What Drives the Dispersion Effect: Investor Sentiment or Conditional Equity Premium?

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Abstract

This paper studies the dispersion effect documented in Yu (2011) that aggregate analyst forecast dispersion negatively forecasts future market returns. Using the U.S. data from 1981 to 2014, we find that the market return predictive power of aggregate dispersion only exists prior to 2005. The dispersion-return relation is partly driven by its correlation with conditional equity premium. In the sub-period analyses, we find that the impact of investor sentiment on dispersion effect documented by Kim et al. (2014) is also significant only prior to 2005. The dispersion effect significantly weakens after the global financial crisis and this is not driven by the changes in investor sentiment. Contrary to what Miller (1977) predicts, we do not find the short-sale constrained stocks experience higher dispersion effect.

Keywords: analyst forecast dispersion, conditional equity premium, market variance, average idiosyncratic variance, investor sentiment

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1. Introduction

One of the intriguing anomalies in stock market is the dispersion effect, which is the phenomenon that stocks with higher dispersion in analysts' forecasts earn lower returns subsequently. Diether et al. (2002) argue that dispersion in analysts' earnings forecasts reflects the differences of opinion among investors. According to Miller (1997), stock prices will reflect a more optimistic valuation when pessimistic investors are not able to trade due to the short-sale restriction. Thus, the higher disagreement among investors about the value of a stock, the higher the price of the stock relative to its true value. The overvaluation of the stock will cause the lower subsequent returns. Though Deither et al. (2002) reject the interpretation of dispersion as a measure of risk, Johnson (2004) argues that the dispersion effect is not necessarily a result of the market frictions or irrationality. Instead he argues that the dispersion proxies for the idiosyncratic risk when fundamentals of the firm are unobservable. The increased uncertainty increases the option value of the firm, thus causes lower future returns. Deither et al. (2002) and Johnson (2004) present conflicting explanation and interpretation for dispersion anomaly. Further Barron et al. (2009) demonstrate that forecast dispersion can be separated into two components, the levels and changes in dispersion, and these two components capture different information contents. The levels of dispersion reflect unsystematic uncertainty and results in lower future returns while the changes in dispersion however reflect changes in information asymmetry among investors, thus is positively associated with future returns. The authors demonstrate that it is the uncertainty component of dispersion levels explains the negative association between dispersion levels and future stock returns.

Despite the conflicting arguments about the cause of the dispersion anomaly, the negative relationship between the dispersion in analysts' forecasts and future stock returns seems to be robust. Yu (2011) further examines the dispersion effects in the context of stock portfolios.

By employing a portfolio disagreement measurement from individual-stock analysts forecast dispersion, the author finds that the market portfolio disagreement is negatively related to ex post expected market return. The author presents the aggregate dispersion as a proxy for divergence of investor opinions. He argues that his empirical evidence supports Miller's (1977) theory that overpricing occurs in a stock market with short-sale constraints and divergence in investor opinions. The overpricing will be eventually corrected in the long-run as investors observe future news and realize their errors thus causes the lower subsequent returns.

In line with Yu (2011), Kim, Ryu and Seo (2014) employs the investor sentiment as a proxy for short-sale constraints into the analysis of dispersion effect at the aggregate market level. Using the sentiment index of Baker and Wurgler (2006), Kim et al. (2014) show that the negative relation between the aggregate analyst forecast dispersion and future market returns is significant only when investor sentiment is high. They argue that this is consistent with Miller's theory in which short-sale constraints is a necessary condition of the overpricing.

Furthermore, Leippold and Lohre (2014) study the dispersion effect cross-sectionally in the U.S. and Europe. They find that the effect is most pronounced during the mid-to-late 1990s and 2000-2003 around the burst of the Internet bubble. The effect is difficult to be exploited to arbitrage because it concentrates on stocks with high arbitrage costs such as high information uncertainty and high illiquidity.

Despite strong evidence of dispersion effect at the level of individual stock and the aggregate market, the explanation and interpretation of dispersion-return relation remain a debate. We aim to bring new insights into this argument through examining the role of conditional equity premium (Guo and Savickas 2008, Guo and Qiu 2017). Guo and Savickas (2008) propose that stock market variance (MV) and average CAPM-based idiosyncratic variance (IV) are proxies for conditional equity premium as they jointly have significant predictive power for future stock market returns. Guo and Qiu (2017) show that MV and IV can in fact drive out standard market return predictors commonly used in the literature, such as Welch and Goyal (2008). Further the market return predictive power of aggregate investment is driven by its correlation with conditional equity premium (MV and IV).

We re-examine the dispersion effect in the framework of Yu (2011). Interestingly we find that the negative relationship between the aggregate dispersion and future stock return has not only disappeared post 2005 but also become positive in the longer horizon. By adopting the conditional equity premium proxies MV and IV, we find that the market return predictive power of aggregate dispersion is partly driven by its correlation with conditional equity premium in both prior and post 2005 periods. After we decompose the dispersion into two components, one related to the conditional equity premium and the other one unrelated to it, we find that the related component is negatively significantly correlated with returns in both sub-periods, while the unrelated component is negatively significant only in the first period.

Following Kim et al. (2014), we also examine the investor sentiment and its interaction with the dispersion. We find that the interaction term is negatively significant only in the first period also. In addition the dispersion-return relation becomes positive for longer-term horizon in the post 2005 period. Furthermore, we find the dispersion effect weakens after the global financial crisis broke out in September 2008. Investor sentiment does not drive this change.

At last, to test the dispersion effects under short-sale restriction, we separate our sample stocks by their Institutional Ownership (IO) and their put options. We don't find significant differences in dispersion-return relationships across the stocks with different institutional ownership and with/without put options. Our results in general do not support Miller's short-sale constraints story.

This paper is organized as follows. Section 2 explains the data and methodology. The results are presented in Section 3 followed by the robustness test in Section 4. Section 5 concludes.

2. Data and Methodology

Our main sample period is from December 1981 to November 2014. Our data are from various sources. The monthly stock closing prices and shares outstanding data of the U.S. common stocks listed on the NYSE/AMEX/NASDAQ are obtained from CRSP. The one-month Treasury bill rates are obtained from Professor Kenneth R. French's website. The mean and standard deviation of analyst forecasts of the individual stock earnings-per-share (EPS) long-term growth (LTG) data are obtained from unadjusted IBES summary database. To construct the stock market variance and average idiosyncratic variance, the daily individual stock returns and market returns are also obtained from CRSP. The data of common market return predictors are obtained from Amit Goyal's website.

We use BW investor sentiment index constructed by Baker and Wurgler (2006). The BW sentiment data are obtained from Jeffrey Wurgler's website. The institutional ownership data are obtained from Thomson Reuters and the put option data are obtained from Option Metrics.

