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Jin Yu
Saint Cloud University

Haigang Zhou
Cleveland State University, h.zhou16@csuohio.edu

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The Asymmetric Impacts of Good and Bad News on Opinion Divergence: Evidence from Revisions to the S&P 500 Index

Jin Yu
Saint Cloud State University

Haigang Zhou
Cleveland State University

Motivated by the ambiguity theory of Epstein and Schneider (2003, 2008), we hypothesize that investors' beliefs on the prospects of firms converge upon the arrival of bad news, but do not converge - or even further diverge - on the arrival of good news. We expect firms with high divergence in opinions to experience lower stock returns around the announcements of bad news but not for good news. Using revisions to the S&P 500 index between 1962 and 2008 as information events, we find overwhelming support for the hypothesis. The results are robust to controlling for alternative hypotheses of price changes around revisions to the S&P 500 index, as well as common firm characteristics.

INTRODUCTION

In the Graham and Dodd Award winning paper, Doukas et al. (2004) describe how divergent opinions among investors can explain the value anomaly. They find that value stocks are exposed to greater opinion dispersion than growth stocks. As a result, the higher return earned by value stocks relative to growth stocks may be attributed to the higher risk premiums associated with the greater disagreement about their future growth in earnings. In contrast, other studies have documented contradictory evidence. For example, Diether et al. (2002) find that stocks with high opinion divergence underperform otherwise similar stocks[1].

Scant research has examined changes in opinion divergence around announcements of major news, which is important in understanding the evolvement of opinion divergence, especially around important firm-specific or macro news announcements. Notable exceptions include Berkman et al. (2009), who examine changes in opinion divergence around quarterly earnings announcements. They find a negative association between proxies for pre-event opinion divergence and cumulative abnormal returns over the three-day window centered around earnings announcements. Based on the Miller's (1977) theory, the author interprets the results as evidence of decreasing opinion divergence around quarterly earnings announcements. One important implication of Berkman et al. (2009) is that investors adjust their beliefs regarding the prospect of a firm's future earnings promptly following announcements of quarterly earnings.

One limitation of Berkman et al. (2009) is that all earnings announcements, indiscriminate of good and bad earnings shocks, are expected to have uniform impact on investors' belief-updating process. However, the ambiguity theory (Epstein and Schneider, 2003, 2008) suggests that good and bad news

have asymmetric impact on opinion divergence. In contrast to the standard Bayesian of updating prior beliefs upon the arrival of signals of precision, Epstein and Schneider (2003, 2008) study the behavior of investors who are confronted with information of ambiguous precision. They argue that investors observe a range of signal precisions and assign the worst-case assessment of precisions when new information arrives. For instance, when investors receive good (bad) news, the worst case is that the news is unreliable (reliable). Under the ambiguity theory, ambiguity-averse investors react asymmetrically to good and bad news: they discount good news and respond more seriously to bad news. We hypothesize that opinion divergence responds asymmetrically to good and bad news. In particular, opinion divergence decreases upon the arrival of bad news but decreases to a lesser degree - or even further diverge - upon the arrival of good news.

We adopt the "sharper and more powerful" research framework of Berkman et al. (2009) and use three-day excess returns around revision announcements to test the hypothesis. We choose excess returns over a short-term window for a number of reasons. First, we can better capture the immediate effect of changes in opinion divergence on stock prices and mitigate the possibility that changes in opinion divergence are results of changes in systematic risk (Berkman et al., 2009). Furthermore, utilizing returns over a short window also enables us to control the impact of other factors such as firm size, market-to-book ratios, short-sale constraints, momentum, and excess trading volume.

We utilize the announcements of changes in the S&P 500 index as information events due to its two unique features. First, the announcements are among the few firm-specific information events originated independently of a firm. Previous studies (see, for example, Cai, 2007; Chen et al., 2004; Dhillon and Johnson, 1991; Jain, 1987) have documented significant changes in stock prices and trading volumes after such announcements. Arguably, the impact of such changes on opinion divergence is more pronounced than many other corporate news, such as earnings and dividends announcements. Second, although the short-term stock price responses to changes in the index are overwhelmingly positive for addition firms and negative for deletion firms, the long-term effects of such changes are less clear. For example, Siegel and Schwartz (2006) find that a portfolio consisting of firms deleted from the S&P 500 index outperforms a portfolio of firms replacing the deleted firms between 1957 and 2003. Moreover, previous studies find that the negative returns experienced by deletion firms are temporary (Chen et al., 2004; Zhou, 2011). Therefore, investor may perceive announcements of revisions to the S&P 500 index as ambiguous news in estimating future earnings of the firms. The second feature fits well with the spirits of the ambiguity theory.

Using four proxies for opinion divergence and a sample of 880 additions and 236 deletions, we analyze the association between opinion divergence and cumulative excess returns around the announcements of revisions. If our predictions based on Epstein and Schneider (2008) are valid, we should observe a negative association between opinion divergence and excess stock returns for deletions, and a weaker negative - or even a positive - association for additions. In a regression analysis framework, we find a significantly negative association between opinion divergence and cumulative excess returns for deletion firms. The negative association suggests that opinion divergence converges among investors upon the announcements of bad news. For additions, we find no significant relation between opinion divergence and excess returns, which indicates opinion divergence regarding firms' prospects does not necessarily converge upon the announcements of good news. The results are consistent with our hypothesis, and robust to controlling for alternative explanations of changes in stock prices around revisions to the S&P 500 list, such as the downward-sloping demand curve hypothesis and the price pressure hypothesis, as well as common firm characteristics, such as firm size, market-to-book ratio, illiquidity, momentum, and financial leverage.

