Dispersion in Beliefs among Active Mutual Funds and the Cross-Section of Stock Returns

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Abstract

This paper establishes a strong link between the dispersion in beliefs among mutual fund managers, as revealed through their holdings’ deviation from their benchmarks (i.e. active holdings), and future stock returns. We find that after standard risk adjustments, stocks in the top decile portfolio with high dispersion outperform their low-dispersion peers in the bottom decile by 8.76% in annualized terms. This effect of dispersion on returns is particularly pronounced among stocks with high information asymmetry; moreover, the lower returns on stocks with low dispersion concentrate on those with binding short-sale constraints. These results are consistent with a subgroup of informed managers driving up the dispersion in active holdings when they place large bets after receiving positive information signals unobserved by their peers; conversely, binding short-sale constraints prevent them from fully using their negative private information, leading to low dispersion in active holdings.

JEL classification: G10, G11, G12, G14

Keywords: Mutual Funds; Private Information; Dispersion in Beliefs; Short-Sale Constraints; Asymmetric Information

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Information flows into asset prices through the updating of investors’ beliefs. Standard asset pricing models such as the Capital Asset Pricing Model (CAPM) or the Intertemporal CAPM assume homogeneous beliefs among investors, under which the “aggregation” of information is straightforward. In the world of investing, the assumption of homogeneous beliefs can be violated often. But to what extent do heterogeneous beliefs among investors matter for asset prices?

This paper empirically examines the relevance of heterogeneous beliefs for asset prices by focusing on dispersion in beliefs among actively managed mutual funds. We focus on active mutual funds for several reasons. First, the dramatic expansion of the mutual fund industry in the stock market has led to its increasing importance as a group of U.S. corporate shareholders.¹ Second, the majority of mutual fund assets are actively managed, which makes the industry an essential information processor. A growing number of studies have shown that informed trading by active fund managers can play an important role in determining stock prices.² Given the importance of the mutual fund sector, it is surprising that scant research has investigated how dispersion in beliefs among active managers might influence stock prices and returns.

We use a new instrument—namely, active holdings or deviation from benchmarks—to capture the beliefs held by active fund managers. An active manager, according to his or her prospectus, attempts to maximize the active return while minimizing the tracking error variance. A mean-variance analysis of tracking errors in the spirit of Roll (1992) indicates that the deviation in portfolio weights of a stock in the fund portfolio from its benchmark index, under certain assumptions, is linearly related to the expected return to that stock, conditional on the fund manager’s information set.³ Recent empirical work supports the notion that active holdings help to reveal fund managers’ expectation of future returns. Cremers and Petajisto (2009) shows that the deviation from benchmarks aggregated at the fund level or a fund’s active share predicts future fund performance. Jiang, Verbeek, and Wang (2010) show that a stock-level measure of deviations from benchmarks aggregated across active managers predicts returns on

¹According to the U.S. Census Bureau, the fraction of corporate equities owned by mutual funds grew from 2.84% in 1980 to 20.40% in 2009.
²See, e.g., Coval and Moskowitz (2001), Cohen, Frazzini, and Malloy (2008), and Massa and Rehman (2008).
³See, for example, Appendix A of Jiang, Verbeek, and Wang (2010) for a mathematical representation of this idea.
individual stocks. Motivated by these observations, we create a new measure of dispersion in beliefs using the standard deviation of active holdings across all active fund managers whose investment universe includes the stock.

Our results establish a strong and robust relationship between dispersion in beliefs among active mutual funds and future stock returns. We find that stocks in the top decile portfolio with high dispersion in active fund holdings outperform their low-dispersion peers in the bottom decile by 11.76% in annualized terms. We also find intuitively that high dispersion stocks tend to be small and growth stocks. After adjusting for the differences in their exposures to the market, size, value, momentum, and liquidity factors, the return spread between high and low dispersion stocks remains as high as 8.76% per year. Moreover, the return forecasting power of dispersion in active fund holdings is incremental to that of the average active holdings of mutual funds and robust to the effects of idiosyncratic risk, volume, breadth of ownership, and dispersion in analyst earnings forecasts.

The notion that stocks with higher dispersion in beliefs among active mutual funds earn higher average returns may seem puzzling at first, given that several studies have documented a negative association between proxies for dispersion in beliefs and future stock returns. These studies typically invoke the idea put forth by Miller (1977) that in situations with heterogeneous beliefs, binding short-sale constraints can wipe the negative opinions of pessimistic investors from the market, thereby leading to overpricing and lower future returns. We argue that our results are in fact consistent with a model of asset markets populated by investors holding divergent beliefs in the presence of short-sale constraints. The key new ingredient that leads to a different result is the source of divergent beliefs: differential information.

To understand the mechanism, assume that active fund managers are differentially informed about individual stocks. For a given stock, some managers have an information advantage and receive accurate information signals, whereas others receive noisy information signals or appear to be uninformed investors. When informed managers receive positive signals about the stock

\footnote{See Section I for a review of the literature.}

\footnote{The information advantage of certain fund managers could arise from their special connection (e.g., shared educational network with firm managers, or proximity to the location of the firms in which fund managers invest) or specialized expertise (e.g., special knowledge about a particular industry as emphasized by Kacperczyk, Sialm and Zheng (2005)).}
unobserved by other managers, they tend to place large bets relative to their peers, which drive up the observed dispersion in beliefs among fund managers. When they obtain negative information signals, however, binding short-sale constraints prevent them from fully using their negative private information, leading to low dispersion in beliefs among managers.\(^6\) In other words, when bad news occurs, market frictions of shorting force active mutual fund managers to appear homogeneous. Therefore, observed dispersion in beliefs can vary with the private information signal informed managers receive. In line with the standard arguments by Grossman and Stiglitz (1980), as long as the cost of information acquisition is nonzero, the equilibrium stock prices are not fully revealing of agents’ private information, which generates the return forecasting power of dispersion in beliefs. We refer to this mechanism as the hypothesis of differentially informed fund managers.

Results from several tests lend further support to this hypothesis. First, we examine the relationship between innovations in dispersion and future stock returns. The private information institutional investors obtain is likely to be short-lived (Yan and Zhang (2009)) and thus may be better captured by the changes in dispersion. Indeed, we observe stronger return forecasting power for innovations in dispersion. For example, the difference in average returns between decile portfolios with large increases and decreases in dispersion is 13.68% per year after accounting for their differential factor exposures, whereas the corresponding return differential is 8.76% for portfolios based on the level of dispersion in active fund holdings. Notably, we find that the return predictive power of innovations in dispersion persists throughout the subsequent four quarters, and there is no evidence of price reversal in the next three years.