The mean and standard deviation of analyst forecast EPS LTG for stock *i* in month *t* are denoted as $\mu_{i,t}$, and $\sigma_{i,t}$ respectively. Following Yu (2011), the aggregate dispersion of analyst forecast is constructed as the value-weighted average of individual stock standard deviations:

$$adis_t = \frac{\sum_i MKTCAP_{i,t} \cdot \sigma_{i,t}}{\sum_i MKTCAP_{i,t}}$$

Similary, the aggregate mean of analyst forecasts is constructed as the value-weighted average of individual stock means:

$$mean\ forecast_t = \frac{\sum_i MKTCAP_{i,t} \cdot \mu_{i,t}}{\sum_i MKTCAP_{i,t}}$$

Monthly market variance (MV) and average idiosyncratic variance (IV) are constructed using the last available quarterly observation for MV and IV respecitvely. Quarterly MV is constructed by summing up squared daily value-weighted CRSP stock market returns in a quarter. To construct the quarterly IV, we first use the daily individual stock return data in a quarter to estimate the daily CAPM-based idiosyncratic returns. Then we sum up squared daily idiosyncratic returns in a quarter to get realized quarterly idiosyncratic variance for all CRSP common stocks that have at least 51 daily return observations in that quarter. The aggregate idiosyncratic variance is then the value-weighted average of individual stock idiosyncratic variance. To be consistent with prior literature, we only include the largest 500 stocks in the aggregation.

Figure 1 depicts the time series of our dispersion measure. The plot in Figure 1 seems to suggest a structural change in the dispersion measure shown by an obvious increase in both level and deviation of dispersion measure post 2005. To make our results more comparable to Yu (2011), we divide our sample into two sub-periods, Dec 1981 to Dec 2005 and Jan 2006 to Nov 2014.

Table 1 reports the summary statistics of the main variables for the two sub-periods and the whole period respectively. The statistics of aggregate dispersion, aggregate mean forecast and excess market returns in the first period is similar to those reported by Yu (2011) as expected. In the second period, aggregate dispersion, BW sentiment index and market variance (MV) have significantly greater means and standard deviations than those in the first period. The average idiosyncratic variance (IV) has much smaller mean in the second period than in the first period.

3. Results

3.1 The dispersion-return relation

Firstly we conduct the univariate regression of future market returns on dispersion. The regression model is as follows.

$$R^{M}_{t,t+h} = \alpha + \beta \cdot adis_t + \varepsilon_t \tag{1}$$

where $R^{M}_{t,t+h}$ is the excess market return from month *t* to t+h. Excess market returns are value-weighted returns of all the common stocks listed on the NYSE/AMEX/NASDAQ with valid return data minus one-month Treasury-bill rates. The horizon *h* ranges from one month to three years. $adis_t$ is the aggregate analyst forecast dispersion at month *t*. The sample period for this univariate analysis is from December 1981 to December 2015. The results of regression (1) are shown in Table 2. We report Newey West t-statistics adjusted for auto-correlation with number of lags equal to return horizons unless otherwise stated. Contrary to Yu (2011) findings, we find that the negative dispersion-return relation is only marginally significant for horizons of 6 and 12 months and is insignificant for all the other horizons in the whole sample period (see Panel A).

In our sub-period analyses, consistent with Yu (2011) findings, dispersion is negatively significant from Dec. 1981 to Dec. 2005 for each horizon (see Panel B). However, dispersion becomes insignificant for the short horizons in the period after 2005 and becomes positively significant for horizons of 24 and 36 months (see Panel C).

We then control for aggregate mean of analyst forecasts and common market return predictors similar to those used by Yu (2011). These variables include:

> The price-earnings ratio PE, consumption-wealth ratio CAY, dividend-price ratio DP, smoothed earnings-price ratio SMOOTHEP, book-to-market ratio BM, short-term interest rate SHORTYIELD, long-term bond yield LONGYIELD, the term spread between long- and short-term Treasury yields TMSPREAD, the default spread between corporate and Treasury bond yields DFSPREAD, the lagged rate of inflation INFLATION, and the equity share of new issues EQUITYSHARE.

The Appendix describes the above control variables in more details.

The multivariate regression model we use in matrix notation is:

$$R^{M}_{t,t+h} = \beta_0 + \beta_1 \cdot adis + \beta_{ctrl} \cdot Control + \varepsilon \qquad (2)$$

where *Control* is a column vector consisting of all the control variables and β_{ctrl} is a row vector consisting of the coefficients of the control variables. Table 3 shows the multivariate regression results. After adding controls, coefficients of dispersion change. For the whole period (Panel A), dispersion is negatively significant for 6, 12 and 24 months horizon, but the magnitude of coefficients are much smaller than those for the first sub-period (Panel B). In the first period for the 12-month horizon, the coefficient of dispersion is -0.303 and is highly significant (t-stat = -5.676). It is also economically significant. A one-standard-deviation increase in dispersion is linked with a decrease of 13.9% in the future 12-month excess market returns. This figure is economically significant considering that the mean and standard deviation of one-year market returns in the first period is 8.99% and 16.3% respectively. In the second period (Panel C), the dispersion is negatively significant for 6 months (short term) horizon, negative but insignificant for 12 and 24 months (medium term) return, and positively significant for 36 months (long term) return.

In summary, the univariate and multivariate analyses show that the dispersion effect in the aggregate market level has changed from negative to be positive at the longer horizon post 2005.

3.2 Conditional equity premium and dispersion effect

We then investigate what has caused the significant change in the dispersion effect after 2005. According to Guo and Savickas (2008) and Guo and Qiu (2017), stock market variance (MV) and average idiosyncratic variance (IV) as proxies for conditional equity premium jointly have significant predictive power for future stock market returns. In particular, according to their studies, MV is positively and IV is negatively correlated with future market returns.

We also use MV and IV as proxies for conditional equity premium to investigate if the return predictive power of dispersion is driven by its correlation with conditional equity premium. It is natural to think that aggregate dispersion may be correlated with aggregate idiosyncratic variance because both of them have been used as proxies for divergence of investor opinions in the literature (For example, Diether et al. 2002 and Boehme et al. 2006).

Firstly we investigate the relation between dispersion and conditional equity premium with the following regression of dispersion on concurrent MV and IV:

$$adis_t = \alpha + \beta_1 MV_t + \beta_2 IV_t + \varepsilon_t \quad (3)$$

The results are shown in Table 4. As the monthly MV and IV are converted from quarterly measures, Newey West t-statistcis adjusted for auto-correlation with 3 lags are reported. In the whole period (col 1), IV is positively significantly correlated with dispersion and MV is insignificant. In the two sub-periods, MV and IV both flip their signs. In the first sub-period the adjusted R-squared is very high (49%) compared to the second sub-period (5.7%) and the whole sample period (7.4%). This suggests that the dispersion has strong correlation with conditional equity premium in the first sub-period but not in the second period.

