>HML</i>	0.353	0.390	0.095	1.000	-0.407	0.269
<i>RMW</i>	-0.378	-0.299	-0.289	-0.407	1.000	0.005
<i>CMA</i>	-0.162	-0.052	-0.005	0.269	0.005	1.000

Table 4a: Correlation matrix for the factors in the factor models for the full sample.

	$R_M - R_F$	<i>NMP</i>	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
$R_M - R_F$	1.000	0.461	0.178	0.478	-0.294	-0.277
<i>NMP</i>	0.461	1.000	0.006	0.522	-0.355	-0.285
<i>SMB</i>	0.178	0.006	1.000	0.152	-0.177	-0.021
<i>HML</i>	0.478	0.522	0.152	1.000	-0.581	-0.038
<i>RMW</i>	-0.294	-0.355	-0.177	-0.581	1.000	0.075
<i>CMA</i>	-0.277	-0.285	-0.021	-0.038	0.075	1.000

Table 4b: Correlation matrix for the factors in the factor models for the first subsample.

	$R_M - R_F$	<i>NMP</i>	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
$R_M - R_F$	1.000	0.226	0.355	0.165	-0.470	-0.069
<i>NMP</i>	0.226	1.000	0.098	0.256	-0.259	0.100
<i>SMB</i>	0.355	0.098	1.000	0.033	-0.373	0.007
<i>HML</i>	0.165	0.256	0.033	1.000	-0.242	0.591
<i>RMW</i>	-0.470	-0.259	-0.373	-0.242	1.000	-0.038
<i>CMA</i>	-0.069	0.100	0.007	0.591	-0.038	1.000

Table 4c: Correlation matrix for the factors in the factor models for the second subsample.

<i>const.</i>	<i>a</i>	<i>b</i>
<i>Full sample</i>		
-0.0023	0.9611	0.0516
(0.838)	(<0.001)***	(<0.001)***
<i>First subsample</i>		
0.0321	0.2871	0.0154
(0.002)**	(0.034)*	(0.110)
<i>Second subsample</i>		
0.0101	0.4376	0.0480
(0.371)	(0.018)*	(<0.001)***

Table 5: Cross-sectional regression in (11), where Jensen's alpha and the factor loading from the market model are the explanatory variables for the stocks' mean excess returns.

Note: *p*-values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

<i>const.</i>	<i>a</i>	<i>b</i>	<i>n</i>
<i>Full sample</i>			
-0.0195	0.9549	0.0701	-0.0266
(0.128)	(<0.001)***	(<0.001)***	(0.224)
<i>First subsample</i>			
0.0342	0.2975	0.0132	0.0096
(0.079)	(0.054)	(0.446)	(0.693)
<i>Second subsample</i>			
-0.0066	0.4014	0.0662	-0.0525
(0.546)	(0.040)*	(<0.001)***	(0.137)

Table 6: Cross-sectional regression in (9), where Jensen's alpha and the factor loadings from the market model augmented with the sentiment factor are the explanatory variables for the stocks' mean excess returns.

Note: *p*-values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

<i>const.</i>	<i>a</i>	<i>b</i>	<i>s</i>	<i>h</i>
<i>Full sample</i>				
-0.0214	1.0047	0.0728	0.0106	-0.0087
(0.085)	(<0.001)***	(<0.001)***	(0.321)	(0.089)
<i>First subsample</i>				
0.0268	0.2953	0.0251	0.0285	0.0013
(0.062)	(0.030)*	(0.087)	(0.083)	(0.786)
<i>Second subsample</i>				
-0.0052	0.3644	0.0643	0.0005	-0.0184
(0.868)	(0.122)	(0.030)*	(0.990)	(0.362)

Table 7: Cross-sectional regression in (12), where Jensen's alpha and the factor loadings from the Fama-French (1992) three-factor model are the explanatory variables for the stocks' mean excess returns.

Note: *p*-values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

<i>const.</i>	<i>a</i>	<i>b</i>	<i>n</i>	<i>s</i>	<i>h</i>
<i>Full sample</i>					
-0.0284	1.0075	0.0789	-0.0077	0.0061	-0.0074
(0.093)	(<0.001)***	(<0.001)***	(0.684)	(0.598)	(0.097)
<i>First subsample</i>					
0.0415	0.3093	0.0115	0.0274	0.0395	0.0009
(0.035)*	(0.028)*	(0.519)	(0.314)	(0.089)	(0.883)
<i>Second subsample</i>					
-0.0153	0.3786	0.0729	-0.0322	-0.0052	-0.0131
(0.634)	(0.133)	(0.018)*	(0.504)	(0.886)	(0.573)

Table 8: Cross-sectional regression in (10), where Jensen's alpha and the factor loadings from the Fama-French (1992) three-factor model augmented with the sentiment factor are the explanatory variables for the stocks' mean excess returns.

Note: *p*-values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

<i>const.</i>	<i>a</i>	<i>b</i>	<i>s</i>	<i>h</i>	<i>r</i>	<i>c</i>
<i>Full sample</i>						
0.0069	0.8536	0.0477	0.0129	-0.0119	0.0048	-0.0159
(0.464)	(<0.001)***	(<0.001)***	(0.052)	(0.023)*	(0.392)	(0.070)
<i>First subsample</i>						
0.0428	0.2171	0.0125	0.0264	-0.0026	-0.0063	-0.0084
(0.077)	(0.234)	(0.513)	(0.154)	(0.703)	(0.524)	(0.356)
<i>Second subsample</i>						
0.0819	0.5213	-0.0093	0.0605	-0.0200	-0.0107	-0.0298
(0.112)	(0.002)**	(0.811)	(0.196)	(0.263)	(0.580)	(0.111)

Table 9: Cross-sectional regression in (13), where Jensen's alpha and the factor loadings from the Fama-French (2015) five-factor model are the explanatory variables for the stocks' mean excess returns.

Note: *p*-values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

<i>const.</i>	<i>a</i>	<i>b</i>	<i>n</i>	<i>s</i>	<i>h</i>	<i>r</i>	<i>c</i>
<i>Full sample</i>							
0.0018	0.8592	0.0525	-0.0049	0.0103	-0.0114	0.0027	-0.0147
(0.865)	(<0.001)***	(<0.001)***	(0.549)	(0.125)	(0.032)*	(0.638)	(0.087)
<i>First subsample</i>							
0.0459	0.2856	0.0082	0.0269	0.0361	-0.0007	-0.0060	-0.0047
(0.037)*	(0.051)	(0.656)	(0.406)	(0.140)	(0.939)	(0.551)	(0.598)
<i>Second subsample</i>							
0.0729	0.5344	-0.0013	-0.0446	0.0566	-0.0150	-0.0116	-0.0282
(0.156)	(0.002)**	(0.974)	(0.072)	(0.204)	(0.429)	(0.532)	(0.162)

Table 10: Cross-sectional regression in (2), where Jensen's alpha and the factor loadings from the Fama-French (2015) five-factor model augmented with the sentiment factor are the explanatory variables for the stocks' mean excess returns.

Note: *p*-values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
<i>Full sample</i>					
-0.0100	0.2969				
(0.557)	(<0.001)***				
-0.0048	0.2103	-0.0648	0.4949		
(0.766)	(<0.001)***	(0.028)*	(<0.001)***		
0.0012	0.1600	-0.1014	0.4988	-0.3435	-0.3648
(0.941)	(<0.001)***	(<0.001)***	(<0.001)***	(<0.001)***	(<0.001)***
<i>First subsample</i>					
0.0026	0.3478				
(0.932)	(<0.001)***				
0.0031	0.2175	-0.1926	0.5331		
(0.914)	(<0.001)***	(<0.001)***	(<0.001)***		
0.0079	0.1641	-0.1961	0.5139	-0.2081	-0.7808
(0.776)	(<0.001)***	(<0.001)***	(<0.001)***	(0.016)*	(<0.001)***
<i>Second subsample</i>					
-0.0129	0.2284				
(0.519)	(<0.001)***				
-0.0075	0.1813	0.0497	0.4493		
(0.701)	(<0.001)***	(0.216)	(<0.001)***		
-0.0021	0.1207	-0.0183	0.4237	-0.4431	-0.0762
(0.914)	(<0.001)***	(0.659)	(<0.001)***	(<0.001)***	(0.356)

Table 11: Time-series regressions, where Jensen's alpha and the market model in (14), Jensen's alpha and the Fama-French (1992) three-factor model in (15), and Jensen's alpha and the Fama-French (2015) five-factor model in (3) are the explanatory variables for the sentiment factor.

Note: p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively.

Appendix Tables

Ticker	α	$R_M - R_F$
AAPL	0.0301	0.9872
	(0.336)	(<0.001)***
AXP	-0.0231	1.4155
	(0.364)	(<0.001)***
BA	0.0298	0.9965
	(0.185)	(<0.001)***
CAT	-0.0095	1.2440
	(0.682)	(<0.001)***
CSCO	-0.0124	1.0510
	(0.597)	(<0.001)***
CVX	-0.0017	1.0319
	(0.929)	(<0.001)***
DIS	0.0116	1.0315
	(0.529)	(<0.001)***
DWDP	NA	NA
	NA	NA
GS	-0.0232	1.3778
	(0.409)	(<0.001)***
HD	0.0193	0.9506
	(0.324)	(<0.001)***
IBM	-0.0098	0.7605
	(0.575)	(<0.001)***
INTC	-0.0287	1.0802
	(0.262)	(<0.001)***
JNJ	0.0146	0.5458
	(0.268)	(<0.001)***
JPM	0.0139	1.5235
	(0.633)	(<0.001)***
KO	0.0254	0.5488
	(0.097)	(<0.001)***

Table A.1a: The full sample is used in the time-series regressions of the market model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$
MCD	0.0433 (0.015)*	0.5823 (<0.001)***
MMM	0.0049 (0.765)	0.8556 (<0.001)***
MRK	0.0079 (0.722)	0.7637 (<0.001)***
MSFT	0.0094 (0.673)	0.9648 (<0.001)***
NKE	0.0419 (0.069)	0.8931 (<0.001)***
PFE	0.0110 (0.536)	0.7607 (<0.001)***
PG	0.0098 (0.508)	0.5461 (<0.001)***
TRV	0.0071 (0.733)	1.0004 (<0.001)***
UNH	0.0169 (0.553)	0.9307 (<0.001)***
UTX	0.0019 (0.899)	0.9509 (<0.001)***
V	0.0630 (0.032)*	0.9771 (<0.001)***
VZ	0.0170 (0.339)	0.6796 (<0.001)***
WBA	-0.0047 (0.846)	0.7526 (<0.001)***
WMT	0.0142 (0.442)	0.5273 (<0.001)***
XOM	-0.0168 (0.333)	0.9260 (<0.001)***

Table A.1a (continued): The full sample is used in the time-series regressions of the market model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$
AAPL	0.1409 (0.039)*	1.0300 (<0.001)***
AXP	-0.0167 (0.778)	1.6646 (<0.001)***
BA	-0.0084 (0.856)	0.9263 (<0.001)***
CAT	0.0153 (0.756)	1.1930 (<0.001)***
CSCO	0.0176 (0.681)	1.0635 (<0.001)***
CVX	0.0401 (0.310)	1.0635 (<0.001)***
DIS	0.0183 (0.628)	1.0745 (<0.001)***
DWDP	NA NA	NA NA
GS	0.0534 (0.411)	1.4729 (<0.001)***
HD	-0.0242 (0.573)	1.0132 (<0.001)***
IBM	0.0448 (0.168)	0.7391 (<0.001)***
INTC	-0.0528 (0.314)	1.1095 (<0.001)***
JNJ	0.0074 (0.777)	0.5032 (<0.001)***
JPM	0.0691 (0.316)	1.6861 (<0.001)***
KO	0.0483 (0.135)	0.5514 (<0.001)***