Second, we study the price reactions to earnings announcements for stocks with large increases and decreases in dispersion during the quarter after portfolio formation. We find that the earnings announcement returns are substantially higher for stocks with large increases in dispersion than for those with large decreases in dispersion. On average, stocks with large increases in dispersion experience positive surprises, earning a cumulative abnormal return (CAR) of 0.51% during the three days surrounding earnings announcements. In contrast, stocks with large de-

\(^6\)A majority of mutual funds are prohibited from shorting by their charter. For example, Almazan, Brown, Carlson, and Chapman (2004) report that only approximately 30% of mutual funds are allowed by their charters to sell short, and only 3% of funds do sell short.
creases in dispersion deliver low performance, generating a CAR of -0.22%. The difference of 0.73%, realized over only three trading days, represents approximately 20% of the 3.72% total difference during the quarter. These results suggest that earnings-related information drives the return forecasting power of dispersion in beliefs among active mutual funds.

Third, we find that the return forecasting power of innovations in dispersion is particularly strong for stocks with high information asymmetry, which is captured by the adverse selection component of bid-ask spreads. We also conduct subsample analyses for different industries and find that the dispersion effect is stronger for industries that are associated with greater information asymmetry, such as information technology and health care.

Finally, we examine how short-sale constraints affect the return forecasting power of dispersion in active fund holdings. If a low level of dispersion reflects negative private information obtained by fund managers, such information should be incorporated into stock price less efficiently when the short-sale constraints are bound more tightly. We measure the degree of short-sale constraints by jointly considering the level of short interest and institutional ownership. The idea is that the level of short interest could reflect the demand for shorting and institutional ownership could capture the supply for shares loanable for shorting. Thus, a stock is more likely to be short-sale constrained if it has a higher level of short interest but a lower level of institutional ownership. Combining our dispersion variable with the extent of short-sale constraint provides a strong result. For stocks not likely to be short-sale constrained, the abnormal return subsequent to large declines in dispersion is only -0.05% per month, with a t-statistic of -0.28. For stocks likely to be short-sale constrained, the abnormal return subsequent to large declines in dispersion reaches -1.25% per month, with a t-statistic of -4.23. Among stocks with large increases in dispersion, we do not find significant differences in returns between stocks with binding and nonbinding short-sale constraints. These results strongly support the differentially informed manager hypothesis.

Our study contributes to the literature on how heterogeneous beliefs combined with market frictions affect asset prices in an important way. It illustrates the need to understand the economic force that drives the divergent beliefs among investors. In Miller (1977) and Chen, Hong, and Stein’s (2002) formalization, investors hold different beliefs for exogenous reasons.
In their world, with pessimistic investors sitting on the sidelines, optimistic investors push stock prices above the consensus view of all investors, which is assumed to be an unbiased estimator of the fundamental value. These optimists hold overvalued equities and generate negative risk-adjusted returns. A plausible interpretation of that result is that optimistic investors may be overconfident, either in their ability to pick stocks or in the precision of the information signals they observe (see, e.g., Daniel, Hirshleifer, and Subramanyam (1998)). Our results indicate that if we replace behaviorally biased investors with rational informed investors endowed with superior information, optimists could push prices toward the fundamental level, thus generating superior risk-adjusted returns. Therefore, instilling information asymmetry into models with divergent beliefs and short-sale constraints could yield noteworthy insights.

The rest of the paper is organized as follows: Section I summarizes the relevant literature and discusses our contribution in relation to existing studies. Section II details the construction of the dispersion variable and presents the data used. Section III presents the empirical findings on how dispersion in active fund holdings relates to future stock returns, and Section IV provides possible interpretations to the findings. Section V presents several empirical tests that further support our main findings. Section VI concludes.

I Relevant Literature

Our work extends the growing literature that studies how differences of opinions affect stock prices. The empirical studies in this literature have used several proxies for differences of opinion to examine its relationship with future returns, e.g., dispersion in analyst earnings forecast (Diether, Malloy, and Scherbina (2002)), idiosyncratic volatility (Ang, Hodrick, Xing, and Zhang (2006)), trading volume (Brennan, Chordia, and Subrahmanyam (1998)), heterogeneous behavior of retail investors (Goetzmann and Massa, (2005)), and the breadth of ownership by mutual funds (Chen, Hong, and Stein, (2002)). The general finding of these papers is that prox-
ies for difference of opinion and future stock returns are negatively correlated. These empirical results can be viewed as support for the idea put forth by Miller (1977), which Chen, Hong, and Stein (2002) subsequently formalize. In their model economy, each individual investor holds dogmatic beliefs that are either upwardly or downwardly biased, yet the average opinion among all investors is unbiased. Thus, when short-sales constraints suppress the view of the pessimistic investors, stocks are overpriced relative to the level when both types of investors are present, and optimistic investors earn negative risk-adjusted returns.

Our work examining dispersion in beliefs among active mutual funds fleshes out a strikingly different relation between dispersion and future stock returns. The story we favor shares a feature with the above mentioned papers in that divergent beliefs in combination with short sale constraints may be important for stock prices. However, rather than assuming that dispersion in beliefs arises for exogenous reasons, we emphasize the importance of private information as a driving force of dispersion. For active mutual fund managers who specialize in ferreting out private information, difference in their information set can be an important source for divergence of beliefs. If the observed dispersion in beliefs reflects the large bets from superiorly informed managers, these investors could earn positive expected returns, and a positive association between dispersion in beliefs and future returns emerges.

This paper is also related to the literature on how investor heterogeneity affects the adjustment of security prices to private information. Hong and Stein (1999) show that when private information diffuses gradually across investors, prices adjust slowly to the information. Diamond and Verrecchia (1987) model the effects of short-sale constraints on the speed of adjustment to private information of security prices and show that prohibiting traders from shorting reduces the adjustment speed of prices to private information, especially to bad news. Empirical test of these models may be challenging, because it is difficult to observe the arrival of private information. In this paper, we argue that changes in dispersion of active mutual fund holdings can be driven by the arrival of private information. We show that the return forecasting power of the change in dispersion persists for up to four quarters, which is consistent with information gradually flowing into stock prices.

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8Existing studies use indirect tests such as the autocorrelation of security returns (e.g., Hong, Lim, and Stein (2000)).
Finally, our paper also contributes to the growing literature that investigates the role that actively managed mutual funds play in stock markets. Although much evidence shows that on average active mutual funds do not outperform passive benchmarks net of fees and expenses, several studies have identified a subset of mutual fund investments in which superior information emerges. They have examined the information content of the portion of fund holdings that is likely to be *ex ante* informed and whether the stock holdings by a group of potentially skilled fund managers contain information about future stock returns. There is, however, little analysis on the implications of the dispersion in active mutual fund holdings for stock returns. In fact, our paper is one of the first to examine the question. We provide evidence that dispersion in active fund holdings contains value-relevant information that is missed by the average active holdings.