We then study whether the return predictive power of dispersion reflects its co-movement with conditional equity premium. Following Guo and Qiu (2017), we regress the dispersion on concurrent MV and IV for the whole period and two sub-periods respectively and obtain the fitted and residual components of dispersion. We then regress the future 12-month market returns on dispersion, and the fitted and residual components of dispersion obtained from the last step, with controls for all the common market return predictors. The regression model in matrix notation is:

$$R^M_{t,t+12} = \beta_0 + \beta_1 \cdot adis + \beta_2 \cdot disp\_f + \beta_3 \cdot disp\_r + \beta_{ctrl} \cdot Control + \varepsilon \quad (4)$$

where disp_f and disp_r are the fitted and residual components of dispersion respectively. The results are shown in Table 5. In the first period, both the fitted and residual components of dispersion is negatively significantly correlated with future return. Dropping the residual component from the regression reduces the adj. R-squared from 46% to 28%. Dropping the fitted component decreases the adj. R-squared from 46% to 38%. This means both components have considerable return predictive power. The residual component likely has greater power than the fitted component. The return predictive power of dispersion is partly driven by its correlation with conditional equity premium.

In the second period, the fitted component is negatively significantly correlated with return and the magnitude of the coefficient is close to that in the first period. The residual component is negative but insignificant. Dropping the fitted component decreases the adj. R-squared from 86% to 82% while dropping the residual component has no effect on the adj. R-squared. This means in the second period the return predictive power of dispersion is likely driven by its correlation with conditional equity premium.

In summary, in both periods the fitted component of dispersion has negative return predictive power. This means at least part of the return predictive power of dispersion is driven by its correlation with conditional equity premium. Dispersion does not have significant predictive power for future12-month returns in the second period likely because its residual component has no power and brings noises into the dispersion as a whole.

3.3 Investor sentiment and dispersion effect

As Kim, Ryu and Seo (2014) show that the dispersion effect is negatively significant only in high investor sentiment periods, we add an investor sentiment dummy variable (bw_h) and its interaction term with dispersion to the regression. The dummy is set to 1 if the investor sentiment in that month is higher than the median value of the full sample or 0 otherwise. The regression model in matrix notation is:

$$R^{M}_{t,t+12} = \alpha + \beta_1 \cdot adis + \beta_2 \cdot MV + \beta_3 \cdot IV + \beta_4 \cdot bw\_h + \beta_5 \cdot adis \cdot bw\_h + \beta_{ctrl} \cdot Control + \varepsilon_t \quad (5)$$

The results are shown in Table 6. In the first sub-period, dispersion is negatively significantly correlated with future return, in both high- and low-sentiment periods (Col 4). The negatively significant interaction term means that the effect is stronger in high-sentiment periods.

Adding dispersion to the regression greatly increase the adj. R^2 from 29% to 47% (compare Col 5 and 6). The mean analyst forecast is positively correlated with future returns.

In the second sub-period, the coefficients of dispersion and its interaction term with the sentiment dummy are negative and insignificant (Col 7). This means dispersion has no return predictive power in the second period and sentiment has no effect on this. Comparison of Col 8 and 9 shows that adding dispersion has no effect on the adj. R-squared. The mean analyst forecast is negatively correlated with future returns in contrast with the first period.

In summary, dispersion has negative return predictive power in the first subperiod but no power in the second subperiod. High sentiment strengthens the dispersion effect in the first period but not in the second period. This means that Kim et al.'s findings that investor sentiment strengthens the dispersion effect is not robust in periods after 2005.

3.4 The global financial crisis (GFC) and dispersion effect

Table 1 depicts that dispersion increases significantly from 2005 and over the GFC period. It is natural to wonder whether the change is caused by the crisis, such as the changes in market conditions, policies, regulations and investor sentiment around the crisis period. In Table 7, we construct a dummy variable (d_gfc) which is set to one from September 2008 onwards or zero otherwise. The regression model is as follows:

$$R_{t,t+12}^{M} = \alpha + \beta_1 \cdot adis + \beta_2 \cdot d\_gfc + \beta_3 \cdot d\_gfc \cdot adis + \beta_4 \cdot bw + \beta_5 \cdot adis \cdot bw + \beta_{ctrl} \cdot Control + \varepsilon_t \qquad (6)$$

where *bw* is the continuous Baker and Wurgler sentiment index. Column 1 shows that *adis* is negatively significant before Sep. 2008. The interaction term *d_gfc* * *adis* is positively significant. The magnitude of coefficient of dispersion is -0.076 in post-GFC period while that is -0.266 in pre-GFC period. This result shows that dispersion effect becomes weaker after the recent financial crisis begun. Column 2 shows the results after controlling for Baker and Wurgler (BW) sentiment index and its interaction term with the dispersion. The significance of the GFC dummy and its interaction term with dispersion remains largely unchanged, and the sentiment and its interaction term with dispersion however are insignificant. The results here suggest that investor sentiment cannot drive out the effect of the GFC dummy on the dispersion effect. Sentiment is not the main cause of the change in dispersion effect occurring after GFC.

3.5 Portfolio analyses based on Institutional Ownership and Put Option

In Miller's theory short-sale constraints are necessary conditions of overpricing and the subsequent lower returns of high-dispersion stocks. Therefore the dispersion effect should be stronger for stocks with higher short-sale constraints. In this paper we use two proxies for short-sales constraints: Institutional Ownership (IO) and Put option. The short sellers need to borrow stocks to sell short and the institutional investors are the main suppliers of stock lending. Lower IO means the supply of stock lending is lower and thus implies higher short-sale constraints. Put option of a stock enable investors to profit when the underlying stock's price falls, therefore the stocks without put options have higher short-sale constraints. Miller's theory therefore predicts that the dispersion effect should be stronger in stocks with lower IO or without put options. We then test if these predictions are supported in our following analysis.

In each month we divide all the stocks in our sample into two groups, high IO group and low IO group, based on the median IO in that month. The IO data are obtained from Thomson Reuters. We then calculate the value-weighted returns, value-weighted analyst forecast dispersion, and value-weighted mean analyst forecasts for two groups respectively and run regression (2) within each group respectively. The results are shown in Table 8. The coefficients of dispersion in high IO stocks tend to be greater than those in low IO stocks, especially in the first sub-period. In the second sub-period, the coefficients of dispersion are similar in two groups of stocks. These results are inconsistent with Miller's short-sale constraints story.