Table A.1b: The first subsample is used in the time-series regressions of the market model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$
MCD	0.0679	0.6152
	(0.069)	(<0.001)***
MMM	0.0126	0.7956
	(0.710)	(<0.001)***
MRK	0.0197	0.7878
	(0.703)	(<0.001)***
MSFT	0.0155	0.9408
	(0.743)	(<0.001)***
NKE	0.0678	0.8977
	(0.131)	(<0.001)***
PFE	-0.009	0.7592
	(0.808)	(<0.001)***
PG	0.0213	0.5942
	(0.456)	(<0.001)***
TRV	0.0237	1.1565
	(0.638)	(<0.001)***
UNH	-0.0551	0.9747
	(0.428)	(<0.001)***
UTX	0.0299	0.9320
	(0.334)	(<0.001)***
V	0.1284	0.9405
	(0.277)	(<0.001)***
VZ	0.0237	0.7684
	(0.510)	(<0.001)***
WBA	-0.0199	0.7265
	(0.647)	(<0.001)***
WMT	0.0119	0.5684
	(0.741)	(<0.001)***
XOM	0.0167	0.9726
	(0.666)	(<0.001)***

Table A.1b (continued): The first subsample is used in the time-series regressions of the market model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$
AAPL	-0.0283 (0.354)	0.9329 (<0.001)***
AXP	-0.0103 (0.641)	1.0803 (<0.001)***
BA	0.0448 (0.062)	1.0940 (<0.001)***
CAT	-0.0258 (0.288)	1.3150 (<0.001)***
CSCO	-0.0274 (0.329)	1.0345 (<0.001)***
CVX	-0.0216 (0.287)	0.9898 (<0.001)***
DIS	0.0111 (0.581)	0.9727 (<0.001)***
DWDP	NA NA	NA NA
GS	-0.0594 (0.023)*	1.2601 (<0.001)***
HD	0.0455 (0.021)*	0.8652 (<0.001)***
IBM	-0.0391 (0.059)	0.7907 (<0.001)***
INTC	-0.0148 (0.598)	1.0443 (<0.001)***
JNJ	0.0154 (0.299)	0.6039 (<0.001)***
JPM	-0.0066 (0.780)	1.3126 (<0.001)***
KO	0.0137 (0.397)	0.5459 (<0.001)***

Table A.1c: The second subsample is used in the time-series regressions of the market model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$
MCD	0.0323 (0.082)	0.5395 (<0.001)***
MMM	-0.0030 (0.865)	0.9320 (<0.001)***
MRK	0.0035 (0.868)	0.7315 (<0.001)***
MSFT	0.0051 (0.828)	0.9975 (<0.001)***
NKE	0.0290 (0.270)	0.8876 (<0.001)***
PFE	0.0212 (0.264)	0.7623 (<0.001)***
PG	0.0071 (0.670)	0.4812 (<0.001)***
TRV	0.0094 (0.593)	0.7894 (<0.001)***
UNH	0.0568 (0.020)*	0.8690 (<0.001)***
UTX	-0.0137 (0.409)	0.9774 (<0.001)***
V	0.0478 (0.064)	1.0179 (<0.001)***
VZ	0.0195 (0.316)	0.5571 (<0.001)***
WBA	0.0012 (0.968)	0.7878 (<0.001)***
WMT	0.0177 (0.398)	0.4708 (<0.001)***
XOM	-0.0306 (0.074)	0.8624 (<0.001)***

Table A.1c (continued): The second subsample is used in the time-series regressions of the market model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP
AAPL	0.0297 (0.340)	1.0310 (<0.001)***	-0.1663 (<0.001)***
AXP	-0.0214 (0.393)	1.3454 (<0.001)***	0.2418 (<0.001)***
BA	0.0311 (0.161)	0.9398 (<0.001)***	0.1910 (<0.001)***
CAT	-0.0085 (0.714)	1.2170 (<0.001)***	0.0907 (<0.001)***
CSCO	-0.0137 (0.558)	1.0975 (<0.001)***	-0.1616 (<0.001)***
CVX	-0.0009 (0.962)	1.0053 (<0.001)***	0.0905 (<0.001)***
DIS	0.0109 (0.552)	1.0580 (<0.001)***	-0.0915 (<0.001)***
DWDP	NA NA	NA NA	NA NA
GS	-0.0222 (0.401)	1.2356 (<0.001)***	0.5305 (<0.001)***
HD	0.0186 (0.341)	0.9712 (<0.001)***	-0.0690 (<0.001)***
IBM	-0.0112 (0.513)	0.8237 (<0.001)***	-0.2172 (<0.001)***
INTC	-0.0284 (0.266)	1.1002 (<0.001)***	-0.0798 (0.002)**
JNJ	0.0143 (0.279)	0.5606 (<0.001)***	-0.0495 (<0.001)***
JPM	0.0164 (0.560)	1.4250 (<0.001)***	0.3783 (<0.001)***
KO	0.0243 (0.112)	0.5757 (<0.001)***	-0.0911 (<0.001)***

Table A.2a: The full sample is used in the time-series regressions of the market model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP
MCD	0.0429 (0.015)*	0.6136 (<0.001 ***)	-0.1103 (<0.001 ***)
MMM	0.0049 (0.766)	0.8572 (<0.001 ***)	-0.0059 (0.719)
MRK	0.0077 (0.729)	0.7690 (<0.001 ***)	-0.0185 (0.412)
MSFT	0.0091 (0.682)	0.9918 (<0.001 ***)	-0.0954 (<0.001 ***)
NKE	0.0396 (0.078)	0.9814 (<0.001 ***)	-0.2976 (<0.001 ***)
PFE	0.0108 (0.542)	0.7644 (<0.001 ***)	-0.0124 (0.489)
PG	0.0085 (0.557)	0.5854 (<0.001 ***)	-0.1328 (<0.001 ***)
TRV	0.0076 (0.716)	0.9859 (<0.001 ***)	0.0486 (0.023)*
UNH	0.0183 (0.518)	0.8875 (<0.001 ***)	0.1455 (<0.001 ***)
UTX	0.0021 (0.887)	0.9444 (<0.001 ***)	0.0219 (0.156)
V	0.0632 (0.031)*	0.9606 (<0.001 ***)	0.0503 (0.070)
VZ	0.0165 (0.352)	0.7050 (<0.001 ***)	-0.0866 (<0.001 ***)
WBA	-0.0062 (0.799)	0.7991 (<0.001 ***)	-0.1566 (<0.001 ***)
WMT	0.0132 (0.471)	0.5633 (<0.001 ***)	-0.1217 (<0.001 ***)
XOM	-0.0165 (0.342)	0.9164 (<0.001 ***)	0.0322 (0.067)

Table A.2a (continued): The full sample is used in the time-series regressions of the market model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP
AAPL	0.1420	1.0999	-0.2512
	(0.036)*	(<0.001)***	(<0.001)***
AXP	-0.0203	1.5430	0.3642
	(0.726)	(<0.001)***	(<0.001)***
BA	-0.0102	0.8429	0.2415
	(0.824)	(<0.001)***	(<0.001)***
CAT	0.0152	1.1624	0.0878
	(0.758)	(<0.001)***	(0.062)
CSCO	0.0215	1.1595	-0.2962
	(0.607)	(<0.001)***	(<0.001)***
CVX	0.0395	1.0113	0.1521
	(0.314)	(<0.001)***	(<0.001)***
DIS	0.0191	1.1030	-0.0874
	(0.612)	(<0.001)***	(0.016)*
DWDP	NA	NA	NA
	NA	NA	NA
GS	0.0349	1.2459	0.7803
	(0.559)	(<0.001)***	(<0.001)***
HD	-0.0237	1.0532	-0.1143
	(0.580)	(<0.001)***	(0.005)**
IBM	0.0494	0.8534	-0.3369
	(0.108)	(<0.001)***	(<0.001)***
INTC	-0.0487	1.1608	-0.2002
	(0.350)	(<0.001)***	(<0.001)***
JNJ	0.0076	0.5240	-0.0597
	(0.770)	(<0.001)***	(0.016)*
JPM	0.0631	1.1562	0.6263
	(0.340)	(<0.001)***	(<0.001)***
KO	0.0481	0.5910	-0.1165
	(0.134)	(<0.001)***	(<0.001)***

Table A.2b: The first subsample is used in the time-series regressions of the market model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP
MCD	0.0700 (0.059)	0.6600 (<0.001)***	-0.1391 (<0.001)***
MMM	0.0130 (0.700)	0.8074 (<0.001)***	-0.0407 (0.220)
MRK	0.0196 (0.704)	0.7743 (<0.001)***	0.0401 (0.416)
MSFT	0.0180 (0.702)	0.9796 (<0.001)***	-0.1194 (0.007)**
NKE	0.0691 (0.121)	0.9522 (<0.001)***	-0.1580 (<0.001)***
PFE	-0.0090 (0.808)	0.7622 (<0.001)***	-0.0089 (0.802)
PG	0.0225 (0.418)	0.6717 (<0.001)***	-0.2235 (<0.001)***
TRV	0.0235 (0.640)	1.1346 (<0.001)***	0.0629 (0.191)
UNH	-0.0563 (0.410)	0.8251 (<0.001)***	0.4300 (<0.001)***
UTX	0.0299 (0.334)	0.9359 (<0.001)***	-0.0114 (0.698)
V	0.1134 (0.335)	0.8602 (<0.001)***	0.1932 (0.025)*
VZ	0.0255 (0.472)	0.8327 (<0.001)***	-0.1884 (<0.001)***
WBA	-0.0191 (0.653)	0.8244 (<0.001)***	-0.2814 (<0.001)***
WMT	0.0138 (0.694)	0.6549 (<0.001)***	-0.2572 (<0.001)***
XOM	0.0165 (0.668)	0.9636 (<0.001)***	0.0260 (0.479)

Table A.2b (continued): The first subsample is used in the time-series regressions of the market model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP
AAPL	-0.0289 (0.341)	0.9624 (<0.001)***	-0.1212 (<0.001)***
AXP	-0.0086 (0.694)	1.0498 (<0.001)***	0.1326 (<0.001)***
BA	0.0468 (0.049)*	1.0544 (<0.001)***	0.1727 (<0.001)***
CAT	-0.0243 (0.314)	1.2918 (<0.001)***	0.1017 (<0.001)***
CSCO	-0.0288 (0.304)	1.0551 (<0.001)***	-0.0856 (0.003)**
CVX	-0.0210 (0.300)	0.9789 (<0.001)***	0.0471 (0.026)*
DIS	0.0097 (0.627)	0.9965 (<0.001)***	-0.0995 (<0.001)***
DWDP	NA NA	NA NA	NA NA
GS	-0.0539 (0.029)*	1.1695 (<0.001)***	0.3785 (<0.001)***
HD	0.0448 (0.023)*	0.8769 (<0.001)***	-0.0515 (0.014)*
IBM	-0.0410 (0.045)*	0.8231 (<0.001)***	-0.1427 (<0.001)***
INTC	-0.0148 (0.596)	1.0484 (<0.001)***	-0.0169 (0.544)
JNJ	0.0151 (0.308)	0.6122 (<0.001)***	-0.0361 (0.022)*
JPM	-0.0030 (0.895)	1.2542 (<0.001)***	0.2366 (<0.001)***
KO	0.0125 (0.437)	0.5638 (<0.001)***	-0.0764 (<0.001)***

