Investor sentiment, growth forecast boldness, and cross-sectional stock returns

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Abstract

We analyze whether market-wide investor sentiment has an influence on cross-sectional stock returns, by affecting the boldness of analyst predictions for long-term earnings growth. We predict that bullish market-wide sentiment induces analysts to boldly sort out firms with high future growth from others, and that this excessive boldness results in a high level of mispricing. Consistent with our prediction, we observe an excessively large dispersion in consensus growth forecasts, when proxies for investor sentiment are high at the beginning of the period. Furthermore, stocks with higher predicted growth experience more negative earnings forecast revisions and lower subsequent stock returns, especially following periods of high investor sentiment.

Keywords: investor sentiment; long-term earnings growth forecast; cross-sectional stock return.

1. Introduction

Several behavioral finance studies reveal that investor sentiment drives stock prices away from fundamental value if investor sentiment is correlated (De Long et al. 1990; Shleifer and Vishny 1997). Consistent with this prediction, studies show that time-varying market-wide sentiment affects cross-sectional stock returns. Lemmon and Portniaguina (2006) and Baker and Wurgler (2006, 2007) use a measure of market-wide investor sentiment to show that difficult-to-value stocks (i.e., small, young, volatile stocks) are overvalued, especially when sentiment is high. They argue that, since difficult to value stocks are highly influenced by the trading activity of noise traders, valuation of these stocks is considerably affected by investor sentiment.

On the other hand, sentiment could reflect errors in market participants' expectations about future payoffs. Several studies report the influence of investor sentiment on financial analysts' earnings forecasts, which can be regarded as a proxy for investor expectations about future payoffs. Walther and Willis (2012) show that financial analysts' optimism regarding quarterly earnings forecasts is affected by market-wide investor sentiment.

Furthermore, Hribar and McInnis (2012) reveal that a difference in optimism in their expectation about a firm's future earnings, between difficult to value stocks and others, is affected by market-wide sentiment. These studies raise the possibility that investor sentiment affects cross-sectional stock returns by affecting market participants' expectation about a firm's future payoffs.

In this study, we contribute to this research by examining whether market-wide investor sentiment affects cross-sectional stock returns by inducing analysts to make excessively bold long-term earnings growth forecasts.

Long-term earnings growth expectations are crucial to stock price valuations. In many valuation models, an estimated intrinsic value of a firm's stock depends on long-term earnings growth (LTG) expectations (Frankel and Lee 1998; Gebhardt et al. 2001). Copeland et al. (2004) report that analysts' long-term earnings forecasts, a proxy for investors' long-term growth expectations, exert a great influence on stock prices.

Nevertheless, the extant research reveals that analysts' LTG forecasts are, on average, too extreme, and that this results in economically significant mispricing of stocks. La Porta (1996) and Chan et al. (2003) reveal that analysts too aggressively pick the future success stories: analysts excessively distinguish firms with high predicted growth from others.

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Analysts could more prefer to pick the future success stories when market-wide sentiment is more supportive for their preference, i.e. market-wide sentiment is higher. Thus, we predict that higher sentiment more allows analysts to boldly distinguish firms with high predicted growth from others. Since errors in LTG expectations induce significant mispricing, the excessive boldness in LTG expectations which is driven by market-wide investor sentiment, could affect on cross-sectional stock returns in a subsequent period.

In this study, we present empirical analyses directed at testing this possibility. Following Baker and Wurgler (2006, 2007), we use their market-wide investor sentiment index, and the Michigan Consumer Sentiment Index, to explore market sentiment effects.

We predict that bullish market-wide investor sentiment induces analysts to boldly sort out firms with high future growth from others. These bold predictions could be then corrected in a subsequent period, and this forecast correction affects cross-sectional stock returns by reducing mispricing induced by the bold predictions. Thus, we can predict that firms with higher expected growth experience more negative earnings forecast revisions and lower stock returns, especially following bullish market-wide sentiment.