Next, we do similar portfolio analyses for stocks with and without put options. Our data of put options are obtained from Option Metrics and begin from January 1996, so the sample size is smaller in this analysis. The results are shown in Table 9. We find that the dispersion effect tends to be stronger in stocks with put options than stocks without put options, in the first sub-period. In the second sub-period the coefficients of dispersion are similar in the two groups of stocks. Again, our results do not support Miller's theory.

4. Robustness checks

Our analysis so far uses the value-weighted average of the standard deviations of analyst forecasts for individual stocks as the dispersion measure. Diether et al. (2002) and Leippold and Lohre (2014) use the analyst forecast standard deviations divided by the mean analyst forecasts for individual stocks as their dispersion measures. Though the dispersion measures calculated by these two methods have high correlation at 0.8, we use the scaled dispersion measure *asdmn* and continuous BW sentiment index for robustness checks in

Table 10. Column 1 shows that in the whole sample period there is a negative dispersion-return relation and sentiment strengthens this negative relation. Column 2 shows that in the first period the effect of sentiment is insignificant. In the second period shown in Column 3 there is no significant dispersion-return relation and the interaction term becomes positively significant. These results show that the impact of sentiment on the dispersion effect is not robust to alternative measures and this contradicts Kim et al. (2014) findings.

5. Conclusion

In summary, we find that the dispersion effect documented in Yu (2011) has disappeared post 2005. Our study shows that the market return predictive power of aggregate dispersion is partly driven by its correlation with conditional equity premium. The impact of investor sentiment on dispersion effect is significant only before 2005. Furthermore, the dispersion-return relation is negatively significant for short-term horizon and positively significant for long-term horizon in post 2005 period. The negative dispersion effect significantly weakens after the global financial crisis broke out in September 2008 and this is not driven by the changes in investor sentiment. In robustness checks we examine the dispersion effect in low IO and high IO stocks, and in stocks with and without put options respectively. Our results raise questions about the validity of Miller's short-sale constraints story.

Our study points out an intriguing question for the future research, "why has the dispersion effect disappeared"? It will be interesting to study if the economic policy uncertainty documented in Baker, Bloom and Davis (2016) has caused the change after 2005 or the financial crisis. It is also worthwhile to study the dispersion effect in the international stock markets to see the cross-country differences and their causes.

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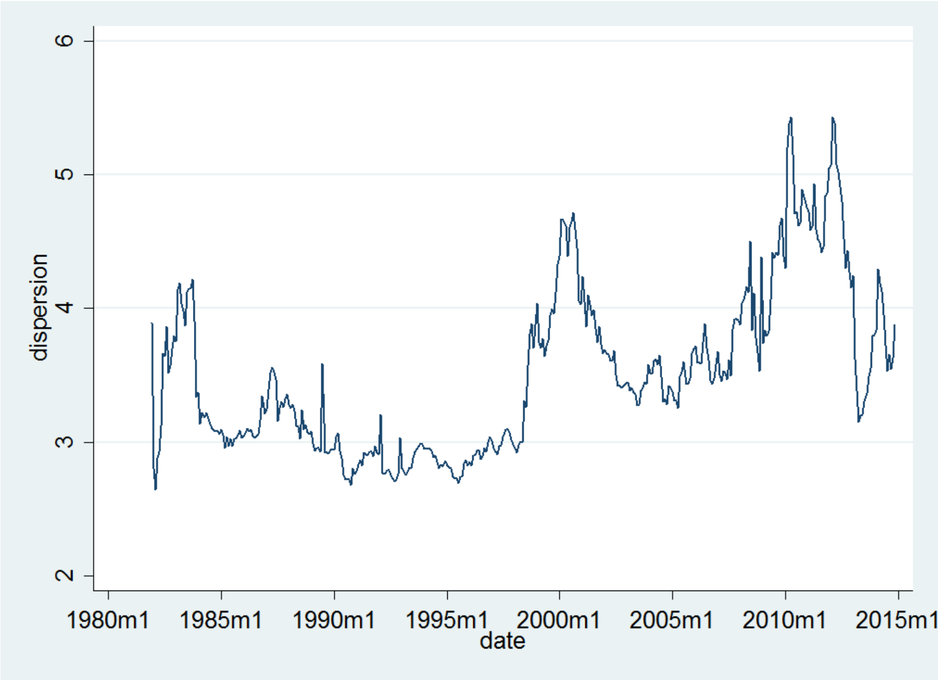

Figure 1: Time series of monthly aggregate analyst forecast dispersion (in percentage) which is the cross-sectional value-weighted average of analyst forecast standard deviations of long-term EPS growth rate. The sample period is December 1981 – November 2014.

Table 1: Summary Statistics

Panel A, B and C reports summary statistics for the first (1981.12-2005.12), second (2006.1-2014.11) and whole period (1981.12-2014.11) respectively. Adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. Mean forecast is the value-weighted average of individual stocks' means of analyst forecasts of EPS long term growth rates. $R^{M}_{t,t+h}$ is the excess market return from month t to t+h. bw is the Baker and Wurgler investor sentiment index. MV is stock market variance. IV is average idiosyncratic variance.

Period	Variable	Num. Obs.	Mean	Sd	Min	Max
Panel A						
1981.12-2005.12	$adis_t$ (%)	289.00	3.28	0.46	2.65	4.72
	$mean\ forecast_t$ (%)	289.00	13.88	2.05	11.78	21.64
	$R^{M}_{t,t+1}$	289.00	0.0066	0.0441	-0.2297	0.1237
	$R^{M}_{t,t+6}$	289.00	0.0428	0.1108	-0.2796	0.3744
	$R^{M}_{t,t+12}$	289.00	0.0899	0.1631	-0.3425	0.5821
	$R^{M}_{t,t+24}$	289.00	0.1840	0.2311	-0.4822	0.6504
	$R^{M}_{t,t+36}$	289.00	0.2915	0.3260	-0.5217	1.0588
	bw	289.00	0.44	0.65	-0.76	3.08
	MV	289.00	0.00701	0.00919	0.00136	0.08095
	IV	289.00	0.01682	0.01178	0.00761	0.07136
Panel B						
2006.1-2014.11	$adis_t$ (%)	107.00	4.14	0.58	3.15	5.43
	$mean\ forecast_t$ (%)	107.00	12.20	0.98	9.93	13.63
	$R^{M}_{t,t+1}$	107.00	0.0061	0.0464	-0.1850	0.1140
	$R^{M}_{t,t+6}$	107.00	0.0415	0.1383	-0.4303	0.4310
	$R^{M}_{t,t+12}$	107.00	0.0804	0.1943	-0.4508	0.5744
	$R^{M}_{t,t+24}$	107.00	0.1525	0.2942	-0.5013	0.9667
	$R^{M}_{t,t+36}$	96.00	0.2629	0.3446	-0.4849	1.0178
	bw	107.00	-0.03	0.39	-0.87	0.85
	MV	107.00	0.00911	0.01544	0.00126	0.09306
	IV	107.00	0.01250	0.01006	0.00671	0.05673
Panel C						
1981.12-2014.11	$adis_t$ (%)	396.00	3.51	0.62	2.65	5.43
	$mean\ forecast_t$ (%)	396.00	13.42	1.97	9.93	21.64
	$R^{M}_{t,t+1}$	396.00	0.0065	0.0446	-0.2297	0.1237
	$R^{M}_{t,t+6}$	396.00	0.0425	0.1186	-0.4303	0.4310
	$R^{M}_{t,t+12}$	396.00	0.0874	0.1719	-0.4508	0.5821
	$R^{M}_{t,t+24}$	396.00	0.1755	0.2497	-0.5013	0.9667
	$R^{M}_{t,t+36}$	385.00	0.2844	0.3305	-0.5217	1.0588
	bw	396.00	0.31	0.63	-0.87	3.08
	MV	396.00	0.00758	0.01124	0.00126	0.09306
	IV	396.00	0.01565	0.01149	0.00671	0.07136