Table A.2c: The second subsample is used in the time-series regressions of the market model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP
MCD	0.0312 (0.091)	0.5622 (<0.001)***	-0.0971 (<0.001)***
MMM	-0.0028 (0.871)	0.9279 (<0.001)***	0.0168 (0.340)
MRK	0.0027 (0.896)	0.7448 (<0.001)***	-0.0585 (0.008)**
MSFT	0.0041 (0.863)	1.0155 (<0.001)***	-0.0788 (0.001)**
NKE	0.0241 (0.335)	0.9775 (<0.001)***	-0.3880 (<0.001)***
PFE	0.0210 (0.268)	0.7656 (<0.001)***	-0.0143 (0.472)
PG	0.0060 (0.718)	0.5007 (<0.001)***	-0.0851 (<0.001)***
TRV	0.0096 (0.586)	0.7863 (<0.001)***	0.0137 (0.463)
UNH	0.0563 (0.021)*	0.8779 (<0.001)***	-0.0390 (0.129)
UTX	-0.0131 (0.430)	0.9669 (<0.001)***	0.0460 (0.009)**
V	0.0478 (0.064)	1.1080 (<0.001)***	-0.0005 (0.984)
VZ	0.0191 (0.326)	0.5658 (<0.001)***	-0.0376 (0.065)
WBA	0.0003 (0.991)	0.8047 (<0.001)***	-0.0747 (0.016)*
WMT	0.0172 (0.413)	0.4814 (<0.001)***	-0.0441 (0.044)*
XOM	-0.0303 (0.078)	0.8560 (<0.001)***	0.0281 (0.120)

Table A.2c (continued): The second subsample is used in the time-series regressions of the market model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>
AAPL	0.0298 (0.334)	1.0898 (<0.001)***	-0.1605 (0.005)**	-0.4384 (<0.001)***
AXP	-0.0147 (0.536)	1.2813 (<0.001)***	-0.1905 (<0.001)***	0.8438 (<0.001)***
BA	0.0289 (0.197)	1.0355 (<0.001)***	-0.1514 (<0.001)***	-0.1067 (0.004)**
CAT	-0.0092 (0.691)	1.1999 (<0.001)***	0.2731 (<0.001)***	0.0549 (0.146)
CSCO	-0.0136 (0.560)	1.1065 (<0.001)***	-0.1321 (0.002)**	-0.2133 (<0.001)***
CVX	-0.0010 (0.957)	1.0900 (<0.001)***	-0.4612 (<0.001)***	-0.0057 (0.850)
DIS	0.0117 (0.524)	1.0501 (<0.001)***	-0.1776 (<0.001)***	0.0189 (0.533)
DWDP	NA NA	NA NA	NA NA	NA NA
GS	-0.0198 (0.446)	1.2254 (<0.001)***	-0.1865 (<0.001)***	0.9656 (<0.001)***
HD	0.0200 (0.306)	0.9322 (<0.001)***	0.0382 (0.284)	0.0716 (0.026)*
IBM	-0.0104 (0.553)	0.8001 (<0.001)***	-0.1421 (<0.001)***	-0.1178 (<0.001)***
INTC	-0.0273 (0.282)	1.1532 (<0.001)***	-0.1008 (0.031)*	-0.3391 (<0.001)***
JNJ	0.0128 (0.312)	0.6249 (<0.001)***	-0.3460 (<0.001)***	-0.1900 (<0.001)***
JPM	0.0130 (0.558)	1.2398 (<0.001)***	-0.1086 (0.009)**	1.6975 (<0.001)***
KO	0.0231 (0.122)	0.6167 (<0.001)***	-0.2987 (<0.001)***	-0.1629 (<0.001)***

Table A.3a: The full sample is used in the time-series regressions of the Fama-French (1992) three-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>
MCD	0.0427 (0.015)*	0.6255 (<0.001)***	-0.1585 (<0.001)***	-0.1255 (<0.001)***
MMM	0.0049 (0.766)	0.8727 (<0.001)***	-0.0827 (0.006)**	-0.0300 (0.270)
MRK	0.0064 (0.768)	0.8528 (<0.001)***	-0.3787 (<0.001)***	-0.2226 (<0.001)***
MSFT	0.0092 (0.668)	1.0894 (<0.001)***	-0.3760 (<0.001)***	-0.4375 (<0.001)***
NKE	0.0401 (0.081)	0.9076 (<0.001)***	0.0873 (0.037)*	-0.1306 (<0.001)***
PFE	0.0104 (0.552)	0.8151 (<0.001)***	-0.3306 (<0.001)***	-0.0723 (0.012)*
PG	0.0091 (0.522)	0.6022 (<0.001)***	-0.3823 (<0.001)***	-0.0446 (0.058)
TRV	0.0121 (0.546)	0.9499 (<0.001)***	-0.3407 (<0.001)***	0.4850 (<0.001)***
UNH	0.0159 (0.574)	0.9952 (<0.001)***	-0.3613 (<0.001)***	-0.1025 (0.028)*
UTX	0.0015 (0.919)	0.9662 (<0.001)***	-0.0669 (0.016)*	-0.0363 (0.145)
V	0.0635 (0.030)*	1.0004 (<0.001)***	-0.1252 (0.014)*	-0.0492 (0.271)
VZ	0.0178 (0.308)	0.7110 (<0.001)***	-0.3418 (<0.001)***	0.0605 (0.036)*
WBA	-0.0069 (0.776)	0.8137 (<0.001)***	-0.1715 (<0.001)***	-0.2065 (<0.001)***
WMT	0.0130 (0.479)	0.5788 (<0.001)***	-0.2100 (<0.001)***	-0.1372 (<0.001)***
XOM	-0.0173 (0.300)	1.0062 (<0.001)***	-0.4562 (<0.001)***	-0.1223 (<0.001)***

Table A.3a (continued): The full sample is used in the time-series regressions of the Fama-French (1992) three-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>
AAPL	0.1443 (0.034)*	1.1368 (<0.001)***	-0.0424 (0.689)	-0.3771 (<0.001)***
AXP	-0.0199 (0.714)	1.4091 (<0.001)***	-0.2236 (0.008)**	1.0337 (<0.001)***
BA	-0.0075 (0.872)	0.9892 (<0.001)***	-0.1789 (0.012)*	-0.1855 (0.002)**
CAT	0.0130 (0.791)	1.2168 (<0.001)***	0.3400 (<0.001)***	-0.1795 (0.004)**
CSCO	0.0225 (0.596)	1.1365 (<0.001)***	-0.059 (0.374)	-0.2661 (<0.001)***
CVX	0.0447 (0.218)	1.2139 (<0.001)***	-0.6406 (<0.001)***	-0.3912 (<0.001)***
DIS	0.0203 (0.590)	1.0973 (<0.001)***	-0.1781 (0.002)**	-0.0342 (0.483)
DWDP	NA NA	NA NA	NA NA	NA NA
GS	0.0419 (0.494)	1.2622 (<0.001)***	-0.3545 (<0.001)***	0.9117 (<0.001)***
HD	-0.0264 (0.534)	0.9480 (<0.001)***	0.2861 (<0.001)***	0.1635 (0.003)**
IBM	0.0465 (0.150)	0.7857 (<0.001)***	-0.0635 (0.206)	-0.1593 (<0.001)***
INTC	-0.0467 (0.362)	1.2275 (<0.001)***	0.0492 (0.542)	-0.4756 (<0.001)***
JNJ	0.0110 (0.655)	0.5826 (<0.001)***	-0.3517 (<0.001)***	-0.1961 (<0.001)***
JPM	0.0387 (0.448)	1.1744 (<0.001)***	-0.0585 (0.476)	2.0405 (<0.001)***
KO	0.0485 (0.125)	0.6308 (<0.001)***	-0.1739 (<0.001)***	-0.2508 (<0.001)***

Table A.3b: The first subsample is used in the time-series regressions of the Fama-French (1992) three-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>
MCD	0.0697 (0.062)	0.6489 (<0.001 ***)	0.0166 (0.779)	-0.1395 (0.005)**
MMM	0.0129 (0.703)	0.8044 (<0.001 ***)	-0.0111 (0.838)	-0.0279 (0.536)
MRK	0.0249 (0.622)	0.9074 (<0.001 ***)	-0.3761 (<0.001 ***)	-0.3449 (<0.001 ***)
MSFT	0.0257 (0.571)	1.0760 (<0.001 ***)	-0.3189 (<0.001 ***)	-0.4357 (<0.001 ***)
NKE	0.0653 (0.142)	0.8826 (<0.001 ***)	0.2878 (<0.001 ***)	-0.0214 (0.710)
PFE	-0.0059 (0.870)	0.7930 (<0.001 ***)	-0.3906 (<0.001 ***)	-0.0186 (0.690)
PG	0.0238 (0.396)	0.6424 (<0.001 ***)	-0.2693 (<0.001 ***)	-0.1031 (0.004)**
TRV	0.0254 (0.604)	1.0514 (<0.001 ***)	-0.3461 (<0.001 ***)	0.4823 (<0.001 ***)
UNH	-0.0515 (0.456)	1.0313 (<0.001 ***)	-0.4067 (<0.001 ***)	-0.0971 (0.275)
UTX	0.0302 (0.329)	0.9576 (<0.001 ***)	-0.0201 (0.677)	-0.0890 (0.025)*
V	0.1265 (0.284)	0.8742 (<0.001 ***)	-0.0493 (0.720)	0.2117 (0.048)*
VZ	0.0260 (0.462)	0.8100 (<0.001 ***)	-0.3214 (<0.001 ***)	-0.0646 (0.157)
WBA	-0.0192 (0.656)	0.7812 (<0.001 ***)	-0.0364 (0.590)	-0.1916 (<0.001 ***)
WMT	0.0119 (0.739)	0.6345 (<0.001 ***)	-0.0480 (0.387)	-0.2350 (<0.001 ***)
XOM	0.0227 (0.513)	1.1572 (<0.001 ***)	-0.5492 (<0.001 ***)	-0.5295 (<0.001 ***)

Table A.3b (continued): The first subsample is used in the time-series regressions of the Fama-French (1992) three-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>
AAPL	-0.0314	1.0239	-0.2563	-0.6103
	(0.289)	(<0.001)***	(<0.001)***	(<0.001)***
AXP	-0.0055	1.0597	-0.0816	0.4279
	(0.799)	(<0.001)***	(0.066)	(<0.001)***
BA	0.0445	1.1191	-0.1616	0.0775
	(0.063)	(<0.001)***	(0.001)**	(0.118)
CAT	-0.0190	1.2404	0.2156	0.4097
	(0.424)	(<0.001)***	(<0.001)***	(<0.001)***
CSCO	-0.0307	1.0835	-0.1804	-0.1735
	(0.271)	(<0.001)***	(0.002)**	(0.003)**
CVX	-0.0182	0.9946	-0.2469	0.5350
	(0.347)	(<0.001)***	(<0.001)***	(<0.001)***
DIS	0.0103	0.9968	-0.1522	0.0580
	(0.605)	(<0.001)***	(<0.001)***	(0.165)
DWDP	NA	NA	NA	NA
	NA	NA	NA	NA
GS	-0.0490	1.1842	-0.0275	1.0415
	(0.037)*	(<0.001)***	(0.574)	(<0.001)***
HD	0.0430	0.9070	-0.1580	-0.1365
	(0.029)*	(<0.001)***	(<0.001)***	(<0.001)***
IBM	-0.0405	0.8383	-0.2216	-0.0553
	(0.049)*	(<0.001)***	(<0.001)***	(0.196)
INTC	-0.0153	1.0974	-0.1957	-0.2336
	(0.581)	(<0.001)***	(<0.001)***	(<0.001)***
JNJ	0.0110	0.6850	-0.3663	-0.1362
	(0.441)	(<0.001)***	(<0.001)***	(<0.001)***
JPM	-0.0040	1.2545	-0.1859	1.2368
	(0.832)	(<0.001)***	(<0.001)***	(<0.001)***
KO	0.0092	0.6277	-0.4024	-0.0582
	(0.556)	(<0.001)***	(<0.001)***	(0.075)