Consistent with our predictions, we find that high (bullish) investor sentiment induces excessive dispersion in consensus (mean) long-term growth forecasts; dispersion in consensus LTG forecasts tend to be larger following higher investor sentiment, although realized growth spread, between firms with high-predicted growth versus low growth, is narrower following higher investor sentiment. In addition, we find that excessively bold predictions affect subsequent stock returns through the correction of these forecasts; both earnings forecast revisions and stock returns are significantly lower for firms with high-predicted growth than for those with low-predicted growth, especially following high investor sentiment.

These results support the inference that market-wide investor sentiment affects cross-sectional stock returns by inducing analysts to make excessively bold LTG estimations. Since analysts' LTG forecasts are regarded as a representative proxy for investor expectations of long-term earnings growth, our findings raise the possibility that the association between investor sentiment and stock returns is mediated by investors' bold expectation with regard to firm's long-term payoff.

2. Hypothesis development

To test the possibility that market-wide investor sentiment affects subsequent cross-sectional stock returns by inducing excessively bold long-term earnings growth estimations, we examined the following hypotheses.

2.1 Sentiment and forecast dispersions

First, we examined the association between market-wide investor sentiment and analysts' boldness regarding LTG predictions. Bullish investor sentiment allows analysts to boldly distinguish firms with high predicted growth from others, and if this is the case, dispersion in consensus long-term growth forecasts should be positively associated with the sentiment index. Hence, the first hypothesis to be tested is:

Hypothesis 1-1: There is a positive association between investor sentiment and dispersion in consensus long-term earnings growth forecasts.

In addition, we test whether large dispersion in consensus LTG forecasts induced by bullish investor sentiment is excessive, i.e., the large dispersion lowers the accuracy of the forecasts. To this end, we examine the association between investor sentiment and the realized growth spread between firms with high-predicted earnings growth and those with low-predicted growth. If the realized growth spread is not positively associated with investor sentiment, we can say that the large dispersion in the forecasts, induced by bullish investor sentiment, lowers the accuracy of the growth forecasts. Hence, the second hypothesis to be tested is:

Hypothesis 1-2: Investor sentiment is not positively associated with the realized growth spread between firms with high-predicted growth and those with low-predicted growth.

2.2 Stock returns and bold forecasts

Second, we examined whether bold LTG forecasts induced by bullish market-wide investor sentiment affects subsequent cross-sectional returns through the correction of these forecasts. The excessive dispersion in LTG forecasts could be corrected in a subsequent period. In addition, the forecast correction could affect subsequent cross-sectional stock returns by reducing mispricing. If this is the case, firms with high-predicted growth should experience more negative forecast revisions and lower subsequent stock returns than firms with low-predicted growth, especially when proxies for investor sentiment are high at the beginning of the period.

Accordingly, the hypotheses to be tested in this study are:

Hypothesis 2-1: There is a stronger negative association between the LTG forecasts and subsequent earnings forecast revisions, when proxies for investor sentiment are higher.

Hypothesis 2-2: There is a stronger negative association between the LTG forecasts and subsequent stock returns, when proxies for investor sentiment are higher.

3. Sample and descriptive statistics

We obtained our sample of analysts' earnings forecasts from the unadjusted file of the Institutional Brokers Estimate System (IBES) Summary. We collected data from stocks listed on the New York Stock Exchange (NYSE), American Stock Exchange (Amex), and NASDAQ that received LTG forecasts. We excluded the shares of non-US firms and stocks priced below $3 to ensure that the empirical findings are not driven by low priced. We utilized the data from the beginning of 1985 to the end of 2011 (monthly). To evaluate realized growth, we required five years of realized earnings growth. Thus, the final year of the sample is 2006. The number of eligible firms ranged from 1,568 to 3,459; on average, the sample comprised about 2,500 firms.

As mentioned earlier, for the main part of our analysis, we measure investor sentiment using the monthly time series of investor sentiment index constructed by Baker and Wurgler (2006) and the Michigan Consumer Sentiment Index, since these indices are used in extant investor-sentiment studies. To ensure

that both indices are free of macroeconomic influences, following Baker and Wurgler (2006, 2007), we conduct our investigation using an orthogonal version of the indices, which is obtained by regressing the indices against a set of macroeconomic variables.