II Construction of the Dispersion Variable

This section first explains the construction of the dispersion in active mutual fund holdings variable. Then, it provides a description of the sample and summary statistics.

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9 See, for example, Jensen (1968), Gruber (1996), Carhart (1997), and Fama and French (2008).

10 For example, Coval and Moskowitz (2001) investigate mutual fund holdings of stocks of firms located in the same area; Cohen, Frazzini, and Malloy (2008) examine holdings of the shares of firms managed by the alumni of fund managers; Massa and Rehman (2008) examine holdings of the stocks held by bank-affiliated mutual funds; and Tang (2009) examines holdings of the stocks by fund managers who previously covered those stocks as sell-side financial analysts. Moreover, Chen, Jegadeesh, and Wermers (2000) examine the recent portfolio adjustments by mutual funds; Cohen, Polk, and Silli (2010) examine the top holdings by mutual funds; and Jiang, Verbeek, and Wang (2010) examine the deviation of active funds from their performance benchmarks. These studies conclude that holdings by active mutual funds contain information about future stock returns.

11 For example, Cohen, Coval, and Pastor (2005) argue that a fund manager’s skill can be predicted by comparing his or her investment decisions with those of star fund managers. Kacperczyk, Sialm, and Zheng (2005) show that mutual fund managers sometimes deviate from a well-diversified portfolio and concentrate their holdings in industries in which they have informational advantages. Cremers and Petajisto (2009) find that funds with the highest ActiveShare values significantly outperform their benchmarks both before and after expenses. Kacperczyk and Seru (2007) find that mutual funds that rely less on public information perform better. Wermers, Yao, and Zhao (2010) argue that the stock holdings by fund managers with superior past performance contain information relevant for future stock returns. Finally, Shumway, Szeftler, and Yuan (2011) contend that the revealed beliefs of a group of fund managers whose beliefs correlate positively with subsequent stock returns tend to be persistently correct.
A Constructing the Dispersion in Active Mutual Fund Holdings

Our key innovation is to create a novel measure of dispersion in beliefs among actively managed mutual funds. We construct this dispersion measure as the standard deviation of the funds’ active holdings of a particular stock, i.e., the standard deviation of the difference between the weight of the stock in each fund manager’s portfolio and that in the manager’s benchmark index:

\[
Dispersion_{i,t} = \frac{1}{N_i - 1} \sum_{j=1}^{N_i} [(w_{j,i,t} - w_{b,j,i,t}) - (\bar{w}_{j,i,t} - \bar{w}_{b,j,i,t})]^{1/2},
\]

where \(w_{j,i,t}\) is the weight of stock \(i\) in fund \(j\)’s portfolio at the end of quarter \(t\), \(w_{b,j,i,t}\) is the weight of stock \(i\) in fund \(j\)’s benchmark portfolio at the end of quarter \(t\), and \(N_i\) is the number of funds whose investment universe includes the stock \(i\). A stock enters a mutual fund’s investment universe if it (1) is held by the mutual fund or (2) is a member of the fund’s benchmark index.

B Sample and Summary Statistics

To construct our dispersion variable, we collect portfolio holdings for actively managed equity mutual funds from Thomson Financial’s CDA/Spectrum Mutual Fund Holdings Database. We obtain information on individual mutual funds from the Center for Research in Security Prices (CRSP) Survivor-Bias-Free U.S. Mutual Fund Database.\(^\text{12}\) We eliminate balanced, bond, money market, international, index funds, and sector funds, as well as funds not invested primarily in equity securities, from our sample. After the filter, our sample consists of 2,667 active equity funds, which range from the first quarter of 1984 to the third quarter of 2008.

Russell 1000, Russell 2000, Russell 3000, Russell Midcap, the value and growth variants of the four Russell indexes, Wilshire 5000, and Wilshire 4500. For each fund in each quarter, we select from the 19 indexes the one that minimizes the average distance between the fund portfolio weights and the benchmark index weights. Data on the index holdings of the 12 Russell indexes since their inception come from the Frank Russell Company, and data on S&P 500, S&P 400, and S&P 600 index holdings since December 1994 come from COMPSTAT. For the remaining indexes and periods, we use the holdings of index funds to approximate the index holdings.

The information on the monthly returns, prices, and market values of equity for common stocks traded on the NYSE, AMEX, and NASDAQ comes from the CRSP. In line with previous research, we exclude closed-ended funds, real estate investment trusts, American Depository Receipts, foreign companies, primes, and scores (we keep only shares with codes of 10 or 11). To mitigate the concern that our stock return tests might be influenced by return outliers, we eliminate stocks with prices below $5 as of the portfolio formation date (typically the end of the previous quarter). To mitigate the potential influence of mutual funds’ preferential access to initial public offerings on our results (Gaspar, Massa, and Matos (2005), and Reuter (2006)), we exclude all stocks whose return history in CRSP falls below six months from our sample. Finally, we require that at least five funds have active holdings information in the computation of the dispersion variable. Panel A in Appendix A summarizes the size of our sample. In terms of the number of stocks, our sample covers from 40% to 69% of the total number of CRSP stocks. Yet the total market equity constitutes more than 95% of the entire CRSP sample. This is consistent with the notion that mutual funds tend to hold large stocks.

Table I shows the descriptive statistics.\textsuperscript{13} First, Panel A shows that the mean of the dispersion variable is 0.387% whereas the average of the excess weights is 0.055%, which suggests that on average the dispersion in active fund holdings is large. The standard deviation of dispersion in active fund holdings is 0.36%, approximately 55% of which comes from within-firm variation over time,\textsuperscript{14} which indicates that variation in the dispersion variable is driven by both cross-sectional and time-series variation. Second, Panel B presents the Fama-MacBeth (1973) cross-sectional regressions of dispersion on stock characteristics. The results indicate

\textsuperscript{13} Appendix B provides definitions of the major variables used in this paper.

\textsuperscript{14} The average within-firm standard deviation is 0.0020, which is 55% of the total standard deviation.
that dispersion is correlated with stock characteristics in an intuitive way. For example, small and growth stocks tend to have higher dispersion in beliefs among active mutual funds. Fund managers tend to have more disagreement about the future prospect of past winners. We also find a positive relation between dispersion in active fund holdings and the breadth of mutual fund ownership. In other words, stocks with low dispersion in active fund holdings tend to have low breadth in mutual fund ownership. If we interpret low dispersion in active fund holdings as arising mainly from the presence of negative private information combined with short-sale constraints, the positive correlation between dispersion and breadth is consistent with the argument of Chen, Hong, and Stein (2002) that those stocks should also have low breadth of mutual fund ownership.