Table A.3c: The second subsample is used in the time-series regressions of the Fama-French (1992) three-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>
MCD	0.0297 (0.104)	0.6091 (<0.001 ***)	-0.2987 (<0.001 ***)	-0.1624 (<0.001 ***)
MMM	-0.0037 (0.832)	0.9636 (<0.001 ***)	-0.1726 (<0.001 ***)	0.0182 (0.613)
MRK	0.0004 (0.984)	0.8060 (<0.001 ***)	-0.3513 (<0.001 ***)	-0.0826 (0.054)
MSFT	-0.0002 (0.994)	1.1123 (<0.001 ***)	-0.4333 (<0.001 ***)	-0.4407 (<0.001 ***)
NKE	0.0249 (0.339)	0.9329 (<0.001 ***)	-0.0980 (0.068)	-0.3222 (<0.001 ***)
PFE	0.0178 (0.339)	0.8276 (<0.001 ***)	-0.2888 (<0.001 ***)	-0.1262 (0.001)**
PG	0.0032 (0.842)	0.5703 (<0.001 ***)	-0.4593 (<0.001 ***)	-0.0106 (0.751)
TRV	0.0117 (0.490)	0.8101 (<0.001 ***)	-0.2761 (<0.001 ***)	0.3887 (<0.001 ***)
UNH	0.0530 (0.028)*	0.9379 (<0.001 ***)	-0.2985 (<0.001 ***)	-0.1367 (0.006)**
UTX	-0.0141 (0.396)	0.9954 (<0.001 ***)	-0.1149 (<0.001 ***)	0.0482 (0.162)
V	0.0456 (0.073)	1.0885 (<0.001 ***)	-0.2573 (<0.001 ***)	-0.3183 (<0.001 ***)
VZ	0.0194 (0.308)	0.6030 (<0.001 ***)	-0.3030 (<0.001 ***)	0.1598 (<0.001 ***)
WBA	-0.0035 (0.903)	0.8663 (<0.001 ***)	-0.3075 (<0.001 ***)	-0.2231 (<0.001 ***)
WMT	0.0148 (0.475)	0.5375 (<0.001 ***)	-0.3207 (<0.001 ***)	-0.0625 (0.147)
XOM	-0.0275 (0.092)	0.8892 (<0.001 ***)	-0.3039 (<0.001 ***)	0.4075 (<0.001 ***)

Table A.3c (continued): The second subsample is used in the time-series regressions of the Fama-French (1992) three-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML
AAPL	0.0298 (0.334)	1.1062 (<0.001)***	-0.0965 (0.003)**	-0.1613 (0.004)**	-0.3897 (<0.001)***
AXP	-0.0145 (0.540)	1.2626 (<0.001)***	0.0908 (<0.001)***	-0.1849 (<0.001)***	0.7999 (<0.001)***
BA	0.0295 (0.181)	0.9875 (<0.001)***	0.2299 (<0.001)***	-0.1373 (<0.001)***	-0.2213 (<0.001)***
CAT	-0.0087 (0.707)	1.1800 (<0.001)***	0.0946 (<0.001)***	0.2793 (<0.001)***	0.0079 (0.843)
CSCO	-0.0143 (0.540)	1.1345 (<0.001)***	-0.1369 (<0.001)***	-0.1392 (0.001)**	-0.1458 (<0.001)***
CVX	-0.0006 (0.973)	1.0708 (<0.001)***	0.0915 (<0.001)***	-0.4554 (<0.001)***	-0.0509 (0.109)
DIS	0.0113 (0.538)	1.0724 (<0.001)***	-0.1078 (<0.001)***	-0.1843 (<0.001)***	0.0711 (0.025)*
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA
GS	-0.0198 (0.430)	1.1564 (<0.001)***	0.3920 (<0.001)***	-0.1824 (<0.001)***	0.7666 (<0.001)***
HD	0.0195 (0.316)	0.9514 (<0.001)***	-0.0905 (<0.001)***	0.0325 (0.361)	0.1163 (<0.001)***
IBM	-0.0109 (0.524)	0.8453 (<0.001)***	-0.2177 (<0.001)***	-0.1550 (<0.001)***	-0.0112 (0.705)
INTC	-0.0272 (0.282)	1.1568 (<0.001)***	-0.0221 (0.399)	-0.1007 (0.031)*	-0.3280 (<0.001)***
JNJ	0.0127 (0.314)	0.6295 (<0.001)***	-0.0218 (0.108)	-0.3473 (<0.001)***	-0.1792 (<0.001)***
JPM	0.0137 (0.539)	1.2242 (<0.001)***	0.0886 (<0.001)***	-0.1079 (0.009)**	1.6542 (<0.001)***
KO	0.0226 (0.130)	0.6321 (<0.001)***	-0.0733 (<0.001)***	-0.3034 (<0.001)***	-0.1270 (<0.001)***

Table A.4a: The full sample is used in the time-series regressions of the Fama-French (1992) three-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML
MCD	0.0426 (0.015)*	0.6456 (<0.001 ***)	-0.0987 (<0.001 ***)	-0.1637 (<0.001 ***)	-0.0773 (0.012)*
MMM	0.0049 (0.766)	0.8728 (<0.001 ***)	-0.0005 (0.978)	-0.0827 (0.006)**	-0.0298 (0.298)
MRK	0.0065 (0.764)	0.8491 (<0.001 ***)	0.0179 (0.439)	-0.3776 (<0.001 ***)	-0.2313 (<0.001 ***)
MSFT	0.0091 (0.670)	1.0944 (<0.001 ***)	-0.0249 (0.263)	-0.3774 (<0.001 ***)	-0.4253 (<0.001 ***)
NKE	0.0397 (0.077)	0.9700 (<0.001 ***)	-0.3001 (<0.001 ***)	0.0673 (0.101)	0.0202 (0.602)
PFE	0.0104 (0.553)	0.8162 (<0.001 ***)	-0.0053 (0.774)	-0.3309 (<0.001 ***)	-0.0697 (0.020)*
PG	0.0085 (0.547)	0.6326 (<0.001 ***)	-0.1452 (<0.001 ***)	-0.3916 (<0.001 ***)	0.0272 (0.264)
TRV	0.0119 (0.554)	0.9616 (<0.001 ***)	-0.0555 (0.010)**	-0.3442 (<0.001 ***)	0.5125 (<0.001 ***)
UNH	0.0167 (0.552)	0.9585 (<0.001 ***)	0.1745 (<0.001 ***)	-0.3499 (<0.001 ***)	-0.1889 (<0.001 ***)
UTX	0.0017 (0.910)	0.9598 (<0.001 ***)	0.0304 (0.061)	-0.0650 (0.019)*	-0.0514 (0.050)*
V	0.0635 (0.030)*	0.9853 (<0.001 ***)	0.0639 (0.028)*	-0.1221 (0.016)*	-0.0799 (0.087)
VZ	0.0178 (0.306)	0.7349 (<0.001 ***)	-0.1142 (<0.001 ***)	-0.3489 (<0.001 ***)	0.1161 (<0.001 ***)
WBA	-0.0074 (0.759)	0.8416 (<0.001 ***)	-0.1333 (<0.001 ***)	-0.1800 (<0.001 ***)	-0.1402 (<0.001 ***)
WMT	0.0127 (0.487)	0.6021 (<0.001 ***)	-0.1101 (<0.001 ***)	-0.2171 (<0.001 ***)	-0.0837 (0.007)**
XOM	-0.0171 (0.305)	0.9954 (<0.001 ***)	0.0509 (0.004)**	-0.4527 (<0.001 ***)	-0.1475 (<0.001 ***)

Table A.4a (continued): The full sample is used in the time-series regressions of the Fama-French (1992) three-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML
AAPL	0.1449 (0.032)*	1.1586 (<0.001)***	-0.1659 (0.025)*	-0.0604 (0.569)	-0.2821 (0.005)**
AXP	-0.0205 (0.704)	1.3937 (<0.001)***	0.0726 (0.202)	-0.2099 (0.014)*	0.9963 (<0.001)***
BA	-0.0103 (0.819)	0.9164 (<0.001)***	0.3427 (<0.001)***	-0.1128 (0.108)	-0.3711 (<0.001)***
CAT	0.0127 (0.794)	1.1756 (<0.001)***	0.1895 (<0.001)***	0.3770 (<0.001)***	-0.2810 (<0.001)***
CSCO	0.0239 (0.566)	1.1889 (<0.001)***	-0.2642 (<0.001)***	-0.1046 (0.112)	-0.1235 (0.037)*
CVX	0.0429 (0.225)	1.1554 (<0.001)***	0.2749 (<0.001)***	-0.5870 (<0.001)***	-0.5382 (<0.001)***
DIS	0.0210 (0.575)	1.1187 (<0.001)***	-0.1046 (0.008)**	-0.1990 (<0.001)***	0.0203 (0.701)
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA
GS	0.0322 (0.582)	1.1715 (<0.001)***	0.6088 (<0.001)***	-0.2829 (0.002)**	0.5645 (<0.001)***
HD	-0.0255 (0.545)	0.9866 (<0.001)***	-0.1754 (<0.001)***	0.2530 (<0.001)***	0.2567 (<0.001)***
IBM	0.0504 (0.100)	0.8605 (<0.001)***	-0.3512 (<0.001)***	-0.1295 (0.007)**	0.0276 (0.522)
INTC	-0.0458 (0.371)	1.2352 (<0.001)***	-0.0653 (0.237)	0.0426 (0.598)	-0.4383 (<0.001)***
JNJ	0.0111 (0.652)	0.5883 (<0.001)***	-0.0263 (0.307)	-0.3567 (<0.001)***	-0.1821 (<0.001)***
JPM	0.0386 (0.449)	1.1703 (<0.001)***	0.0287 (0.609)	-0.0557 (0.498)	2.0249 (<0.001)***
KO	0.0486 (0.123)	0.6449 (<0.001)***	-0.0655 (0.047)*	-0.1867 (<0.001)***	-0.2165 (<0.001)***

Table A.4b: The first subsample is used in the time-series regressions of the Fama-French (1992) three-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML
MCD	0.0707 (0.057)	0.6731 (<0.001 ***)	-0.1184 (0.002)**	-0.0044 (0.941)	-0.0769 (0.148)
MMM	0.0131 (0.699)	0.8098 (<0.001 ***)	-0.0396 (0.284)	-0.0155 (0.775)	-0.0045 (0.928)
MRK	0.0247 (0.624)	0.8775 (<0.001 ***)	0.1397 (0.008)**	-0.3499 (<0.001 ***)	-0.4176 (<0.001 ***)
MSFT	0.0259 (0.568)	1.0792 (<0.001 ***)	-0.0156 (0.738)	-0.3218 (<0.001 ***)	-0.4275 (<0.001 ***)
NKE	0.0673 (0.129)	0.9171 (<0.001 ***)	-0.1645 (<0.001 ***)	0.2554 (<0.001 ***)	0.0684 (0.274)
PFE	-0.0059 (0.871)	0.7990 (<0.001 ***)	-0.0276 (0.465)	-0.3957 (<0.001 ***)	-0.0040 (0.938)
PG	0.0251 (0.355)	0.6962 (<0.001 ***)	-0.2491 (<0.001 ***)	-0.3173 (<0.001 ***)	0.0293 (0.441)
TRV	0.0257 (0.598)	1.0760 (<0.001 ***)	-0.1134 (0.026)*	-0.3680 (<0.001 ***)	0.5427 (<0.001 ***)
UNH	-0.0532 (0.431)	0.9178 (<0.001 ***)	0.5218 (<0.001 ***)	-0.3060 (0.004)**	-0.3752 (<0.001 ***)
UTX	0.0301 (0.330)	0.9542 (<0.001 ***)	0.0157 (0.626)	-0.0171 (0.725)	-0.0974 (0.025)*
V	0.1154 (0.328)	0.8361 (<0.001 ***)	0.1482 (0.119)	-0.0208 (0.880)	0.1354 (0.249)
VZ	0.0285 (0.413)	0.8573 (<0.001 ***)	-0.2218 (<0.001 ***)	-0.3634 (<0.001 ***)	0.0528 (0.280)
WBA	-0.0184 (0.666)	0.8405 (<0.001 ***)	-0.2729 (<0.001 ***)	-0.0890 (0.185)	-0.0461 (0.440)
WMT	0.0144 (0.681)	0.6824 (<0.001 ***)	-0.2292 (<0.001 ***)	-0.0923 (0.093)	-0.1140 (0.019)*
XOM	0.0214 (0.534)	1.1183 (<0.001 ***)	0.1791 (<0.001 ***)	-0.5139 (<0.001 ***)	-0.6255 (<0.001 ***)