4. Sentiment and bold growth forecasts
4.1 Sentiment and the forecast dispersion

To test Hypothesis 1-1, we examine the association between market-wide investor sentiment and LTG forecast dispersion. As for the dispersion in the LTG forecasts, following the study of Chan et al. (2003), we evaluate the spread in predicted growth between the top and bottom quintile of IBES long-term earnings growth (LTG) forecasts. We ran regressions of this type:

$$LTG_{X_t=High,t} - LTG_{X_t=Low,t} = c_k + d_k SENTIMENT_{k,t} + \varepsilon_{k,t} \quad (1)$$

$LTG_{X_t=High,t}$ denotes an average of consensus LTG forecasts for stocks included in the top LTG quintile (we denote these stocks as LTG5); $LTG_{X_t=Low,t}$ denotes an average of consensus LTG forecasts for stocks included in the bottom LTG quintile (we denote these stocks as LTG1). Thus, the dependent variable in the formula (1) is dispersion in a firm's consensus long-term growth forecast between the top and bottom quintile; $SENTIMENT_{k,t}$ (k=1,2) denotes Baker & Wurgler Sentiment Index and Michigan Consumer Sentiment Index, at the end of month t, respectively.

The regression result, shown in Table 1, reveals that dispersion in the LTG forecasts is significantly positively associated with the two sentiment indices, supporting Hypothesis 1-1.

4.2 Realized growth rate dispersion

To test Hypothesis 1-2, we examine the association between market-wide investor sentiment and the realized growth spread between firms with high LTG forecasts and firms with low ones. In keeping with the study of Chan et al. (2003), we report not only realized EPS (earnings per share) growth but realized growth in sales per share and operating income before depreciation (OIBD) per share. Earnings/ sales/ OIBD per share is defined by the past four quarters' earnings/ sales/ OIBD per share; we calculate the geometric average of the growth rate over 3 years (36 months) and 5 years (60 months). To

analyze the relationship between sentiment and the realized growth dispersion, we run the following regression:

$$Growth_{h,X_t=High,t,t+s} - Growth_{h,X_t=Low,t,t+s} \qquad (2)$$
$$= c_{h.k.s} + d_{h,k,s}SENTIMENT_{k,t} + \varepsilon_{h,k,s,t}$$

$Growth_{h,X_t=High,t,t+s}$ (h=1,2,3) denotes a median value of EPS, OIBD, and sales growth over subsequent s months (s=36 or 60) for stocks included in the top LTG quintile (LTG5); on the other hand, $Growth_{h,X_t=Low,t,t+s}$ indicates a median growth for the bottom LTG quintile (LTG1).

The regression results are shown in Table 1. Some results reveal that the dispersion in realized growth is significantly negatively associated with the two sentiment indices; the dispersions in 3- and 5-year realized EPS growth and 5-year realized OIBD growth are significantly negatively associated with the Baker & Wurgler Index; the dispersions in 5-year realized EPS growth, 5-year realized OIBD growth, and 3- and 5-year realized sales growth are significantly negatively associated with the Michigan Index. On the other hand, no result supports a positive association between the dispersion in realized growth and market-wide investor sentiment; these results support Hypothesis 1-2 which posits that investor sentiment is not positively associated with the realized growth spread between firms with high-predicted growth and those with low-predicted growth.

Table 1 Forecast and realized dispersion

	Baker & Wurgler Index		Michigan Index	
3-years EPS growth	-0.0363	(2.14)	-0.0015	(0.99)
5-years EPS growth	-0.0316	(3.83)	-0.0011	(2.35)
3-years OIBD growth	-0.0190	(1.17)	-0.0008	(0.90)
5-years OIBD growth	-0.0174	(2.21)	-0.0014	(4.92)
3-years sales growth	-0.0147	(0.37)	-0.0015	(1.81)
5-years sales growth	-0.0183	(1.17)	-0.0022	(6.93)
LTG dispersion	0.0575	(4.45)	0.0038	(4.60)

Note: The last row (the row of "LTG dispersion") shows ordinary least squares regression results for Eqs. (1). Other rows show ordinary least squares regression results for Eqs. (2). The column of "Baker & Wurgler Index" shows a coefficient of the index constructed by Baker and Wurgler (2007); the column of "Michigan Index" shows a coefficient of Michigan Consumer Sentiment Index. The figures in parentheses are t-statistics based on Newey-West standard errors.