Table 2: Univariate regressions of future excess market returns on aggregate dispersion

This table reports univariate regression results of future excess market returns on aggregate dispersion. The return horizons ranges from one month to three years. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. Panel A, B, and C reports results for the whole period (1981.12-2015.12), the first subperiod (1981.12-2005.12), and the second subperiod (2006.1-2015.12) respectively. Parentheses report Newey West t-statistics adjusted for autocorrelation, with the number of lags equal to the return horizons. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A. Ex-post excess market return on dispersion, 1981.12-2015.12.

	(1)	(2)	(3)	(4)	(5)
Return horizons (in months)	1	6	12	24	36
adis	-0.00318	-0.0309*	-0.0648*	-0.0952	-0.111
	(-0.936)	(-1.797)	(-1.739)	(-1.093)	(-0.813)
Constant	0.0174	0.150***	0.315**	0.510*	0.674
	(1.469)	(2.646)	(2.567)	(1.781)	(1.484)
Adj R^2	-0.000	0.025	0.056	0.054	0.042
Observations	409	409	409	397	385

Panel B. Ex-post excess market return on dispersion, 1981.12-2005.12.

	(1)	(2)	(3)	(4)	(5)
Return horizons (in months)	1	6	12	24	36
adis	-0.00749	-0.0717***	-0.175***	-0.324***	-0.431***
	(-1.288)	(-2.868)	(-4.200)	(-4.210)	(-3.618)
Constant	0.0312*	0.278***	0.664***	1.247***	1.706***
	(1.675)	(3.558)	(4.957)	(4.823)	(4.362)
Observations	289	289	289	289	289
Adjusted R-squared	0.003	0.087	0.244	0.420	0.373

Panel C. Ex-post excess market return on dispersion, 2006.1-2015.12.

	(1)	(2)	(3)	(4)	(5)
Return horizons (in months)	1	6	12	24	36
adis	0.00198	-0.00240	0.0362	0.209**	0.341***

	(0.283)	(-0.0993)	(0.763)	(1.991)	(2.808)
Constant	-0.00338	0.0454	-0.0762	-0.714	-1.158*
	(-0.114)	(0.423)	(-0.338)	(-1.422)	(-1.963)
Observations	120	120	120	108	96
Adjusted R-squared	-0.008	-0.008	0.004	0.162	0.342

Table 3: Multivariate regressions of future excess market returns on dispersion

This table reports multivariate regression results of future excess market returns on dispersion. The return horizons ranges from one month to three years. Panel A, B, and C reports results for the whole period (1981.12-2014.11), the first subperiod (1981.12-2005.12), and the second subperiod (2006.1-2014.11) respectively. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. Mean forecast is the value-weighted average of individual stocks' means of analyst forecasts of EPS long term growth rates. We control for the common market return predictors used in Yu (2011). Parentheses report Newey West t-statistics adjusted for autocorrelation, with the number of lags equal to the return horizons. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: The whole period 1981.12-2014.11

	(1)	(2)	(3)	(4)	(5)
Horizons/periods	1 whole	6 whole	12 whole	24 whole	36 whole
adis	-0.00507	-0.0472**	-0.0960***	-0.101**	-0.0644
	(-0.884)	(-2.212)	(-2.648)	(-2.110)	(-0.928)
Mean forecast	0.00531	0.0111	-0.00519	0.0131	0.0332
	(1.388)	(0.911)	(-0.279)	(0.653)	(1.217)
PE	0.000320	0.00215***	0.00171	0.00171	-0.00378
	(1.376)	(3.113)	(1.605)	(1.283)	(-1.521)
CAY	0.567***	2.713***	2.960***	7.317***	8.072**
	(2.772)	(3.384)	(2.762)	(3.524)	(2.456)
DP	0.563	-1.884	-6.800	-3.317	17.28
	(0.420)	(-0.328)	(-0.843)	(-0.285)	(1.092)
SMOOTHEP	1.443**	4.141	5.394	12.38**	25.79***
	(2.084)	(1.583)	(1.423)	(2.232)	(3.289)
BM	0.00313	0.450*	0.577	0.179	-1.792*
	(0.0453)	(1.649)	(1.363)	(0.458)	(-1.914)
LONGYIELD	-1.688***	-6.659***	-6.747**	-13.21***	-18.86***
	(-2.957)	(-3.731)	(-2.347)	(-4.097)	(-4.415)
TMSPREAD	-0.259	-1.905	-1.969	2.597	4.263
	(-0.936)	(-1.535)	(-1.198)	(0.838)	(1.285)
DFSPREAD	-1.848**	-4.076	0.391	-6.386	-9.035
	(-2.023)	(-1.408)	(0.0841)	(-1.091)	(-1.352)
INFLATION	0.918	-0.558	-3.072	-1.065	5.263*
	(0.872)	(-0.203)	(-0.830)	(-0.211)	(1.860)
EQUITYSHARE	0.0548	1.068	2.470	1.552	4.146***
	(0.250)	(1.058)	(1.567)	(1.007)	(3.153)
Constant	-0.000822	0.209	0.583***	0.537	0.212
	(-0.0207)	(1.331)	(2.855)	(1.450)	(0.477)
Observations	396	396	396	396	385
Adjusted R-squared	0.041	0.286	0.362	0.468	0.580