Table A.4b (continued): The first subsample is used in the time-series regressions of the Fama-French (1992) three-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML
AAPL	-0.0316 (0.286)	1.0350 (<0.001)***	-0.0565 (0.063)	-0.2524 (<0.001)***	-0.5846 (<0.001)***
AXP	-0.0049 (0.819)	1.0435 (<0.001)***	0.0888 (<0.001)***	-0.0862 (0.051)	0.3879 (<0.001)***
BA	0.0458 (0.053)	1.0874 (<0.001)***	0.1750 (<0.001)***	-0.1722 (<0.001)***	-0.0009 (0.986)
CAT	-0.0186 (0.434)	1.2304 (<0.001)***	0.0551 (0.033)*	0.2128 (<0.001)***	0.3848 (<0.001)***
CSCO	-0.0314 (0.260)	1.0967 (<0.001)***	-0.0685 (0.020)*	-0.1770 (0.002)**	-0.1429 (0.017)*
CVX	-0.0183 (0.345)	0.9965 (<0.001)***	-0.0105 (0.614)	-0.2463 (<0.001)***	0.5397 (<0.001)***
DIS	0.0094 (0.636)	1.0180 (<0.001)***	-0.1101 (<0.001)***	-0.1459 (<0.001)***	0.1079 (0.011)*
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA
GS	-0.0464 (0.041)*	1.1310 (<0.001)***	0.2785 (<0.001)***	-0.0473 (0.317)	0.9137 (<0.001)***
HD	0.0427 (0.030)*	0.9135 (<0.001)***	-0.0360 (0.092)	-0.1562 (<0.001)***	-0.1203 (0.004)**
IBM	-0.0417 (0.041)*	0.8637 (<0.001)***	-0.1410 (<0.001)***	-0.2137 (<0.001)***	0.0068 (0.875)
INTC	-0.0153 (0.582)	1.0953 (<0.001)***	0.0109 (0.700)	-0.1966 (<0.001)***	-0.2386 (<0.001)***
JNJ	0.0109 (0.444)	0.6880 (<0.001)***	-0.0169 (0.280)	-0.3653 (<0.001)***	-0.1286 (<0.001)***
JPM	-0.0025 (0.894)	1.2320 (<0.001)***	0.1116 (<0.001)***	-0.1925 (<0.001)***	1.1867 (<0.001)***
KO	0.0085 (0.587)	0.6404 (<0.001)***	-0.0692 (<0.001)***	-0.3986 (<0.001)***	-0.0268 (0.423)

Table A.4c: The second subsample is used in the time-series regressions of the Fama-French (1992) three-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML
MCD	0.0292 (0.108)	0.6241 (<0.001 ***)	-0.0801 (<0.001 ***)	-0.2942 (<0.001 ***)	-0.1262 (0.001)**
MMM	-0.0035 (0.838)	0.9601 (<0.001 ***)	0.0178 (0.322)	-0.1737 (<0.001 ***)	0.0102 (0.781)
MRK	0.0000 (0.998)	0.8145 (<0.001 ***)	-0.0478 (0.032)*	-0.3487 (<0.001 ***)	-0.0611 (0.164)
MSFT	-0.0004 (0.985)	1.1173 (<0.001 ***)	-0.0270 (0.259)	-0.4319 (<0.001 ***)	-0.4284 (<0.001 ***)
NKE	0.0222 (0.373)	1.0012 (<0.001 ***)	-0.3695 (<0.001 ***)	-0.0802 (0.120)	-0.1536 (0.004)**
PFE	0.0179 (0.339)	0.8270 (<0.001 ***)	0.0032 (0.874)	-0.2889 (<0.001 ***)	-0.1276 (0.001)**
PG	0.0025 (0.874)	0.5853 (<0.001 ***)	-0.0831 (<0.001 ***)	-0.4549 (<0.001 ***)	0.0267 (0.435)
TRV	0.0115 (0.498)	0.8155 (<0.001 ***)	-0.0303 (0.100)	-0.2745 (<0.001 ***)	0.4023 (<0.001 ***)
UNH	0.0529 (0.028)*	0.9417 (<0.001 ***)	-0.0213 (0.416)	-0.2974 (<0.001 ***)	-0.1272 (0.014)*
UTX	-0.0137 (0.408)	0.9874 (<0.001 ***)	0.0439 (0.015)*	-0.1172 (<0.001 ***)	0.0284 (0.422)
V	0.0461 (0.070)	1.0813 (<0.001 ***)	0.0379 (0.156)	-0.2595 (<0.001 ***)	-0.3350 (<0.001 ***)
VZ	0.0192 (0.314)	0.6131 (<0.001 ***)	-0.0551 (0.007)**	-0.3001 (<0.001 ***)	0.1841 (<0.001 ***)
WBA	-0.0038 (0.896)	0.8748 (<0.001 ***)	-0.0477 (0.131)	-0.3049 (<0.001 ***)	-0.2014 (0.001)**
WMT	0.0145 (0.484)	0.5445 (<0.001 ***)	-0.0358 (0.106)	-0.3190 (<0.001 ***)	-0.0466 (0.291)
XOM	-0.0277 (0.090)	0.8922 (<0.001 ***)	-0.0162 (0.357)	-0.3032 (<0.001 ***)	0.4147 (<0.001 ***)

Table A.4c (continued): The second subsample is used in the time-series regressions of the Fama-French (1992) three-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
AAPL	0.0342 (0.256)	0.9978 (<0.001)***	-0.1243 (0.028)*	-0.1887 (<0.001)***	0.0739 (0.450)	-1.3291 (<0.001)***
AXP	-0.0130 (0.584)	1.2524 (<0.001)***	-0.1875 (<0.001)***	0.9031 (<0.001)***	-0.0312 (0.686)	-0.3613 (<0.001)***
BA	0.0259 (0.246)	1.0760 (<0.001)***	-0.1425 (<0.001)***	-0.1562 (<0.001)***	0.1294 (0.073)	0.4232 (<0.001)***
CAT	-0.0141 (0.538)	1.2472 (<0.001)***	0.2946 (<0.001)***	0.0229 (0.590)	0.2338 (0.002)**	0.4188 (<0.001)***
CSCO	-0.0134 (0.566)	1.1146 (<0.001)***	-0.1408 (0.001)**	-0.2479 (<0.001)***	-0.0464 (0.542)	0.1554 (0.065)
CVX	-0.0070 (0.701)	1.1431 (<0.001)***	-0.4062 (<0.001)***	0.0277 (0.413)	0.4810 (<0.001)***	0.2884 (<0.001)***
DIS	0.0090 (0.622)	1.0896 (<0.001)***	-0.1764 (<0.001)***	-0.0526 (0.126)	0.0732 (0.217)	0.4657 (<0.001)***
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
GS	-0.0114 (0.652)	1.1184 (<0.001)***	-0.2789 (<0.001)***	0.9752 (<0.001)***	-0.7883 (<0.001)***	-0.8119 (<0.001)***
HD	0.0118 (0.541)	0.9981 (<0.001)***	0.0889 (0.014)*	0.0730 (0.041)*	0.4675 (<0.001)***	0.4590 (<0.001)***
IBM	-0.0138 (0.428)	0.8288 (<0.001)***	-0.1143 (<0.001)***	-0.1075 (<0.001)***	0.2382 (<0.001)***	0.1726 (0.006)**
INTC	-0.0283 (0.263)	1.1792 (<0.001)***	-0.0765 (0.110)	-0.3444 (<0.001)***	0.1960 (0.017)*	0.2114 (0.021)*
JNJ	0.0093 (0.451)	0.6682 (<0.001)***	-0.3458 (<0.001)***	-0.2615 (<0.001)***	0.0819 (0.042)*	0.4955 (<0.001)***
JPM	0.0183 (0.391)	1.1321 (<0.001)***	-0.1478 (<0.001)***	1.8379 (<0.001)***	-0.4259 (<0.001)***	-1.1486 (<0.001)***
KO	0.0162 (0.267)	0.6814 (<0.001)***	-0.2718 (<0.001)***	-0.2170 (<0.001)***	0.3032 (<0.001)***	0.6088 (<0.001)***

Table A.5a: The full sample is used in the time-series regressions of the Fama-French (2015) five-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
MCD	0.0389 (0.026)*	0.6637 (<0.001)***	-0.1169 (<0.001)***	-0.1081 (0.001)**	0.3423 (<0.001)***	0.2384 (<0.001)***
MMM	0.0021 (0.896)	0.9173 (<0.001)***	-0.0580 (0.059)	-0.0753 (0.013)*	0.2132 (<0.001)***	0.4521 (<0.001)***
MRK	0.0050 (0.818)	0.8977 (<0.001)***	-0.4113 (<0.001)***	-0.3715 (<0.001)***	-0.1448 (0.039)*	0.7090 (<0.001)***
MSFT	0.0079 (0.712)	1.0999 (<0.001)***	-0.3484 (<0.001)***	-0.3980 (<0.001)***	0.2007 (0.004)**	-0.0299 (0.698)
NKE	0.0363 (0.113)	0.9340 (<0.001)***	0.1420 (<0.001)***	-0.0536 (0.208)	0.4256 (<0.001)***	-0.0099 (0.904)
PFE	0.0086 (0.617)	0.8489 (<0.001)***	-0.3643 (<0.001)***	-0.2002 (<0.001)***	-0.1627 (0.004)**	0.5817 (<0.001)***
PG	0.0001 (0.992)	0.6784 (<0.001)***	-0.3362 (<0.001)***	-0.0733 (0.004)**	0.4531 (<0.001)***	0.6185 (<0.001)***
TRV	0.0114 (0.572)	0.9663 (<0.001)***	-0.3469 (<0.001)***	0.4443 (<0.001)***	-0.0117 (0.857)	0.2230 (0.002)**
UNH	0.0171 (0.546)	0.9842 (<0.001)***	-0.3673 (<0.001)***	-0.0974 (0.064)	-0.0618 (0.501)	-0.0910 (0.370)
UTX	-0.0038 (0.802)	1.0078 (<0.001)***	-0.0324 (0.249)	-0.0298 (0.284)	0.3154 (<0.001)***	0.2763 (<0.001)***
V	0.0685 (0.018)*	0.9277 (<0.001)***	-0.1632 (0.002)**	-0.0011 (0.984)	-0.3500 (<0.001)***	-0.6263 (<0.001)***
VZ	0.0096 (0.574)	0.7939 (<0.001)***	-0.3027 (<0.001)***	0.0071 (0.822)	0.4234 (<0.001)***	0.7270 (<0.001)***
WBA	-0.0111 (0.646)	0.8526 (<0.001)***	-0.1474 (0.001)**	-0.2187 (<0.001)***	0.2380 (0.002)**	0.3116 (<0.001)***
WMT	0.0036 (0.840)	0.6592 (<0.001)***	-0.1476 (<0.001)***	-0.1410 (<0.001)***	0.5775 (<0.001)***	0.5906 (<0.001)***
XOM	-0.0272 (0.094)	1.0784 (<0.001)***	-0.3893 (<0.001)***	-0.0958 (0.002)**	0.5943 (<0.001)***	0.4408 (<0.001)***