5. Stock returns and bold forecasts
5.1 Correction of earnings forecasts

To test Hypothesis 2-1, we examine the association between market-wide investor sentiment and subsequent corrections (revisions) of the earnings forecasts. We evaluate the difference in the LTG forecasts revisions between the top LTG quintile (LTG5) and the bottom LTG quintile (LTG1); we examine whether the difference in the LTG forecast revisions is negatively associated with each market-wide sentiment index. In addition, for a robustness check, we also examine an association between market-wide sentiment and the difference in the revisions of next fiscal-year earnings forecasts between LTG5 and LTG1. We run regressions of this type:

$$\text{Rev}_{h,X_t=High,t} - \text{Rev}_{h,X_t=Low,t} \qquad (3)$$
$$= c_{h.k} + d_{h,k}SENTIMENT_{k,t} + \varepsilon_{h,k,t}$$

$\text{Rev}_{h,X_t=High,t}$ (h=1,2) denotes an average of revisions of next fiscal-year earnings and LTG forecast for LTG5 in the following month, respectively; $\text{Rev}_{h,X_t=Low,t}$ denotes an average of the subsequent 1-month revisions for LTG1.

A subsequent 1-month revision of next fiscal-year earnings and LTG forecast for firm i at the end of month t (we denote these as $Rev_{1,i,t}$ and $Rev_{2,i,t}$, respectively) are defined as:

$$Rev_{1,i,t} \equiv (fEPS_{i,y_t+2,t+1} - fEPS_{i,y_t+2,t})/P_{i,t}$$
$$Rev_{2,i,t} \equiv fLTG_{i,t+1} - fLTG_{i,t}$$

where y_t is the most recent fiscal year in which an earnings announcement was made at the end of month t; $fEPS_{i,y_t,t}$ is firm i's consensus annual EPS forecast for fiscal year y_t at the end of month t; $fLTG_{i,t}$ is the mean LTG forecast for firm i at the end of the month t; $P_{i,t}$ = stock price at the end of month t. $\text{Rev}_{h,X_t=High,t}$ ($\text{Rev}_{h,X_t=Low,t}$) is defined by a mean $Rev_{h,i,t}$ for LTG5 (LTG1).

The regression results, shown in Table 2, reveals that the difference in LTG forecast revisions is significantly negatively associated with the beginning-of-period sentiment indices. In addition, we find that the difference in revision of next fiscal-year earnings forecast is also significantly negatively associated with these sentiment indices. These results indicate

that stocks with higher predicted earnings growth experience a more negative earnings forecast revision, especially following bullish investor sentiment; these results support Hypothesis 2-1.

5.2 Subsequent cross-sectional stock returns

To test Hypothesis 2-2, we examine whether the return spread between LTG5 and LTG1 is negatively associated with market-wide investor sentiment. We should note that, to examine the sentiment effect on cross-sectional stock returns, it is necessary to distinguish sentiment effects from well-known co-movement: Size, Value (book to value), and Momentum. Baker and Wurgler (2006) report that when beginning-of-period proxies for investor sentiment are low, stock returns are relatively high for small stocks. They also predict that, when stocks are sorted by book-to-market, the subsequent stock returns at both extremes are more influenced by sentiment than are others. Furthermore, Antoniou et al. (2012) show that investor sentiment is positively associated with the profitability of price momentum strategies.

Therefore, we first calculate 1-month characteristic-adjusted returns. Then we examine whether difference in the adjusted return between LTG5 and LTG1 is negatively associated with beginning-of-period proxies for investor sentiment. We followed the characteristic-matching procedure in Daniel et al. (1997); we calculate 1-month characteristic adjusted returns as follows.