Interestingly, our dispersion variable exhibits a negative correlation with idiosyncratic volatility and dispersion in analyst earnings forecasts, which suggests that the information captured by dispersion in active fund holdings could be distinct from that captured by idiosyncratic volatility and dispersion in analyst earnings forecasts. Using proprietary limit order and market order data, Garfinkel (2009) constructs a new proxy for divergence of investors’ opinions and finds that his proxy is negatively correlated with analyst earnings forecast and stock return volatility. Garfinkel argues that his proxy based on the order data may contain additional information on investors’ private valuations, not captured by the existing proxies based on publicly available data. Because mutual funds do not disclose their holdings until some subsequent period, our dispersion variable could also contain information on investors’ private valuations. In this sense, our findings of negative correlations between our dispersion variable and analyst forecast and idiosyncratic volatility are consistent with those of Garfinkel (2009).

Finally, Panel C of Table I calculates a 10-by-10 transition matrix of dispersion from quarter to quarter. Consistent with the variance decomposition of the dispersion variable, the transition matrix shows that dispersion in active fund holdings tends to be relatively persistent over time.

III Dispersion and Future Stock Returns
In this section, we study the main question of the paper: Does dispersion in active mutual fund holdings have significant forecasting power for future returns? We probe this question using both a portfolio sorting and a multivariate predictive regression approach.

A Portfolio Sorting

To understand how divergence in mutual fund holdings is related to future stock returns, we sort stocks into decile portfolios on the basis of the dispersion variable at the end of each quarter. We then compute the average monthly portfolio returns in the subsequent quarter. To adjust for risk, we consider various factor models, including the CAPM, the Fama and French (1993) three-factor model, the Carhart (1997) four-factor model, and a five-factor model that augments the Carhart model with Pastor and Stambaugh’s (2003) liquidity risk factor.

Panel A of Table II presents the results for equal-weighted portfolios. We find that average portfolio returns increase monotonically with dispersion in active fund holdings in the past quarter. For stocks in the top decile with the highest dispersion, the average return is 1.47% per month, whereas the average return for stocks in the bottom decile with the lowest dispersion is only 0.49% per month. Such a high return spread of 0.98% per month is highly statistically significant with a \( t \)-statistic of 5.99 and cannot simply be explained by the stocks’ differential factor loadings. For example, according to the Carhart four-factor model, stocks in the bottom decile portfolio with low dispersion in active holdings realize an average abnormal return of –0.27% per month, while stocks in the top decile portfolio with high dispersion in active holdings earn an average abnormal return of 0.45% per month. Both the abnormal returns are statistically significant, with \( t \)-statistics of –1.92 and 6.46, respectively, suggesting that the return predictability of dispersion comes from both the high and the low ends. A long-short strategy that buys stocks in the top decile and shorts stocks in the bottom decile generates an average monthly abnormal return of 0.72% in the subsequent quarter. This superior performance is both highly statistically significant (\( t \)-statistic = 4.52) and economically large. Figure 1 shows the annualized Sharpe ratios and five-factor alpha for the dispersion-sorted portfolios as well as the spread portfolio that buys stocks with high dispersion and shorts stocks with low
Panel B of Table II shows the results for value-weighted portfolios. Again, the results indicate a close to monotonic increasing relationship between the dispersion in mutual fund holdings and the subsequent stock returns. Moreover, the difference in returns between high- and low-dispersion portfolios remains statistically significant and economically large. For example, according to the Carhart four-factor model, an average dollar invested in the high-dispersion portfolio earns an abnormal return 0.61% per month higher than that invested in the low-dispersion portfolio.

B Multivariate Predictive Regression

In this section, we extend our analysis by using a multivariate regression approach. Although the portfolio analysis controls for the standard risk factors, it does not control for various stock characteristics that are known to be correlated with future stock returns. For example, Chen, Hong, and Stein (2002) show that the breadth of mutual fund ownership is positively associated with future stock returns. As Table I shows, a fairly high correlation exists between dispersion and breadth; thus, it is possible that the positive correlation between the dispersion variable and the future stock returns is simply an exemplification of the breadth effect. A multivariate regression framework could help differentiate the alternative explanations by simultaneously controlling for these different effects.

To investigate whether dispersion in mutual fund holdings has a predictive power for future stock returns, we use the Fama and MacBeth (1973) cross-sectional regression approach. Specifically, each month from April 1984 to December 2008, we perform cross-sectional regressions
of stock returns on the dispersion in mutual fund holdings in the most proximate quarter end, along with several control variables. The control variables consist of the natural log of market cap; the natural log of book-to-market ratio (Daniel and Titman (1997)); the stock return in the past year, skipping the most recent month (Jegadeesh and Titman (1993)); the stock return in the past month (Jegadeesh (1990)); idiosyncratic volatility (Ang, Hodrick, Xing, and Zhang (2006)); turnover (Brennan, Chordia, and Subrahmanyam (1998); and Lee and Swaminathan (2000)); and the breadth of mutual fund ownership (Chen, Hong, and Stein (2002)).

Following Fama and French (2008), we lag all control variables by a quarter, except for the past one month and past one year returns, which are updated each month.

Table III presents the regression results. We first conduct the Fama–MacBeth regression of stock returns on the dispersion in mutual fund holdings, without controlling for other variables. The simple regression conforms to the portfolio sorting results. The regression coefficient of dispersion is highly statistically significant, with a t-statistic of 5.59. We then add various control variables to the regression. The coefficient for the dispersion variable remains significant at the 1% level and economically large. A one standard deviation increase in dispersion (0.36) is associated with an increase in monthly returns of approximately 0.27% over the subsequent quarter (= 0.36 × 0.752), after we control for other stock characteristics.

![Insert Table III here](image)

The regression coefficients for the control variables are largely consistent with the findings in previous research. For example, small stocks, value stocks, stocks with low idiosyncratic volatility, stocks with low turnover, and stocks with high breadth of mutual fund ownership tend to earn higher future returns. Moreover, stock returns tend to exhibit short-term reversal and intermediate-term momentum.

Jiang, Verbeek, and Wang (2010) examine the information content of average active mutual fund holdings and find that the average deviations from benchmarks by mutual funds positively

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17 As further robustness tests, we include several other control variables in the regression: index membership, three-day abnormal return surrounding earnings announcements in the past quarter, revisions in analyst earnings forecasts in the past quarter, and past three month returns. The return forecasting power of dispersion in active fund holdings remains strong after we control for these variables. We summarize these regression results in Appendix C.
predict future returns. In column (6) and (7) of Table III, we include the Average deviation as an additional control variable. The coefficient for dispersion is only slightly reduced and remains highly significant even after we control for the effect of average deviations from benchmarks by mutual funds.