Table A.5a (continued): The full sample is used in the time-series regressions of the Fama-French (2015) five-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
AAPL	0.1486 (0.024)*	1.0510 (<0.001)***	-0.0711 (0.492)	-0.5550 (<0.001)***	-0.9244 (<0.001)***	-1.5056 (<0.001)***
AXP	-0.0158 (0.771)	1.4062 (<0.001)***	-0.2337 (0.006)**	0.9901 (<0.001)***	-0.1826 (0.283)	-0.0400 (0.828)
BA	-0.0091 (0.844)	1.0065 (<0.001)***	-0.1749 (0.015)*	-0.1655 (0.018)*	0.1160 (0.421)	0.2541 (0.102)
CAT	0.0090 (0.854)	1.2055 (<0.001)***	0.3511 (<0.001)***	-0.1290 (0.082)	0.1726 (0.258)	-0.1709 (0.296)
CSCO	0.0363 (0.385)	1.1684 (<0.001)***	-0.1000 (0.129)	-0.4439 (<0.001)***	-0.6362 (<0.001)***	0.5302 (<0.001)***
CVX	0.0148 (0.660)	1.1673 (<0.001)***	-0.5621 (<0.001)***	-0.0386 (0.451)	1.2882 (<0.001)***	-0.7119 (<0.001)***
DIS	0.0210 (0.571)	1.1524 (<0.001)***	-0.1836 (0.002)**	-0.0738 (0.196)	0.0230 (0.844)	0.8401 (<0.001)***
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
GS	0.0444 (0.458)	1.2043 (<0.001)***	-0.4086 (<0.001)***	0.7187 (<0.001)***	-0.9157 (<0.001)***	-1.1132 (<0.001)***
HD	-0.0357 (0.393)	1.0019 (<0.001)***	0.3009 (<0.001)***	0.2341 (<0.001)***	0.4117 (0.002)**	0.7732 (<0.001)***
IBM	0.0491 (0.128)	0.8031 (<0.001)***	-0.0763 (0.131)	-0.2124 (<0.001)***	-0.1651 (0.103)	0.2603 (0.015)*
INTC	-0.0362 (0.475)	1.2700 (<0.001)***	0.0166 (0.837)	-0.6112 (<0.001)***	-0.3897 (0.015)*	0.7298 (<0.001)***
JNJ	0.0075 (0.755)	0.6291 (<0.001)***	-0.3514 (<0.001)***	-0.1925 (<0.001)***	0.1281 (0.086)	0.6853 (<0.001)***
JPM	0.0266 (0.594)	1.1004 (<0.001)***	-0.0512 (0.527)	2.1163 (<0.001)***	0.0396 (0.802)	-1.2439 (<0.001)***
KO	0.0468 (0.133)	0.6737 (<0.001)***	-0.1778 (<0.001)***	-0.2793 (<0.001)***	0.0154 (0.874)	0.6512 (<0.001)***

Table A.5b: The first subsample is used in the time-series regressions of the Fama-French (2015) five-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	<i>SMB</i>	<i>HML</i>	<i>RMW</i>	<i>CMA</i>
MCD	0.0661 (0.075)	0.6727 (<0.001)***	0.0278 (0.640)	-0.1061 (0.065)	0.2034 (0.081)	0.3778 (0.003)**
MMM	0.0126 (0.706)	0.8309 (<0.001)***	0.0087 (0.872)	0.0239 (0.648)	0.2867 (0.007)**	0.5165 (<0.001)***
MRK	0.0294 (0.556)	0.9678 (<0.001)***	-0.3961 (<0.001)***	-0.4319 (<0.001)***	-0.1950 (0.210)	0.8929 (<0.001)***
MSFT	0.0391 (0.380)	1.1400 (<0.001)***	-0.3408 (<0.001)***	-0.5124 (<0.001)***	-0.1587 (0.256)	1.0097 (<0.001)***
NKE	0.0588 (0.186)	0.8974 (<0.001)***	0.3046 (<0.001)***	0.0716 (0.293)	0.3918 (0.005)**	0.2286 (0.127)
PFE	-0.0057 (0.872)	0.8594 (<0.001)***	-0.4062 (<0.001)***	-0.0848 (0.113)	-0.0982 (0.374)	0.9829 (<0.001)***
PG	0.0138 (0.611)	0.6888 (<0.001)***	-0.2539 (<0.001)***	-0.0319 (0.439)	0.3973 (<0.001)***	0.6936 (<0.001)***
TRV	0.0325 (0.503)	1.0967 (<0.001)***	-0.3691 (<0.001)***	0.3783 (<0.001)***	-0.2996 (0.049)*	0.6781 (<0.001)***
UNH	-0.0401 (0.563)	1.0240 (<0.001)***	-0.4322 (<0.001)***	-0.2162 (0.040)*	-0.4902 (0.024)*	-0.0916 (0.692)
UTX	0.0227 (0.460)	0.9778 (<0.001)***	-0.0054 (0.911)	-0.0189 (0.684)	0.3268 (<0.001)***	0.2881 (0.005)**
V	0.1128 (0.329)	0.7961 (<0.001)***	-0.0258 (0.848)	0.1751 (0.194)	-0.2277 (0.451)	-1.4758 (<0.001)***
VZ	0.0244 (0.480)	0.8720 (<0.001)***	-0.3291 (<0.001)***	-0.0845 (0.107)	0.0752 (0.486)	0.9222 (<0.001)***
WBA	-0.0253 (0.557)	0.8074 (<0.001)***	-0.0260 (0.701)	-0.1419 (0.030)*	0.2614 (0.053)	0.3783 (0.009)**
WMT	0.0098 (0.781)	0.6801 (<0.001)***	-0.0390 (0.476)	-0.1990 (<0.001)***	0.2640 (0.016)*	0.6998 (<0.001)***
XOM	-0.0117 (0.713)	1.1411 (<0.001)***	-0.4651 (<0.001)***	-0.1497 (0.002)**	1.4715 (<0.001)***	-0.2808 (0.008)**

Table A.5b (continued): The first subsample is used in the time-series regressions of the Fama-French (2015) five-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	SMB	HML	RMW	CMA
AAPL	-0.0230 (0.421)	1.0302 (<0.001)***	-0.1217 (0.050)*	-0.0513 (0.503)	0.6081 (<0.001)***	-1.2742 (<0.001)***
AXP	-0.0038 (0.859)	1.0411 (<0.001)***	-0.1055 (0.022)*	0.4071 (<0.001)***	-0.1493 (0.048)*	0.0055 (0.952)
BA	0.0397 (0.096)	1.1708 (<0.001)***	-0.1305 (0.011)*	-0.0298 (0.643)	0.2500 (0.003)**	0.3618 (<0.001)***
CAT	-0.0259 (0.274)	1.3032 (<0.001)***	0.2414 (<0.001)***	0.2438 (<0.001)***	0.2591 (0.002)**	0.5177 (<0.001)***
CSCO	-0.0319 (0.254)	1.1073 (<0.001)***	-0.1366 (0.023)*	-0.0897 (0.233)	0.2515 (0.010)*	-0.1394 (0.242)
CVX	-0.0206 (0.284)	1.0079 (<0.001)***	-0.2790 (<0.001)***	0.3471 (<0.001)***	-0.1055 (0.119)	0.4603 (<0.001)***
DIS	0.0077 (0.700)	1.0188 (<0.001)***	-0.1535 (<0.001)***	-0.0442 (0.411)	0.0429 (0.540)	0.2842 (<0.001)***
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
GS	-0.0324 (0.146)	1.0249 (<0.001)***	-0.1326 (0.006)**	1.3011 (<0.001)***	-0.8236 (<0.001)***	-0.9447 (<0.001)***
HD	0.0327 (0.088)	1.0058 (<0.001)***	-0.1100 (0.007)**	-0.3544 (<0.001)***	0.4442 (<0.001)***	0.7204 (<0.001)***
IBM	-0.0463 (0.023)*	0.9079 (<0.001)***	-0.1410 (0.001)**	-0.0175 (0.750)	0.5189 (<0.001)***	0.0625 (0.473)
INTC	-0.0144 (0.601)	1.1390 (<0.001)***	-0.1183 (0.047)*	-0.0938 (0.204)	0.4350 (<0.001)***	-0.2235 (0.055)
JNJ	0.0068 (0.630)	0.7244 (<0.001)***	-0.3559 (<0.001)***	-0.2610 (<0.001)***	0.1372 (0.006)**	0.3735 (<0.001)***
JPM	0.0057 (0.752)	1.1182 (<0.001)***	-0.2791 (<0.001)***	1.4386 (<0.001)***	-0.7300 (<0.001)***	-0.7523 (<0.001)***
KO	-0.0001 (0.995)	0.7238 (<0.001)***	-0.3490 (<0.001)***	-0.2381 (<0.001)***	0.4623 (<0.001)***	0.6323 (<0.001)***

Table A.5c: The second subsample is used in the time-series regressions of the Fama-French (2015) five-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	SMB	HML	RMW	CMA
MCD	0.0254 (0.159)	0.6729 (<0.001 ***)	-0.2498 (<0.001 ***)	-0.2272 (<0.001 ***)	0.3717 (<0.001 ***)	0.2980 (<0.001 ***)
MMM	-0.0086 (0.616)	1.0231 (<0.001 ***)	-0.1379 (<0.001 ***)	-0.1189 (0.010)**	0.2804 (<0.001 ***)	0.4426 (<0.001 ***)
MRK	-0.0022 (0.915)	0.8152 (<0.001 ***)	-0.4034 (<0.001 ***)	-0.3373 (<0.001 ***)	-0.2123 (0.003)**	0.6052 (<0.001 ***)
MSFT	0.0059 (0.790)	1.1236 (<0.001 ***)	-0.3435 (<0.001 ***)	-0.0569 (0.341)	0.4602 (<0.001 ***)	-0.8560 (<0.001 ***)
NKE	0.0208 (0.423)	0.9972 (<0.001 ***)	-0.0284 (0.608)	-0.3046 (<0.001 ***)	0.4598 (<0.001 ***)	0.1060 (0.337)
PFE	0.0151 (0.415)	0.8342 (<0.001 ***)	-0.3310 (<0.001 ***)	-0.3289 (<0.001 ***)	-0.1676 (0.010)**	0.4816 (<0.001 ***)
PG	-0.0074 (0.631)	0.6705 (<0.001 ***)	-0.4103 (<0.001 ***)	-0.2432 (<0.001 ***)	0.4431 (<0.001 ***)	0.7557 (<0.001 ***)
TRV	0.0105 (0.536)	0.8206 (<0.001 ***)	-0.2792 (<0.001 ***)	0.3309 (<0.001 ***)	0.0105 (0.860)	0.1560 (0.031)*
UNH	0.0515 (0.033)*	0.9569 (<0.001 ***)	-0.2705 (<0.001 ***)	-0.1009 (0.119)	0.1687 (0.046)*	-0.0397 (0.700)
UTX	-0.0195 (0.234)	1.0522 (<0.001 ***)	-0.0676 (0.054)	0.0043 (0.922)	0.3451 (<0.001 ***)	0.2259 (0.001)**
V	0.0473 (0.062)	1.0463 (<0.001 ***)	-0.3056 (<0.001 ***)	-0.3433 (<0.001 ***)	-0.3149 (<0.001 ***)	-0.0349 (0.746)
VZ	0.0088 (0.633)	0.7153 (<0.001 ***)	-0.2394 (<0.001 ***)	-0.0548 (0.267)	0.5410 (<0.001 ***)	0.7374 (<0.001 ***)
WBA	-0.0086 (0.768)	0.9194 (<0.001 ***)	-0.2783 (<0.001 ***)	-0.3310 (<0.001 ***)	0.2538 (0.013)*	0.3695 (0.003)**
WMT	0.0014 (0.944)	0.6643 (<0.001 ***)	-0.2310 (<0.001 ***)	-0.2263 (<0.001 ***)	0.7071 (<0.001 ***)	0.6512 (<0.001 ***)
XOM	-0.0302 (0.062)	0.9076 (<0.001 ***)	-0.3314 (<0.001 ***)	0.2157 (<0.001 ***)	-0.0799 (0.158)	0.4778 (<0.001 ***)