Panel B: The first period 1981.12-2005.12

	(6)	(7)	(8)	(9)	(10)
Horizons/periods	1 1981-2005	6 1981-2005	12 1981-2005	24 1981-2005	36 1981-2005
adis	0.000377	-0.101**	-0.303***	-0.385***	-0.451***
	(0.0412)	(-2.509)	(-5.676)	(-6.409)	(-6.477)
Mean forecast	0.0102**	0.0366**	0.0355	0.0153	0.0537*
	(1.975)	(2.302)	(1.603)	(0.601)	(1.680)
PE	-0.00104	-0.00522	-0.0101*	-0.00757	-0.0178
	(-1.232)	(-1.557)	(-1.935)	(-1.258)	(-1.627)
CAY	0.354	1.346	1.688	5.258***	5.219*
	(1.074)	(1.126)	(1.000)	(2.675)	(1.749)
DP	4.468*	3.710	-20.83*	-46.00***	-20.27
	(1.917)	(0.469)	(-1.732)	(-3.522)	(-1.048)
SMOOTHEP	0.651	2.827	2.856	14.67***	31.51***
	(0.821)	(1.189)	(0.980)	(3.517)	(7.644)
BM	-0.0714	0.146	0.940**	0.683*	-2.020***
	(-0.727)	(0.482)	(2.107)	(1.788)	(-3.342)
LONGYIELD	-2.366***	-7.078***	-3.664	-2.407	-8.901
	(-2.654)	(-2.815)	(-1.082)	(-0.983)	(-1.608)
TMSPREAD	0.556	1.656	1.935	1.316	3.812
	(1.610)	(1.141)	(0.885)	(0.425)	(1.332)
DFSPREAD	-1.196	-1.627	4.235	-3.856	0.554
	(-0.918)	(-0.510)	(0.883)	(-0.875)	(0.0535)
INFLATION	-0.437	3.673	3.941	5.053	9.896*
	(-0.388)	(1.132)	(0.696)	(0.985)	(1.831)
EQUITYSHARE	-0.518**	-0.998	0.617	2.378	5.290**
	(-2.239)	(-1.122)	(0.533)	(1.548)	(2.591)
Constant	-0.0558	0.165	0.945***	1.630***	1.375***
	(-1.064)	(0.897)	(3.666)	(6.676)	(3.512)
Observations	289	289	289	289	289
Adjusted R-squared	0.071	0.266	0.460	0.595	0.665

Panel C: The second period 2006.1-2014.11

	(11)	(12)	(13)	(14)	(15)
Horizons	1 2006-2014	6 2006-2014	12 2006-2014	24 2006-2014	36 2006-2014
adis	-0.00624	-0.0484**	-0.0485	-0.0131	0.0895***
	(-0.545)	(-2.485)	(-1.194)	(-0.467)	(4.474)
Mean forecast	0.00160	-0.0367*	-0.101***	-0.0126	0.0553*
	(0.0997)	(-1.821)	(-4.143)	(-0.398)	(1.714)
PE	0.000152	0.00107***	-0.00192***	0.000111	-0.000360
	(0.547)	(3.136)	(-3.744)	(0.186)	(-0.734)
CAY	-0.332	1.903	0.265	3.501**	0.578
	(-0.476)	(1.236)	(0.285)	(2.588)	(0.268)
DP	-0.933	11.71	13.82	10.63	13.44

	(-0.171)	(1.262)	(0.949)	(0.813)	(1.467)
SMOOTHEP	4.369	6.994	15.62*	21.14**	23.91***
	(0.976)	(0.983)	(1.804)	(2.582)	(4.965)
BM	-0.154	0.757***	0.779*	1.147**	0.204
	(-0.979)	(3.414)	(1.685)	(2.190)	(1.145)
LONGYIELD	-1.482*	-5.657***	-3.148*	-15.44***	-15.66***
	(-1.874)	(-3.772)	(-1.907)	(-6.835)	(-10.95)
TMSPREAD	-1.431*	-5.975***	-7.407***	1.592	7.328***
	(-1.852)	(-5.689)	(-5.672)	(1.094)	(4.263)
DFSPREAD	-0.744	-5.428**	-3.205	-6.995**	-6.485***
	(-0.345)	(-2.180)	(-0.986)	(-2.038)	(-2.769)
INFLATION	3.034	1.683	0.531	5.346*	4.223
	(1.479)	(0.692)	(0.209)	(1.709)	(1.264)
EQUITYSHARE	0.976*	3.573***	4.166***	1.190	2.586*
	(1.893)	(3.771)	(4.122)	(0.692)	(1.731)
Constant	-0.0159	0.408	0.738**	-0.424	-1.625***
	(-0.0657)	(1.013)	(2.470)	(-0.786)	(-4.690)
Observations	107	107	107	107	96
Adjusted R-squared	0.137	0.765	0.830	0.883	0.931

Table 4: Regression results of dispersion on MV and IV

This table reports regression results of dispersion on MV and IV. Column 1, 2, and 3 reports results for the whole period (1981.12-2014.11), the first subperiod (1981.12-2005.12), and the second subperiod (2006.1-2014.11) respectively. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. MV is stock market variance. IV is average idiosyncratic variance. Parentheses report Newey West t-statistics adjusted for autocorrelation with 3 lags. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)
Periods	1981-2014	1981-2005	2006-2014
MV	4.302	-2.371	20.10**
	(0.815)	(-1.208)	(2.410)
IV	12.52**	28.46***	-30.54**
	(2.474)	(12.32)	(-2.607)
Constant	3.285***	2.821***	4.335***
	(32.64)	(49.46)	(24.76)
Observations	396	289	107
Adjusted R-squared	0.074	0.490	0.057

Table 5: Return on dispersion, its components, and control variables

This table reports regression results of future 12-month excess market return on dispersion, the residual and fitted components of dispersion, mean forecast and common market return predictors. Column 1-4, 5-8, and 9-12 report results for the whole period (1981.12-2014.11), the first subperiod (1981.12-2005.12), and the second subperiod (2006.1-2014.11) respectively. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. Disp_f and disp_r are the fitted and residual components of dispersion after regressing it on MV and IV in the whole period. The suffixes _1 and _2 refer to decomposition in the first and second periods respectively. The coefficients of control variables and constants are not reported for brevity. Parentheses report Newey West t-statistics adjusted for autocorrelation with 12 lags. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Horizons/periods	12 whole	12 whole	12 whole	12 whole	12 1981-2005	12 1981-2005	12 1981-2005	12 1981-2005	12 2006-2014	12 2006-2014	12 2006-2014	12 2006-2014
adis	-0.0960***				-0.303***				-0.0485			
	(-2.648)				(-5.676)				(-1.194)			
disp_f		0.0634	0.0817									
		(0.562)	(0.743)									
disp_r		-0.104***		-0.105***								
		(-2.841)		(-2.853)								
disp_f_1						-0.364***	-0.191					
						(-3.772)	(-1.575)					
disp_r_1						-0.294***		-0.232***				
						(-5.439)		(-4.294)				
disp_f_2										-0.367***	-0.369***	
										(-4.019)	(-4.011)	
disp_r_2										-0.00681		-0.0182
										(-0.204)		(-0.465)
Mean forecast	-0.00519	-0.0129	-0.0174	-0.00971	0.0355	0.0446*	0.0259	-0.00731	-0.101***	-0.0878***	-0.0878***	-0.104***
	(-0.279)	(-0.633)	(-0.844)	(-0.535)	(1.603)	(1.694)	(0.732)	(-0.301)	(-4.143)	(-3.764)	(-3.797)	(-4.517)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Constant	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	396	396	396	396	289	289	289	289	107	107	107	107
Adjusted R-squared	0.362	0.369	0.318	0.369	0.460	0.461	0.283	0.384	0.830	0.860	0.862	0.823