Finally, we stress-test the return forecasting power of dispersion in active fund holdings in the presence of dispersion in analyst earnings forecasts. The last column of Table III presents the results. Consistent with Diether, Malloy, and Scherbina (2002), we find that analyst dispersion negatively predicts future stock returns. The return forecasting power of dispersion in active fund holdings, however, remains largely intact after we control for the effect of analyst earnings forecast dispersion. In other words, the information content of dispersion in active mutual fund holdings seems to be distinct from that contained by dispersion in analyst earnings forecasts.

Why do these two proxies for dispersion in beliefs among different players in the stock market capture distinct information about future stock returns? Our measure of dispersion in active fund holdings is designed to capture the dispersion in beliefs among sophisticated institutions. The literature shows that the behavior of more sophisticated and more informed investors tends to correlate less with analysts’ opinions, while retail investors are more likely to be affected by analysts (e.g., Kacperczyk and Seru (2007); and Mikhail, Walther, and Willis (2007)). Notably, Goetzmann and Massa (2005) use data from individual investor accounts and construct a measure of dispersion of opinion among retail investors. They argue that difference of opinion among retail investors Granger-causes dispersion of opinion among analysts. It is well known that the behavior of institutional and retail investors has very different implications for future performance (e.g., Barber and Odean (2000)). For example, using comprehensive ownership data from China, Choi, Jin, and Yan (2011) show that changes in ownership breadth among retail investors negatively predict future returns whereas changes in breadth among institutions positively predict future returns. Therefore, it may not be surprising that dispersion in active fund holdings and dispersion in analyst earnings forecasts have different implications for future stock returns.

To further examine the link between heterogeneous beliefs among fund managers and those among security analysts, we form portfolios by independently sorting stocks on dispersion in
active fund holdings and dispersion in analyst forecasts. Table IV conforms to the finding in the Fama–MacBeth regression that dispersion in beliefs among active funds and dispersion in analyst earnings forecasts do not subsume each other. The analyst forecast dispersion, however, significantly predicts future returns only when mutual fund dispersion is low, while the mutual fund dispersion exhibits strong return forecasting ability across most of the analyst dispersion quintiles. Table IV also reveals an intriguing pattern: the return predictive power of dispersion in active fund holdings is particularly pronounced when dispersion in analyst earnings forecasts is high. If stocks with high analyst forecast dispersion are more subject to information asymmetry, this pattern suggests that the source of the return forecasting power of the dispersion in fund holdings could pertain to asymmetric information.

IV Differentially Informed Fund Managers or Differential Uncertainties?

In this section, we propose a hypothesis that combines differentially informed fund managers and short-sale constraints to explain the positive association between dispersion in active mutual fund holdings and future stock returns. We also consider a competing explanation of our finding—namely, that higher dispersion in the holdings of active funds reflects greater uncertainty, which leads to higher expected returns on those stocks.

We argue that dispersion in active holdings of mutual funds varies with the private information received by informed managers, with positive information driving up the dispersion and negative information driving down the dispersion. The private information may not be fully incorporated into the stock price until a subsequent period, leading to a positive association between dispersion in holdings and future stock returns. As mentioned previously, we refer to this explanation as the hypothesis of differentially informed fund managers.

Consider some mutual fund managers who receive positive information signals about a firm that are unobserved by other managers. The positive private information would motivate the informed managers to place larger bets on the stock, deviating themselves from the less
informed managers. Thus, the arrival of the private information increases the divergence of active holdings among heterogeneously informed fund managers. The larger the magnitude of the private information, the higher is the dispersion. Conversely, managers who receive negative private information are likely to decrease their holdings, but only to the extent of holding zero shares because of short-sale constraints. The selling behaviors of informed managers are likely to result in a reduction in the stock price and, thus, the stock’s weight in the benchmark portfolio. The uninformed managers’ weights on the stock are also likely to decrease because they tend to match their holdings to the benchmark. Thus, both the informed and the uninformed managers’ positions lean toward zero, reducing the dispersion in their holdings.\(^{18}\)

The dispersion in active holdings has incremental predictive power for future returns than the average active holdings because it better captures the distribution of differentially informed managers. Consider two stocks with the same amount of information: In one stock, the information is evenly distributed across a large number of managers, and in the other stock, only a small group of managers learn about the private information. In the first case, a larger amount of the information is incorporated into the stock price in the contemporaneous quarter owing to the competition among a large number of informed investors; in the second case, the price can be less informational efficient and the post quarter drift will be higher.

Alternatively, the positive association between dispersion in active fund holdings and subsequent stock returns may be consistent with a hypothesis of differential uncertainty. In particular, a higher dispersion in mutual fund holdings may reflect a higher level of uncertainty about the stock. The uncertainty can be due to either a high volatility in fundamentals or poor information, both of which may lead to a high dispersion in beliefs among fund managers (Kraus and Smith (1989), Harris and Raviv (1993)). Because a high level of uncertainty implies a high required rate of return, a positive association between dispersion and future returns thus could emerge.\(^{19}\) We refer to this explanation as the information uncertainty hypothesis.

\(^{18}\) Mathematically, zero holdings by the informed managers can still generate large dispersions in holdings on a stock, if the stock takes a large weight in other managers’ portfolios. However, empirically, this is not likely to be the case. To control their tracking errors, managers are generally reluctant to deviate from their benchmark holdings. In our data, the average benchmark holdings is only 0.08%, which means zero holdings are unlikely to generate large dispersions among managers.

\(^{19}\) According to Merton (1987), investors would demand compensation for holding stocks with high idiosyncratic risk if they hold under-diversified portfolios. In addition, uncertainty increases investors’ estimation risk about the true distributions of assets’ payoff. If estimation risk is non-diversifiable, investors require compensation
To distinguish between the two explanations, we examine the relationship between innovations in dispersion and the contemporaneous changes in stock prices. According to our differentially informed manager hypothesis, dispersion in active fund holdings captures the private information obtained by more informed managers, with positive information driving up the dispersion and negative information driving down the dispersion. In stylized models with asymmetric information among investors, such as those of Grossman and Stiglitz (1980) and O’Hara (2003), positive (negative) private information triggers buy (sell) orders from the informed investors, which partially push up (down) the stock price as they trade. In such a scenario, stock prices partially reveal the private information obtained by informed investors. One testable implication of the differentially informed manager hypothesis is that large increases in dispersion should be associated with contemporaneous increases in stock prices whereas large decreases in dispersion should be associated with contemporaneous decreases in stock prices.

The information uncertainty hypothesis, however, predicts a negative association between changes in dispersion and the contemporaneous changes in stock prices. The idea is that if dispersion in active fund holdings is driven by the degree of information uncertainty about the stock, an increase in dispersion (i.e., an increase in the level of uncertainty) should be associated with an increase in investors’ required rates of return, which leads to a contemporaneous decline in stock prices.