Table A.5c (continued): The second subsample is used in the time-series regressions of the Fama-French (2015) five-factor model.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML	RMW	CMA
AAPL	0.0347 (0.247)	1.0144 (<0.001 ***)	-0.1371 (<0.001 ***)	-0.1313 (0.020)*	-0.1211 (0.040)*	0.0197 (0.841)	-1.3739 (<0.001 ***)
AXP	-0.0133 (0.574)	1.2398 (<0.001 ***)	0.0799 (0.002)**	-0.1795 (<0.001 ***)	0.8644 (<0.001 ***)	-0.0032 (0.967)	-0.3341 (<0.001 ***)
BA	0.0252 (0.250)	1.0352 (<0.001 ***)	0.2558 (<0.001 ***)	-0.1170 (0.004)**	-0.2841 (<0.001 ***)	0.2175 (0.002)**	0.5159 (<0.001 ***)
CAT	-0.0143 (0.533)	1.2278 (<0.001 ***)	0.1218 (<0.001 ***)	0.3071 (<0.001 ***)	-0.0381 (0.387)	0.2760 (<0.001 ***)	0.4633 (<0.001 ***)
CSCO	-0.0135 (0.563)	1.1363 (<0.001 ***)	-0.1376 (<0.001 ***)	-0.1538 (<0.001 ***)	-0.1814 (<0.001 ***)	-0.0981 (0.198)	0.1102 (0.191)
CVX	-0.0071 (0.694)	1.1234 (<0.001 ***)	0.1238 (<0.001 ***)	-0.3938 (<0.001 ***)	-0.0337 (0.336)	0.5246 (<0.001 ***)	0.3335 (<0.001 ***)
DIS	0.0091 (0.617)	1.1046 (<0.001 ***)	-0.0931 (<0.001 ***)	-0.1859 (<0.001 ***)	-0.0080 (0.821)	0.0399 (0.503)	0.4356 (<0.001 ***)
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
GS	-0.0128 (0.604)	1.0739 (<0.001 ***)	0.3443 (<0.001 ***)	-0.2594 (<0.001 ***)	0.8034 (<0.001 ***)	-0.6561 (<0.001 ***)	-0.7017 (<0.001 ***)
HD	0.0118 (0.538)	1.0073 (<0.001 ***)	-0.0575 (0.006)**	0.0831 (0.021)*	0.1016 (0.006)**	0.4478 (<0.001 ***)	0.4382 (<0.001 ***)
IBM	-0.0131 (0.442)	0.8615 (<0.001 ***)	-0.2078 (<0.001 ***)	-0.1345 (<0.001 ***)	-0.0047 (0.887)	0.1661 (0.003)**	0.0965 (0.117)
INTC	-0.0283 (0.264)	1.1802 (<0.001 ***)	-0.0082 (0.756)	-0.0769 (0.109)	-0.3404 (<0.001 ***)	0.1927 (0.020)*	0.2089 (0.023)*
JNJ	0.0093 (0.451)	0.6683 (<0.001 ***)	-0.0006 (0.966)	-0.3458 (<0.001 ***)	-0.2612 (<0.001 ***)	0.0817 (0.044)*	0.4953 (<0.001 ***)
JPM	0.0184 (0.387)	1.1273 (<0.001 ***)	0.0376 (0.098)	-0.1459 (<0.001 ***)	1.8198 (<0.001 ***)	-0.4116 (<0.001 ***)	-1.1365 (<0.001 ***)
KO	0.0161 (0.268)	0.6883 (<0.001 ***)	-0.0426 (0.007)**	-0.2761 (<0.001 ***)	-0.1960 (<0.001 ***)	0.2888 (<0.001 ***)	0.5936 (<0.001 ***)

Table A.6a: The full sample is used in the time-series regressions of the Fama-French (2015) five-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML	RMW	CMA
MCD	0.0392 (0.025)*	0.6763 (<0.001)***	-0.0803 (<0.001)***	-0.1243 (<0.001)***	-0.0686 (0.045)*	0.3149 (<0.001)***	0.2105 (<0.001)***
MMM	0.0021 (0.896)	0.9144 (<0.001)***	0.0222 (0.197)	-0.0568 (0.064)	-0.0867 (0.006)**	0.2211 (<0.001)***	0.4595 (<0.001)***
MRK	0.0049 (0.818)	0.8919 (<0.001)***	0.0373 (0.108)	-0.4077 (<0.001)***	-0.3898 (<0.001)***	-0.1324 (0.060)	0.7223 (<0.001)***
MSFT	0.0079 (0.711)	1.1028 (<0.001)***	-0.0184 (0.412)	-0.3503 (<0.001)***	-0.3890 (<0.001)***	0.1941 (0.006)**	-0.0356 (0.645)
NKE	0.0372 (0.097)	0.9803 (<0.001)***	-0.2915 (<0.001)***	0.1124 (0.008)**	0.0936 (0.031)*	0.3274 (<0.001)***	-0.1158 (0.151)
PFE	0.0086 (0.617)	0.8475 (<0.001)***	0.0083 (0.654)	-0.3635 (<0.001)***	-0.2043 (<0.001)***	-0.1598 (0.004)**	0.5847 (<0.001)***
PG	0.0003 (0.980)	0.6956 (<0.001)***	-0.1084 (<0.001)***	-0.3473 (<0.001)***	-0.0196 (0.457)	0.4150 (<0.001)***	0.5794 (<0.001)***
TRV	0.0114 (0.569)	0.9742 (<0.001)***	-0.0495 (0.023)*	-0.3519 (<0.001)***	0.4689 (<0.001)***	-0.0287 (0.661)	0.2049 (0.005)**
UNH	0.0169 (0.549)	0.9565 (<0.001)***	0.1735 (<0.001)***	-0.3497 (<0.001)***	-0.1839 (<0.001)***	-0.0023 (0.980)	-0.0278 (0.784)
UTX	-0.0038 (0.800)	0.9991 (<0.001)***	0.0540 (<0.001)***	-0.0270 (0.337)	-0.0567 (0.050)	0.3340 (<0.001)***	0.2959 (<0.001)***
V	0.0684 (0.018)*	0.9209 (<0.001)***	0.0360 (0.214)	-0.1599 (0.002)**	-0.0178 (0.734)	-0.3373 (<0.001)***	-0.6166 (<0.001)***
VZ	0.0100 (0.556)	0.8057 (<0.001)***	-0.0742 (<0.001)***	-0.3101 (<0.001)***	0.0435 (0.183)	0.3973 (<0.001)***	0.6998 (<0.001)***
WBA	-0.0109 (0.652)	0.8713 (<0.001)***	-0.1164 (<0.001)***	-0.1589 (<0.001)***	-0.1604 (<0.001)***	0.1990 (0.012)*	0.2694 (0.002)**
WMT	0.0038 (0.830)	0.6706 (<0.001)***	-0.0696 (<0.001)***	-0.1548 (<0.001)***	-0.1072 (0.002)**	0.5529 (<0.001)***	0.5665 (<0.001)***
XOM	-0.0275 (0.090)	1.0634 (<0.001)***	0.0931 (<0.001)***	-0.3794 (<0.001)***	-0.1421 (<0.001)***	0.6274 (<0.001)***	0.4749 (<0.001)***

Table A.6a (continued): The full sample is used in the time-series regressions of the Fama-French (2015) five-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML	RMW	CMA
AAPL	0.1494 (0.022)*	1.0799 (<0.001 ***)	-0.3285 (<0.001 ***)	-0.1073 (0.296)	-0.3764 (<0.001 ***)	-1.0005 (<0.001 ***)	-1.7472 (<0.001 ***)
AXP	-0.0166 (0.760)	1.3950 (<0.001 ***)	0.0685 (0.243)	-0.2202 (0.010)*	0.9559 (<0.001 ***)	-0.1680 (0.325)	0.0108 (0.954)
BA	-0.0131 (0.771)	0.9440 (<0.001 ***)	0.3896 (<0.001 ***)	-0.0983 (0.163)	-0.3671 (<0.001 ***)	0.1971 (0.160)	0.5549 (<0.001 ***)
CAT	0.0077 (0.875)	1.1738 (<0.001 ***)	0.1940 (<0.001 ***)	0.3897 (<0.001 ***)	-0.2290 (0.004)**	0.2133 (0.161)	-0.0203 (0.904)
CSCO	0.0386 (0.349)	1.2096 (<0.001 ***)	-0.2621 (<0.001 ***)	-0.1468 (0.025)*	-0.3128 (<0.001 ***)	-0.7023 (<0.001 ***)	0.3380 (0.019)*
CVX	0.0125 (0.704)	1.1230 (<0.001 ***)	0.2768 (<0.001 ***)	-0.5074 (<0.001 ***)	-0.1803 (<0.001 ***)	1.3497 (<0.001 ***)	-0.4946 (<0.001 ***)
DIS	0.0215 (0.562)	1.1597 (<0.001 ***)	-0.0471 (0.238)	-0.1932 (<0.001 ***)	-0.0498 (0.411)	0.0132 (0.910)	0.8049 (<0.001 ***)
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
GS	0.0383 (0.508)	1.1463 (<0.001 ***)	0.5375 (<0.001 ***)	-0.3408 (<0.001 ***)	0.4265 (<0.001 ***)	-0.7999 (<0.001 ***)	-0.7196 (<0.001 ***)
HD	-0.0346 (0.406)	1.0204 (<0.001 ***)	-0.1114 (0.013)*	0.2794 (<0.001 ***)	0.2911 (<0.001 ***)	0.3880 (0.003)**	0.6862 (<0.001 ***)
IBM	0.0548 (0.074)	0.8600 (<0.001 ***)	-0.3595 (<0.001 ***)	-0.1441 (0.003)**	-0.0254 (0.610)	-0.2318 (0.016)*	-0.0272 (0.796)
INTC	-0.0360 (0.479)	1.2723 (<0.001 ***)	-0.0277 (0.622)	0.0135 (0.868)	-0.5961 (<0.001 ***)	-0.3960 (0.014)*	0.7101 (<0.001 ***)
JNJ	0.0072 (0.764)	0.6237 (<0.001 ***)	0.0330 (0.200)	-0.3449 (<0.001 ***)	-0.2094 (<0.001 ***)	0.1350 (0.071)	0.7112 (<0.001 ***)
JPM	0.0266 (0.594)	1.1071 (<0.001 ***)	-0.0675 (0.232)	-0.0586 (0.470)	2.1518 (<0.001 ***)	0.0245 (0.877)	-1.2940 (<0.001 ***)
KO	0.0469 (0.132)	0.6764 (<0.001 ***)	-0.0167 (0.620)	-0.1811 (<0.001 ***)	-0.2707 (<0.001 ***)	0.0122 (0.901)	0.6382 (<0.001 ***)