(i) We first divide the firms into five groups on the basis of a firm's size (log value of market capitalization); (ii) within each group, the firms are again divided into five groups based on book-to-market ratio (book value for the most recent reported quarter to market); (iii) within each group, the firms are divided into five groups based on mid-term stock return (the return from t - 12 months to t - 2 months); (iv) after forming a set of 125 (5 X 5 X 5) groups, we subtract the return of the equal-weighted benchmark portfolio to which that stock belongs from the return of that stock. Then, we run the following regression.

$$Ret_{X_t=High,t} - Ret_{X_t=Low,t}$$
$$= c_k + d_k SENTIMENT_{k,t} + \varepsilon_{k,t} \quad (4)$$

$Ret_{X_t=High,t}$ ($Ret_{X_t=Low,t}$) denotes a mean characteristic adjusted return for LTG5 (LTG1), in the following month (month t+1). Thus, the dependent variable in formula (4) is the spread in a subsequent 1-month adjusted return between the top and bottom LTG quintiles.

The regression results, shown in Table 2, reveal that the return spreads between LTG5 and LTG1 are significantly negatively associated with the two sentiment indices. These indicate that stocks with high-predicted growth experience low subsequent stock returns, especially following bullish investor sentiment; these support Hypothesis 2-2 which posits that there is a stronger negative association between the LTG forecasts and subsequent stock returns when proxies for investor sentiment are higher.

Table 2 Returns and forecast revisions

	Baker & Wurgler Index		Michigan Index	
EPS revison	-0.0008	(4.65)	-0.00002	(2.17)
LTG revision	-0.0017	(3.70)	-0.00004	(1.70)
Stock return	-0.0097	(1.72)	-0.00081	(1.77)

Note: Ordinary least squares regression results for Eqs. (3) are shown in the rows of "EPS revision" and "LTG revision". Ordinary least squares regression results for Eqs. (4) are shown in the rows of "Stock return". The figures in parentheses are t-statistics based on White's heteroscedasticity consistent standard errors.

6. Conclusions

Studies (e.g. Baker and Wurgler, 2006, 2007) have argued that market-wide investor sentiment has an influence on cross-sectional stock returns by affecting analysts' preference for securities whose valuations are highly subjective and are difficult to arbitrage. However, other studies report that the accuracy of earnings forecasts is also significantly influenced by market-wide investor sentiment. Since forecast errors could induce significant mispricing, such studies raise the possibility that market-wide investor sentiment also affects cross-sectional stock returns by affecting the accuracy of earnings forecasts. In this study, we contribute to these researches by examining whether market-wide investor sentiment affects cross-sectional stock returns by inducing excessively bold long-term earnings growth forecasts. We predict that higher investor sentiment induces analysts to

boldly distinguish high-growth firms from others, and this excessive bold behavior affects subsequent stock returns through the correction of these bold forecasts.

In line with our prediction, the analyses reveal that dispersion in LTG forecasts is larger following higher market-wide investor sentiment, although a realized growth spread between firms with high LTG forecasts and firms with low ones tends to be narrower following such sentiment. These findings support the inference that bullish investor sentiment induces analysts to excessively sort out firms with high-predicted growth from others. In addition, the analyses reveal that stocks with higher predicted growth experience more negative forecast revisions and lower stock returns, especially following bullish investor sentiment. These findings support the view that excessive dispersion in LTG forecasts is corrected in a subsequent period and that the correction affects cross-sectional stock returns through reducing mispricing.

Therefore, our findings support the inference that market-wide investor sentiment affects subsequent cross-sectional stock returns by inducing analysts to make excessively bold long-term earnings growth forecasts.

The study most closely related to ours is those of Baker and Wurgler (2006) and Hribar and McInnis (2012); they focus on an impact of investor sentiment on the return spread between difficult to value (hard to arbitrage) stocks and others. A key difference between our study and theirs is that we focus on impact of market-wide sentiment on the return spread between stocks with high predicted growth and stocks with low predicted growth, while both stocks are regarded as difficult to value in their study. Thus, we can say that our analyses offer new insight into the mechanism through which investor sentiment affects cross-sectional stock returns.

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