In Table V, we form decile portfolios on the basis of changes in dispersion in the recent quarter and compute the average contemporaneous portfolio returns. The results are striking. We observe a strict monotonic increasing relationship between change in dispersion and contemporaneous quarter returns, throughout all specifications. The high minus low portfolios earn positive abnormal returns and are highly statistically significant. For the equally weighted portfolio, by construction, on average about half the stocks have positive changes in dispersion, and the other half have negative changes in dispersion. We find negative and significant abnormal returns for the lowest five portfolios and positive and significant returns for the highest five portfolios. The fact that an increase (decrease) in the dispersion is strongly associated with

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for this risk (Coles and Loewenstein (1988), and Lambert, Leuz, and Verrecchia (2007)). Empirically, Botosan (1997) finds that when the amount of publicly available information about a firm is low or imprecise, the firm’s cost of capital is higher.
a contemporaneous increase (decrease) in the stock price lends support to our differentially informed manager hypothesis but contradicts the information uncertainty hypothesis.

<Insert Table V here>

V Further Empirical Tests

In this section, we perform several tests that lend further support to the hypothesis of differentially informed fund managers. First, we investigate the return forecasting power of the change in dispersion, which presumably better captures the private information recently obtained by the informed managers. Second, we examine the information content of the dispersion variable by looking at the relationship between dispersion in active fund holdings and subsequent earnings announcement returns. Third, we study how the dispersion effect varies across stocks with different degrees of information asymmetry. Fourth, we examine how short-sale constraints affect the return forecasting power of dispersion in active fund holdings. Finally, we consider how the return forecasting power of dispersion varies with firm size and across time periods.

A Innovations in Dispersion and Future Stock Returns

Building on the finding of a positive contemporaneous relationship between innovations in dispersion and stock returns, in this subsection we examine the stock performance subsequent to large innovations in dispersion. If variation in dispersion of active fund holdings is driven by the action of privately informed fund managers, we would expect to find stronger return forecasting power of innovations in dispersion than of the level of dispersion.20

In Table VI, we perform the portfolio analysis according to changes in dispersion. The results are qualitatively similar to those in Table II based on the level of dispersion, but quantitatively we observe stronger return forecasting power of changes in dispersion than that of the level of dispersion. For example, the difference in average equal-weight returns between decile portfolios

20Panel C of Table I shows that dispersion tends to be persistent. To the extent that the persistent component of dispersion does not reflect new information, innovations in dispersion could better capture the private information obtained by informed managers.
with large increases and decreases in dispersion is 1.38% per month with a \( t \)-statistic of 8.18; after we account for their differential exposures on the market, size, value, momentum, and liquidity factors, the return spread remains as high as 1.14% per month with a \( t \)-statistic of 7.13. The corresponding return differential for portfolios based on the level of dispersion in active fund holdings is 0.98% per month with a \( t \)-statistic of 5.99, and the five-factor adjusted alpha is 0.73% per month with a \( t \)-statistic of 4.64.

Table VII shows the results based on the Fama–MacBeth regressions, which indicate a similar pattern. We examine the forecasting power of innovations in dispersion for future stock returns in the quarters \( t + 1 \), \( t + 2 \), until \( t + 12 \). The results show that a one standard deviation increase in the innovations in dispersion (0.216) is associated with an increase in returns of 1.20% over the immediate next quarter (\( = 0.216 \times 5.546 \)), compared with an increase in return of 0.84% with the level of dispersion (\( = 0.360 \times 2.340 \)). Moreover, we find a more persistent return predictability by the change in dispersion. Notably, the forecasting power of innovations in dispersion for future returns persists up to the next four quarters. But the magnitude of the Fama-MacBeth regression coefficients declines substantially after the first quarter, consistent with information gradually flowing into stock prices.

B Dispersion and Stock Returns during Earnings Announcements

To understand the strong return forecasting power of dispersion in beliefs, we examine the stock price reactions to earnings announcements during the quarter after portfolio formation. If dispersion in active fund holdings contains value-relevant information that becomes available to the public during subsequent earnings announcements, we would expect to observe a positive correlation between dispersion and subsequent earnings announcement returns. In particular,
we expect stocks with large increases in dispersion to enjoy positive performance during earnings announcements and stocks with large decreases in dispersion to experience negative performance during earnings announcements. To examine this conjecture, for each quarter we sort stocks into quintile portfolios on the basis of changes in dispersion in active fund holdings. For each portfolio, we then calculate the three-day cumulative abnormal returns (CARs during the most immediate earnings announcements). We measure abnormal returns by deducting the returns on the benchmark portfolios that match the size and book-to-market characteristics of the stocks from daily individual stock returns.

Panel A of Table VIII indicates that the earnings announcement returns are substantially higher for stocks with large increases in dispersion than for those with large decreases in dispersion. On average, the portfolio with large increases in dispersion experiences positive surprises, earning a CAR of 0.51%. In contrast, the portfolio with large decreases in dispersion delivers rather disappointing performance, earning a CAR of −0.22%. The difference of 0.73%, realized over only three trading days, represents approximately 20% of the 3.72% total difference in returns during the quarter. This result suggests that a significant portion of the return forecasting power of dispersion comes from its ability to predict earnings surprises.

As La Porta, Lakonishok, Shleifer, and Vishny (1997) note, it is possible that the differences in event returns between the high- and low-dispersion portfolios “just represent differences in ex ante risk premia realized around a small number of important information events.” (p. 870) If a disproportionately high percentage of risk is realized during earnings announcements, a disproportionate share of the risk premium may show up as well. If high-dispersion stocks are also high-risk stocks, high abnormal returns might also occur during earnings announcement. A powerful test of this risk premium/uncertainty hypothesis, according to La Porta, Lakonishok, Shleifer, and Vishny, is to examine its implication that for both high and low dispersion stocks, event returns are higher than nonevent returns.

\[21\] The 3.72% difference in quarterly returns is obtained by sorting stocks into quintile portfolios based on the end of quarter changes in dispersion, and then compute the abnormal returns for the “high minus low” portfolio over the next quarter.
In Panel B of Table VIII, we follow their approach. For each portfolio formed on the basis of changes in dispersion in each quarter, we perform regressions of daily excess stock returns on the excess market return and an indicator variable that equals one if the day is within one trading day before and after earnings announcements and zero otherwise. The statistical inference is based on the Fama and MacBeth procedure. Two results are noteworthy. First, we observe a large decline in returns of 3.74 basis points ($t$-statistic = 1.95) for the portfolio with decreases in dispersion in Quintile 1 during the earnings announcement days, which is inconsistent with the prediction of the risk-based hypothesis. Second, Panel B provides clear evidence that the dispersion effect in returns is more pronounced during the earnings announcement period. The difference in average daily returns between stocks with increases and decreases in dispersion is 19.26 basis points during the event days, approximately four times that of 4.49 basis points during the non-event days.