Table 6: Investor sentiment and dispersion effect

This table reports regression results of future 12-month excess market return on dispersion, MV, IV, BW sentiment dummy, its interaction term with dispersion, the aggregate mean of analyst forecasts and common market return predictors. Column 1-2, 3-4, and 5-6 report results for the whole period (1981.12-2014.11), the first subperiod (1981.12-2005.12), and the second subperiod (2006.1-2014.11) respectively. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. MV is stock market variance. IV is average idiosyncratic variance. Bw_h is a dummy set to 1 when investor sentiment is higher than the median level of the whole sample period or set to 0 otherwise. The coefficients of control variables and constants are not reported for brevity. Parentheses report Newey West t-statistics adjusted for autocorrelation with 12 lags. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Horizons/Periods	12 whole	12 whole	12 whole	12 1981-2005	12 1981-2005	12 1981-2005	12 2006-2014	12 2006-2014	12 2006-2014
adis	-0.0746**	-0.104***		-0.230***	-0.295***		-0.0147	-0.00754	
	(-2.326)	(-2.837)		(-2.603)	(-5.509)		(-0.468)	(-0.227)	
MV	0.683	0.943	1.130	1.827	2.469*	2.642*	-7.499***	-7.544***	-7.711***
	(0.490)	(0.641)	(0.797)	(1.161)	(1.713)	(1.740)	(-2.740)	(-2.719)	(-2.862)
IV	3.248	1.763	-0.144	-2.211	-3.483	-6.882*	12.63*	12.44*	12.60*
	(1.146)	(0.511)	(-0.0421)	(-0.783)	(-1.302)	(-1.795)	(1.691)	(1.665)	(1.714)
bw_h	0.457**			0.435*			0.162		
	(2.517)			(1.739)			(0.343)		
adis*bw_h	-0.146***			-0.145*			-0.0535		
	(-2.706)			(-1.855)			(-0.487)		
mean forecast	-0.00944	-0.0114	-0.0120	0.0607***	0.0545**	0.0353	-0.0768***	-0.0888***	-0.0886***
	(-0.392)	(-0.435)	(-0.456)	(2.776)	(2.005)	(0.934)	(-4.068)	(-3.867)	(-3.871)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	396	396	396	289	289	289	107	107	107
Adjusted R-squared	0.414	0.367	0.318	0.506	0.470	0.290	0.864	0.859	0.860

Table 7: The global financial crisis and dispersion effect

This table reports regression results of future 12-month excess market return on dispersion, the GFC dummy, continuous BW sentiment index, their respective interaction terms with dispersion and other common market return predictors for the whole period. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. MV is stock market variance. IV is average idiosyncratic variance. d_gfc is a dummy variable which is set to one from September 2008 onwards or zero otherwise. The coefficients of control variables and constants are not reported for brevity. Parentheses report Newey West t-statistics adjusted for autocorrelation with 12 lags. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)
Horizons	12	12
adis	-0.266***	-0.272***
	(-4.745)	(-4.105)
d_gfc	-0.505*	-0.459
	(-1.832)	(-1.489)
d_gfc * adis	0.190***	0.177**
	(2.754)	(2.157)
bw		0.175
		(1.027)
bw * adis		-0.0688
		(-1.476)
Mean forecast	0.0160	0.0348**
	(0.990)	(2.368)
controls	yes	yes
Constant	yes	yes
Observations	396	396
Adjusted R-squared	0.466	0.518

Table 8: Comparison of dispersion effect between low and high IO stocks

This table reports the comparison of dispersion effect between low and high IO stocks. The regressions are the same as those in Table 3 except that they are run respectively for low and high IO stocks. Panel A reports results for the whole period. Panel B and C report results for the two subperiods respectively. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. We control for the aggregate mean analyst forecast and common market return predictors used in Yu (2011). Parentheses report Newey West t-statistics adjusted for autocorrelation, with the number of lags equal to the return horizons. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: whole sample period, low IO and high IO stocks.

	Low IO stocks					high IO stocks				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Horizon/period	1 whole	6 whole	12 whole	24 whole	36 whole	1 whole	6 whole	12 whole	24 whole	36 whole
adis	-0.00278	-0.0270	-0.0758*	-0.120	-0.188	-0.00870	-0.0585**	-0.105***	-0.0748	-0.0884
	(-0.518)	(-1.349)	(-1.854)	(-1.585)	(-1.292)	(-1.378)	(-2.171)	(-2.961)	(-1.028)	(-0.575)
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	395	390	384	372	360	395	390	384	372	360
Adjusted R-squared	0.031	0.222	0.232	0.263	0.407	0.018	0.186	0.207	0.237	0.354

Panel B: The first subperiod, low IO and high IO stocks

	Low IO stocks					high IO stocks				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	1 1985-2005	6 1985-2005	12 1985-2005	24 1985-2005	36 1985-2005	1 1985-2005	6 1985-2005	12 1985-2005	24 1985-2005	36 1985-2005
adis	-0.00234	-0.0610*	-0.204***	-0.412***	-0.623***	0.000652	-0.117**	-0.325***	-0.364***	-0.667***
	(-0.300)	(-1.913)	(-4.452)	(-6.048)	(-4.535)	(0.0623)	(-2.588)	(-5.538)	(-3.347)	(-6.720)
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	289	289	289	289	289	289	289	289	289	289
Adjusted R-squared	0.043	0.164	0.298	0.521	0.667	0.055	0.156	0.277	0.297	0.548

Panel C: The second subperiod, low IO and high IO stocks

	Low IO stocks					high IO stocks				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	1 2006-2014	6 2006-2014	12 2006-2014	24 2006-2014	36 2006-2014	1 2006-2014	6 2006-2014	12 2006-2014	24 2006-2014	36 2006-2014
adis	-0.00334	-0.0310**	-0.0503*	-0.0521**	-0.00133	-0.0116	-0.0635*	-0.0491	0.0151	-0.0106
	(-0.296)	(-2.085)	(-1.851)	(-2.307)	(-0.0377)	(-0.929)	(-1.768)	(-1.063)	(0.326)	(-0.0881)
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	106	101	95	83	71	106	101	95	83	71
Adjusted R-squared	0.138	0.783	0.851	0.909	0.931	0.110	0.712	0.824	0.920	0.927