Table A.6b: The first subsample is used in the time-series regressions of the Fama-French (2015) five-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML	RMW	CMA
MCD	0.0672 (0.070)	0.6867 (<0.001 ***)	-0.0904 (0.023)*	0.0110 (0.854)	-0.0598 (0.326)	0.1847 (0.114)	0.3080 (0.017)*
MMM	0.0126 (0.707)	0.8302 (<0.001 ***)	0.0077 (0.839)	0.0096 (0.858)	0.0195 (0.731)	0.2882 (0.007)**	0.5223 (<0.001 ***)
MRK	0.0281 (0.571)	0.9329 (<0.001 ***)	0.2178 (<0.001 ***)	-0.3545 (<0.001 ***)	-0.5417 (<0.001 ***)	-0.1518 (0.326)	1.0625 (<0.001 ***)
MSFT	0.0385 (0.387)	1.1325 (<0.001 ***)	0.0484 (0.301)	-0.3314 (<0.001 ***)	-0.5365 (<0.001 ***)	-0.1472 (0.294)	1.0439 (<0.001 ***)
NKE	0.0606 (0.171)	0.9207 (<0.001 ***)	-0.1472 (0.002)**	0.2758 (<0.001 ***)	0.1491 (0.039)*	0.3649 (0.009)**	0.1137 (0.459)
PFE	-0.0061 (0.863)	0.8514 (<0.001 ***)	0.0484 (0.202)	-0.3970 (<0.001 ***)	-0.1096 (0.054)	-0.0884 (0.425)	1.0205 (<0.001 ***)
PG	0.0160 (0.549)	0.7213 (<0.001 ***)	-0.1972 (<0.001 ***)	-0.2928 (<0.001 ***)	0.0687 (0.109)	0.3549 (<0.001 ***)	0.5404 (<0.001 ***)
TRV	0.0331 (0.495)	1.1089 (<0.001 ***)	-0.0742 (0.157)	-0.3837 (<0.001 ***)	0.4165 (<0.001 ***)	-0.3151 (0.039)*	0.6202 (<0.001 ***)
UNH	-0.0444 (0.512)	0.9359 (<0.001 ***)	0.5365 (<0.001 ***)	-0.3268 (0.002)**	-0.4920 (<0.001 ***)	-0.3787 (0.074)	0.3273 (0.160)
UTX	0.0223 (0.467)	0.9695 (<0.001 ***)	0.0507 (0.126)	0.0046 (0.925)	-0.0450 (0.364)	0.3375 (<0.001 ***)	0.3277 (0.002)**
V	0.1097 (0.344)	0.7864 (<0.001 ***)	0.0447 (0.639)	-0.0177 (0.896)	0.1533 (0.283)	-0.2213 (0.465)	-1.4424 (<0.001 ***)
VZ	0.0270 (0.431)	0.8974 (<0.001 ***)	-0.1588 (<0.001 ***)	-0.3594 (<0.001 ***)	-0.0039 (0.944)	0.0405 (0.706)	0.7957 (<0.001 ***)
WBA	-0.0234 (0.584)	0.8489 (<0.001 ***)	-0.2530 (<0.001 ***)	-0.0756 (0.263)	-0.0119 (0.862)	0.2088 (0.118)	0.1807 (0.219)
WMT	0.0119 (0.732)	0.7090 (<0.001 ***)	-0.1812 (<0.001 ***)	-0.0750 (0.170)	-0.1071 (0.053)	0.2253 (0.038)*	0.5610 (<0.001 ***)
XOM	-0.0144 (0.645)	1.1053 (<0.001 ***)	0.2171 (<0.001 ***)	-0.4213 (<0.001 ***)	-0.2605 (<0.001 ***)	1.5216 (<0.001 ***)	-0.1117 (0.298)

Table A.6b (continued): The first subsample is used in the time-series regressions of the Fama-French (2015) five-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML	RMW	CMA
AAPL	-0.0230 (0.421)	1.0357 (<0.001 ***)	-0.0405 (0.170)	-0.1219 (0.049)*	-0.0342 (0.659)	0.5891 (<0.001 ***)	-1.2767 (<0.001 ***)
AXP	-0.0038 (0.861)	1.0309 (<0.001 ***)	0.0841 (<0.001 ***)	-0.1041 (0.023)*	0.3713 (<0.001 ***)	-0.1118 (0.142)	0.0124 (0.893)
BA	0.0402 (0.088)	1.1476 (<0.001 ***)	0.1915 (<0.001 ***)	-0.1288 (0.011)*	-0.1104 (0.086)	0.3347 (<0.001 ***)	0.3758 (<0.001 ***)
CAT	-0.0258 (0.276)	1.2946 (<0.001 ***)	0.0716 (0.006)**	0.2426 (<0.001 ***)	0.2131 (0.001)**	0.2912 (<0.001 ***)	0.5235 (<0.001 ***)
CSCO	-0.0322 (0.248)	1.1152 (<0.001 ***)	-0.0598 (0.044)*	-0.1378 (0.021)*	-0.0651 (0.392)	0.2240 (0.023)*	-0.1427 (0.230)
CVX	-0.0206 (0.283)	1.0094 (<0.001 ***)	-0.0118 (0.570)	-0.2791 (<0.001 ***)	0.3520 (<0.001 ***)	-0.1107 (0.105)	0.4594 (<0.001 ***)
DIS	0.0072 (0.716)	1.0333 (<0.001 ***)	-0.1086 (<0.001 ***)	-0.1549 (<0.001 ***)	0.0013 (0.981)	-0.0055 (0.937)	0.2776 (0.001)**
DWDP	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
GS	-0.0313 (0.148)	0.9938 (<0.001 ***)	0.2434 (<0.001 ***)	-0.1320 (0.005)**	1.1979 (<0.001 ***)	-0.7087 (<0.001 ***)	-0.9304 (<0.001 ***)
HD	0.0327 (0.088)	1.0073 (<0.001 ***)	-0.0119 (0.570)	-0.1102 (0.007)**	-0.3494 (<0.001 ***)	0.4389 (<0.001 ***)	0.7196 (<0.001 ***)
IBM	-0.0467 (0.021)*	0.9221 (<0.001 ***)	-0.1204 (<0.001 ***)	-0.1429 (0.001)**	0.0317 (0.566)	0.4634 (<0.001 ***)	0.0554 (0.521)
INTC	-0.0144 (0.603)	1.1354 (<0.001 ***)	0.0274 (0.335)	-0.1183 (0.047)*	-0.1052 (0.159)	0.4479 (<0.001 ***)	-0.2220 (0.057)
JNJ	0.0068 (0.629)	0.7253 (<0.001 ***)	-0.0078 (0.619)	-0.3561 (<0.001 ***)	-0.2577 (<0.001 ***)	0.1337 (0.008)**	0.3728 (<0.001 ***)
JPM	0.0065 (0.714)	1.1071 (<0.001 ***)	0.0799 (<0.001 ***)	-0.2781 (<0.001 ***)	1.4052 (<0.001 ***)	-0.6934 (<0.001 ***)	-0.7476 (<0.001 ***)
KO	-0.0004 (0.981)	0.7296 (<0.001 ***)	-0.0467 (0.004)**	-0.3496 (<0.001 ***)	-0.2181 (<0.001 ***)	0.4419 (<0.001 ***)	0.6286 (<0.001 ***)

Table A.6c: The second subsample is used in the time-series regressions of the Fama-French (2015) five-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.

Ticker	α	$R_M - R_F$	NMP	SMB	HML	RMW	CMA
MCD	0.0252 (0.161)	0.6813 (<0.001 ***)	-0.0649 (<0.001 ***)	-0.2505 (<0.001 ***)	-0.2002 (<0.001 ***)	0.3434 (<0.001 ***)	0.2942 (<0.001 ***)
MMM	-0.0084 (0.624)	1.0187 (<0.001 ***)	0.0308 (0.084)	-0.1378 (<0.001 ***)	-0.1316 (0.005)**	0.2936 (<0.001 ***)	0.4440 (<0.001 ***)
MRK	-0.0023 (0.909)	0.8216 (<0.001 ***)	-0.0533 (0.016)*	-0.4041 (<0.001 ***)	-0.3146 (<0.001 ***)	-0.2352 (0.001)**	0.6013 (<0.001 ***)
MSFT	0.0058 (0.794)	1.1253 (<0.001 ***)	-0.0133 (0.571)	-0.3437 (<0.001 ***)	-0.0513 (0.398)	0.4543 (<0.001 ***)	-0.8568 (<0.001 ***)
NKE	0.0196 (0.432)	1.0414 (<0.001 ***)	0.3560 (<0.001 ***)	-0.0354 (0.508)	-0.1508 (0.027)*	0.3021 (<0.001 ***)	0.0764 (0.472)
PFE	0.0151 (0.415)	0.8343 (<0.001 ***)	-0.0008 (0.968)	-0.3311 (<0.001 ***)	-0.3286 (<0.001 ***)	-0.1679 (0.010)*	0.4816 (<0.001 ***)
PG	-0.0075 (0.624)	0.6776 (<0.001 ***)	-0.0594 (<0.001 ***)	-0.4113 (<0.001 ***)	-0.2181 (<0.001 ***)	0.4162 (<0.001 ***)	0.7511 (<0.001 ***)
TRV	0.0104 (0.538)	0.8241 (<0.001 ***)	-0.0293 (0.115)	-0.2798 (<0.001 ***)	0.3433 (<0.001 ***)	-0.0025 (0.966)	0.1538 (0.034)*
UNH	0.0514 (0.033)*	0.9587 (<0.001 ***)	-0.0146 (0.581)	-0.2708 (<0.001 ***)	-0.0947 (0.150)	0.1622 (0.057)	-0.0408 (0.692)
UTX	-0.0193 (0.238)	1.0448 (<0.001 ***)	0.0615 (<0.001 ***)	-0.0666 (0.057)	-0.0218 (0.624)	0.3723 (<0.001 ***)	0.2303 (0.001)**
V	0.0476 (0.061)	1.0432 (<0.001 ***)	0.0249 (0.355)	-0.3052 (<0.001 ***)	-0.3534 (<0.001 ***)	-0.3032 (<0.001 ***)	-0.0335 (0.756)
VZ	0.0088 (0.634)	0.7186 (<0.001 ***)	-0.0277 (0.165)	-0.2399 (<0.001 ***)	-0.0433 (0.386)	0.5285 (<0.001 ***)	0.7355 (<0.001 ***)
WBA	-0.0086 (0.767)	0.9236 (<0.001 ***)	-0.0355 (0.265)	-0.2786 (<0.001 ***)	-0.3159 (<0.001 ***)	0.2386 (0.021)*	0.3670 (0.003)**
WMT	0.0014 (0.944)	0.6645 (<0.001 ***)	-0.0018 (0.935)	-0.2310 (<0.001 ***)	-0.2256 (<0.001 ***)	0.7063 (<0.001 ***)	0.6511 (<0.001 ***)
XOM	-0.0302 (0.061)	0.9097 (<0.001 ***)	-0.0167 (0.344)	-0.3317 (<0.001 ***)	0.2227 (<0.001 ***)	-0.0874 (0.126)	0.4766 (<0.001 ***)

Table A.6c (continued): The second subsample is used in the time-series regressions of the Fama-French (2015) five-factor model that is augmented with the sentiment factor.

Note: One regression for each stock. p -values are in parentheses. *, ** and *** indicate statistical significance at the 5%, 1% and 0.1% levels, respectively. NA: not available.