C Information Asymmetry and Return Predictability

The informed manager hypothesis ascribes the return forecasting power of dispersion in active fund holdings to the private information obtained by informed fund managers. If informed managers have greater information advantages for opaque stocks with more asymmetric information, our hypothesis implies that the return forecasting power of dispersion in active fund holdings is stronger among stocks with greater information asymmetry.

Table IV already provides evidence that the return forecasting power by the dispersion in holdings is particularly strong for stocks when analysts forecast dispersion is high. In this section, we offer further supporting evidence by using an alternative measure of information asymmetry. We adapt a widely used measure of information asymmetry in the literature—namely, the adverse selection component of the bid-ask spread.22 This measure is designed to capture the degree of informed trading perceived by the market makers. To the extent that informed mutual fund managers constitute a subset of informed investors, this measure can capture markets’ perception of the information advantage gained by informed fund managers.

22For papers that use this empirical proxy, see, for example, Jones, Kaul, and Lipson (1994), Kumar, Sarin, and Shastri (1998), Flannery, Kwan, and Nimalendran (2004), and Bharath, Pasquariello, and Wu (2009).
We follow the method George, Kaul, and Nimalendran (1991) develop to calculate the adverse selection component. In particular, we calculate the measure as

\[ \text{AS} = S - 2 \times \sqrt{-\text{COV}(RD_t, RD_{t-1})}, \]

where \( S \) is the proportional quoted spread and \( RD \) is the difference between daily returns computed using transaction prices and bid-ask midquotes.\(^\text{23}\)

To examine our conjecture, we perform independent sorts. Along one dimension, we sort stocks into quintile portfolios according to changes in dispersion, and along the other dimension we sort stocks into terciles on the basis of the adverse selection component of bid-ask spread. Fifteen portfolios thus emerge from this double sort. We compute equal- and value-weighted returns on these portfolios and present the results in Table IX. Consistent with the differentially informed manager hypothesis, we observe a monotonic increasing relationship between the return forecasting power of dispersion in active fund holdings and the degree of information asymmetry. For example, on the value-weighted basis, a spread portfolio that buys stocks with high dispersion in active fund holdings and shorts stocks with low dispersion in active holdings earns an abnormal return of 1.64% per month (\( t \)-statistic=5.78), for stocks with a high level of information asymmetry. In contrast, a similar spread portfolio generates an abnormal return of only 0.36% per month (\( t \)-statistic=1.75) for stocks with a low level of information asymmetry. The difference in abnormal returns between the two spread portfolios is 1.28% per month (\( t \)-statistic=3.91). These results indicate that the level of information asymmetry is important in determining the return forecasting power of dispersion in active fund holdings, which lends further support to our differentially informed manager hypothesis.

\[^{23}\text{We use CRSP end-of-day closing bid-ask quotes to calculate the quoted bid-ask spread. We drop all quotes with negative bid-ask spreads and require the recorded ask and bid prices to be strictly positive. We also require a minimum of 20 valid observations within a quarter to calculate the quarterly adverse selection measure. Finally, we exclude observations with negative adverse selection measures.}\]
D Dispersion Effect across Industries

Next, we subdivide our sample into different industries and reexamine the return forecasting power of the dispersion variable within each industry. The test serves two purposes. First, dispersion might be correlated with industry-wide fundamental shocks that are not captured by the standard asset pricing factors (e.g., Hou (2007)). Therefore, performing a within-industry analysis helps mitigate the sector effects. Second, given that firms in different industries differ significantly in terms of informational opaqueness, the test provides another way to examine the impact of information asymmetry on the dispersion effect.

Specifically, we use the Fama–French 10 industry classifications to group stocks and construct portfolios according to changes in dispersion within each industry. Because the industries of consumer durables, oil, and telephone contain only a small number of firms, we exclude them from our industry analysis. 24

Table X summarizes the portfolio sorting results for each of the seven industries. The results indicate that for most of the industries, a spread portfolio that buys stocks with higher dispersion in active fund holdings and shorts stocks with low dispersion in active holdings earns significant alphas in both equal- and value-weighted returns. This result suggests that the return forecasting power of dispersion in active fund holdings is not confined to just a few industries. More importantly, we find that the superior performance of high dispersion stocks is not uniform across various industries. The dispersion effect in stock returns is particularly pronounced among stocks in the information technology industry, followed by stocks in the health care and service industries. In contrast, the dispersion effect in stock returns is relatively weak among stocks in the consumer staples and utilities industries. This pattern is consistent with our expectation, as stocks in the technology-oriented industries are presumably more difficult to value and more likely to be subject to asymmetric information.

24Panel B of Appendix A summarizes the sample size across different industries.
E  **Short-Sale Constraints and Return Predictability**

In addition to information asymmetry, another building block for the differentially informed manager hypothesis is short-sale constraint. Therefore, in this subsection, we examine how short-sale constraints affect the return forecasting power of dispersion in active fund holdings. According to our hypothesis, low dispersion in active fund holdings arises from binding short-sale constraints preventing informed managers from fully using their negative private information. Assuming that negative private information held by the informed mutual fund managers is also observed by some short sellers (e.g., hedge funds), the shorting will help the negative information be incorporated into the stock price, unless shorting is prohibitive. Therefore, the negative return forecasting power of low dispersion in active holdings should be particularly strong among stocks with binding short-sale constraints, whereas the positive return forecasting power of high dispersion in active holdings should be largely uninfluenced by short-sale constraints.

To capture short-sale constraints, we follow Asquith, Pathak, and Ritter (2005) and combine the information on the level of institutional ownership and short interest. The idea is that the level of institutional ownership could be proxy of the supply for loanable shares (e.g., Nagel (2005)), whereas the level of short interest captures the loan capacity already utilized. A stock is hit by binding short-sale constraints when the supply for loanable shares is limited and there is already a large outstanding demand for shorting (D'Avolio (2002)).

In particular, we create a stock-level short-sale constraint index by performing double sorts on institutional ownership (IO) and short interest ratios. A stock receives an index value of 3 if it has low IO and a high short ratio, 1 if it has high IO and a low short ratio, and 2 if otherwise. A higher value of the index indicates more binding short-sale constraints. Figure 2 illustrates the construction of the measure.

Institutional investors exhibit preferences to hold large company stocks (Gompers and Metrick, 2001). To purge a mechanical size effect, we compute residuals from cross-sectional regressions of $\log(IO/(1-IO))$ on $\log(ME)$ and $\log(ME)^2$. We then use the residual IO in the double sorts. Our short interest data for common stocks traded on the NYSE, AMEX and NASDAQ between 1988 and 2008 come from Bloomberg. The short interest ratio is calculated
as the number of shares sold short divided by the number of shares outstanding.