Table 9: Comparison of dispersion effect between stocks with and without put options

This table reports the comparison of dispersion effect between stocks with and without put options. The regressions are the same as those in Table 3 except that they are run respectively for stocks with and without put options. Panel A report results for the whole period. Panel B and C report results for the two subperiods respectively. adis is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates. We control for the aggregate mean analyst forecast and common market return predictors used in Yu (2011). Parentheses report Newey West t-statistics adjusted for autocorrelation, with the number of lags equal to the return horizons. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: The whole period, stocks with and without put options.

	stocks with put options					stocks without put options				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Horizon/period	1 whole	6 whole	12 whole	24 whole	36 whole	1 whole	6 whole	12 whole	24 whole	36 whole
adis	-0.00317	-0.00710	-0.0113	-0.0409	0.0239	-0.00853	-0.0328	-0.0493	-0.0491*	0.0260
	(-0.439)	(-0.280)	(-0.301)	(-1.133)	(0.320)	(-1.337)	(-1.505)	(-1.631)	(-1.666)	(0.400)
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	226	221	215	203	191	226	221	215	203	191
Adjusted R-squared	0.054	0.446	0.596	0.760	0.757	0.076	0.456	0.592	0.760	0.697

Panel B: The first subperiod, stocks with and without put options.

	stocks with put options					stocks without put options				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Horizon/period	1 1985-2005	6 1985-2005	12 1985-2005	24 1985-2005	36 1985-2005	1 1985-2005	6 1985-2005	12 1985-2005	24 1985-2005	36 1985-2005

adis	-0.00780	0.150**	-0.0788	-0.285***	-1.040***	-0.00958	0.0236	-0.0934	-0.103*	-0.363***
	(-0.253)	(1.990)	(-1.041)	(-3.370)	(-9.573)	(-0.439)	(0.307)	(-1.076)	(-1.696)	(-2.793)
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	120	120	120	120	120	120	120	120	120	120
Adjusted R-squared	0.012	0.437	0.650	0.832	0.916	0.003	0.360	0.624	0.837	0.854

Panel C: The second subperiod, stocks with and without put options.

	stocks with put options					stocks without put options				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Horizon/period	1 2006-2014	6 2006-2014	12 2006-2014	24 2006-2014	36 2006-2014	1 2006-2014	6 2006-2014	12 2006-2014	24 2006-2014	36 2006-2014
adis	-0.00505	-0.0400**	-0.0377	0.0258	0.00745	-0.00881	-0.0595***	-0.0701	0.0163	-0.00570
	(-0.442)	(-2.223)	(-0.961)	(0.895)	(0.168)	(-0.876)	(-2.699)	(-1.429)	(0.659)	(-0.360)
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	106	101	95	83	71	106	101	95	83	71
Adjusted R-squared	0.123	0.769	0.834	0.904	0.916	0.174	0.788	0.815	0.885	0.921

Table 10: Returns on an alternative dispersion measure and continuous sentiment values

This table reports regression results of future 12-month excess market returns on scaled dispersion, continuous BW sentiment, their interaction term, MV, IV, mean analyst forecast and other common market return predictors for the whole period (col 1) and the two subperiods (col 2 and 3). asdmn is the value-weighted average of individual stocks' standard deviations of analyst forecasts of EPS long term growth rates divided by the value-weighted average of individual stocks' mean analyst forecasts. BW is the continuous Baker and Wurgler investor sentiment index. MV is stock market variance. IV is average idiosyncratic variance. The coefficients of control variables and constants are not reported for brevity. Parentheses report Newey West t-statistics adjusted for autocorrelation with 12 lags. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)
Horizon/Period	12 whole	12 1981-2005	12 2006-2014
asdmn	-1.665***	-4.802***	0.0485
	(-3.862)	(-5.917)	(0.0983)
bw	0.420***	-0.181	-0.463*
	(2.681)	(-0.792)	(-1.828)
Bw * asdmn	-1.941***	0.495	1.262*
	(-3.386)	(0.519)	(1.907)
MV	1.547	1.940	-6.629**
	(1.113)	(1.363)	(-2.296)
IV	-0.0861	-2.087	10.07
	(-0.0298)	(-0.832)	(1.322)
Mean forecast	-0.0223	-0.0149	-0.111***
	(-0.938)	(-0.593)	(-4.141)
Control	yes	yes	yes
Constant	yes	yes	yes
Observations	396	289	107
Adjusted R-squared	0.440	0.516	0.865

Appendix: Control Variable Description

All the control variables below are constructed by Welch and Goyal (2008). The data are obtained from Amit Goyal's website.

Variable	Definition
price-earnings ratio PE	The difference between the log of prices and the log of earnings Earnings are 12-month moving sums of earnings on the S&P 500 index. (Welch and Goyal 2008, pp. 1457-1458).
consumption-wealth ratio CAY	The Consumption, wealth, income ratio (cay) estimated by Lettau and Ludvigson (2001)
dividend-price ratio DP	The difference between the log of dividends and the log of prices. Dividends are 12-month moving sums of dividends paid on the S&P 500 index (Welch and Goyal 2008, p. 1457).
smoothed earnings-price ratio SMOOTHEP	Moving ten-year average of earnings divided by price (Welch and Goyal 2008, p. 1458).
book-to-market ratio BM	The ratio of book value to market value for the Dow Jones Industrial Average. For the months from March to December, this is computed by dividing book value at the end of the previous year by the price at the end of the current month. For the months of January and February, this is computed by dividing book value at the end of two years ago by the price at the end of the current month (Welch and Goyal 2008, p. 1458).
short-term interest rate SHORTYIELD	The U.S. Treasury bill rates.
long-term bond yield LONGYIELD	Long-term government bond yield
term spread TMSPREAD	The difference between the long term yield on government bonds and the Treasury-bill rate (Welch and Goyal 2008, p. 1459).
default spread DFSPREAD	The difference between long-term corporate bond and long-term government bond *returns* (Welch and Goyal 2008, p. 1459).
the lagged rate of inflation INFLATION	Inflation is the *Consumer Price Index (All Urban Consumers)* from the Bureau of Labor Statistics.
the equity share of new issues EQUITYSHARE	The ratio of 12-month moving sums of net issues by NYSE listed stocks divided by the total end-of-year market capitalization of NYSE stocks (Welch and Goyal 2008, p. 1458).