The results in Table XI provide supporting evidence for the differentially informed manager hypothesis. On an equal-weighted basis, a strategy that buys stocks with large increases in dispersion and shorts stocks with large decreases in dispersion generates a monthly four-factor alpha of 1.63% for stocks with the most binding short-sale constraints. In contrast, a similar self-financing strategy generates a monthly four-factor alpha of only 0.71% for stocks with the least binding short-sale constraints. A further examination of the 0.92% return difference between the two strategies indicates that it comes primarily from the abysmally low performance of stocks with low dispersion and binding short-sale constraints, which is −1.20% lower than stocks with low dispersion but nonbinding short-sale constraints. Among stocks with high dispersion in active fund holdings, the difference in the monthly four-factor alpha between stocks with binding and nonbinding short-sale constraints is only −0.27% and statistically insignificant. The results on value-weighted returns indicate a qualitatively similar pattern. These results provide further support to our differentially informed manager hypothesis.

Table XI here

F Firm Size and Return Predictability

We also examine how the return forecasting power of dispersion in active holdings pertains to stock size. The goals of this analysis are twofold. First, assessing the economic significance of the dispersion effect is important. In particular, do mutual fund managers gain private information mainly in a subgroup of stocks (e.g., small-cap stocks), or do they obtain private information for a wide range of stocks? Second, if mutual fund managers do exhibit variations in their informational advantage across different stocks, for which size category do they have the highest information advantage?

To achieve these goals, we perform two-way independent sorts. On one dimension, we sort stocks by their market caps, and on the other dimension, we sort stocks on the basis of dispersion in active holdings. Table XII presents the results. The first message from the results
is that the dispersion effect in stock returns exists across all size quintiles. The second message is that the magnitude of the dispersion effect in stock returns varies across firms in different size categories. In particular, the return forecasting power of dispersion in active fund holdings is strongest among mid-cap stocks but weakest among large-cap stocks. This result conforms to our intuition, because very large firms tend to be more transparent with better disclosure policy. They also tend to be more closely followed and researched by market participants. It therefore is more difficult for mutual funds to gain information advantages on those firms. On the other hand, returns to analyzing small firms are relatively less than the costs of information acquisition. Thus, mid-cap stocks could be the areas in which information miners or stock pickers have the greatest information advantage.

<Insert Table XII here>

G Time Varying Return Forecasting Power of Dispersion in Beliefs

Finally, we consider how the return forecasting power of dispersion in beliefs varies across periods. Specifically, we examine the dispersion effect for the periods before and after the Regulation Fair Disclosure (RegFD) and the periods with high and low inflows into the mutual fund sector.

The SEC instated the RegFD in October 2000 to eliminate selective disclosure by firms to a subset of market participants. How does the return forecasting power of dispersion in beliefs among active funds vary across the two regulation regimes? We divide our sample period into two: the pre-RegFD period from April 1984 to December 2000 and the post-RegFD period from January 2001 to December 2008. During the pre-RegFD period, a long-short portfolio that buys stocks with high dispersion in beliefs in Decile 10 and shorts stocks with low dispersion in beliefs in Decile 1 generates an equal-weight five-factor alpha of 0.79% per month ($t = 4.16$) and a value-weight five-factor alpha of 0.74% per month ($t = 4.03$). During the post-RegFD period, the long-short portfolio yields an equal-weight five-factor alpha of 0.72% per month
(t = 2.86) and a value-weight five-factor alpha of 0.54% per month (t = 1.84). Although the post-RegFD period is relatively short, which prevents us from drawing a firm conclusion, the evidence suggests that the dispersion effect in the returns we document remains strong in the period after the implementation of RegFD.

Several studies have investigated the price impact of mutual fund trades induced by fund flows (e.g., Coval and Stafford (2007), and Greenwood and Thesmar (2009)). They show that under certain circumstances (e.g., when a large number of mutual funds facing correlated liquidity shocks liquidate the same stocks in their portfolios), the price impact of mutual fund trades can be large. In this context, it may be worthwhile to examine how the return forecasting power of our dispersion variable changes across periods when the aggregate flow to the mutual fund sectors is high or low.

We obtain quarterly aggregate flows data for equity funds from the Investment Company Institute through our sample period and divide it into high- and low-inflow periods depending on whether the percentage flow is above or below the median. We separate the returns on high- and low-dispersion stocks by constructing two dummy variables that represent the membership of a stock in the high- and low-dispersion deciles (D10 and D1). We perform cross-sectional regressions of quarterly returns on the two dummy variables together with a battery of stock characteristics, such as size, book-to-market, past one-month return, past 11-month return, idiosyncratic volatility, turnover, and the breadth of fund ownership. The coefficients on the high- and low-dispersion dummies represent the abnormal returns on high- and low-dispersion stocks after we neutralize the influence of other stock characteristics. We find that the average coefficients for high-dispersion stocks are 1.79% (t = 4.60) and 1.73% (t = 6.18) for low- and high-inflow periods, respectively, and the difference is a statistically insignificant –0.06% (t = –0.12). For low-dispersion stocks, we find that the average coefficients are –0.88% (t = –2.28) and –1.12% (t = –2.73) for low- and high-inflow periods, respectively, and the difference is a statistically insignificant –0.24% (t = –0.44). Therefore, the variation in aggregate fund flows seems to have no influence on the variation in the return forecasting power of our dispersion variable.
VI Conclusion

We have empirically examined how heterogeneous beliefs among active fund managers might influence stock prices. Our results establish that higher dispersion in beliefs among active mutual fund managers, as revealed through their active holdings, is associated with higher future stock returns. The return forecasting power of dispersion is incremental to that of the average active fund holdings and robust to the effects of idiosyncratic risk, breadth of ownership, and dispersion in analyst earnings forecasts. This effect of dispersion on returns is particularly pronounced among stocks with high information asymmetry; moreover, the lower returns on stocks with lower dispersion concentrate on those with binding short-sale constraints. These results are consistent with a subgroup of informed managers driving up the dispersion in active holdings when they place large bets after receiving positive information signals unobserved by their peers; conversely, binding short-sale constraints prevent them from fully using their negative private information, leading to low dispersion in active holdings.

The positive link between dispersion in beliefs among active mutual funds and future stock returns is striking, as a large body of empirical literature finds a negative association between proxies for dispersion in beliefs and future returns. This literature has interpreted this negative association as empirical support for Miller’s (1977) argument that differences in opinion in combination with short-sale constraints can lead optimistic investors to become price-setting marginal investors, who hold overvalued equities and suffer from losses of negative expected returns. Our evidence suggests that if the seemingly optimistic behavior of investors arises from their superior information, these investors could earn positive expected returns, generating a positive association between dispersion in beliefs and future returns. Considering the increasingly dominant role of sophisticated professional investors in the stock market, our analysis suggests that taking into account the heterogeneity arising from differentially informed investors could be a promising approach to better understand the cross-section of stock returns.
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