The findings of the asymmetric impact of good and bad news on divergence opinions enhance our understanding on the dynamics of opinion divergence on stock prices around announcements of revisions to the S&P 500 index. Specifically, our results suggest that only deletion firms with different degrees of opinion divergence may have different price patterns around the announcements. Our results do not suggest disparate responses in addition firms.

The remainder of the paper proceeds as follows: Section 2 reviews existing literature. Section 3 describes the sampling process and defines the variables used in the study. Section 4 presents the baseline empirical results. Section 5 performs additional tests to substantiate the baseline results, and Section 6 concludes.

REVIEW OF RELATED STUDIES

Ambiguous Information

Epstein and Schneider (2003, 2008) develop a theoretical model that investors react asymmetrically to good and bad news when confronted with information of uncertain quality. Using a sample from 1986 to 2007, Williams (2009) empirically examines how investors respond to firm-specific news when faced with incomplete information and documents that investors react asymmetrically (symmetrically) to earnings news following an increase (decrease) in the uncertainty of information quality (defined as "ambiguity" in his paper). For instance, when there is an increase in ambiguity regarding earnings announcement news, investors react more seriously to bad news than to good news. On the other hand, when there is a decrease in ambiguity regarding earnings announcement news, investors react symmetrically to both good and bad news. Arnold et al. (2010) study the effects of ambiguous information on initial and subsequent IPO returns, and find a positive association between ambiguous information contained in IPO prospectus and IPO underpricing.

The body of literature on ambiguous information is built on the maxmin expected utility theory advanced by Gilboa and Schmeidler (1989). Under the theory, financial market participants act cautiously, or even pessimistically, to bad news when confronted with ambiguous information. As a result, they choose to believe the worst case scenario from a set of possible probability distributions. Market participants' asymmetric responses to negative and positive information have also been explored in areas such as economics (Bowman et al., 1999), political science (Holbrook et al., 2001; Soroka, 2006), and psychology (Singh and Teoh, 2000). Studies in these areas document that the release of bad news has a much greater impact on individuals' behavior than the release of good news. In summary, these studies provide both theoretical and empirical evidence that market participants react differently to good and bad news.

Opinion Divergence

Miller (1977) argues that stock prices are biased upward as long as short-sales constraints exist and investors hold wide-range opinions about stock value. In practice, the overvaluation of stock prices cannot persist forever since firms release news to the public periodically. Based on the newly released information, investors revise their valuation of stocks, and opinion divergence may be reduced among investors. Previous studies testing Miller's theory generate mixed results. For instance, Diether et al. (2002) and Ang et al. (2006) find evidence in support of Miller's hypothesis. However, later studies by Johnson (2004) and Bali and Cakici (2008) find evidence inconsistent with Miller's theory. As pointed out by Berkman et al. (2009), one of the limitations of prior studies in testing Miller's predictions is the authors' assumption that opinion divergence among investors should be reduced over a relatively long horizon of several months.

Contrary to previous research, Berkman et al. (2009) test Miller's theory by investigating the effects of opinion divergence and short-sales constraints on stock prices surrounding earnings announcements. Specifically, the authors focus on the relation between the three-day cumulative abnormal returns around earnings announcements (a short-window event) and opinion divergence among investors conditional on short-sales constraints. The authors argue that investors reevaluate stock prices upon the release of earnings announcements; hence, earnings announcements should reduce opinion divergence among investors. Consistent with Miller's prediction, Berkman et al. find a negative relation between the three-day cumulative excess returns and proxies for opinion divergence. In other words, upon the release of earnings announcements, the average cumulative excess returns for stocks with high opinion divergence are lower than those with low opinion divergence, holding short-sales constraints fixed.

Ambiguous Information Contained in Revisions of the S&P 500 Index

Market reactions surrounding changes to the composition of the S&P 500 list are well-established in the literature. However, no agreement has been reached to explain the price effects around the announcement and/or the effective dates. Earlier studies assume that revisions are information-free events and attribute the price effects to the downward-sloping demand curve (Shleifer, 1986) and/or price pressure (Lynch and Mendenhall, 1997) hypotheses. Later studies argue that S&P's decisions convey new information about a firm's prospects (Cai, 2007; Denis et al., 2003). Other studies attribute the price effects of index additions to improved liquidity and lower transaction costs (Hegde and McDermott, 2003) or increased investor awareness (Chen et al., 2004; Zhou, 2011).

Although there is no consensus on the mechanisms leading to the price effects, empirical evidence suggests that revisions to the S&P 500 index send ambiguous signals regarding firms' prospects. Siegel and Schwartz (2006) compare the performance of a portfolio of the original 500 companies included in the S&P 500 index when it was first created in 1957 to that of the updated S&P 500 index. If the signals are unambiguous, we would expect the updated portfolio to outperform the original portfolio. However, Siegel and Schwartz (2006) find that the original portfolio outperforms the updated S&P 500 index between 1957 and 2003. Moreover, Beneish and Whaley (1996) document a negative average abnormal return for additions on the announcement day over the subperiod between October 1989 and June 1994. Due to documented evidence in prior studies, we argue that investors treat the announcements of revisions to the S&P 500 index as ambiguous information, leading to asymmetric price responses as predicted in Epstein and Schneider (2008).

SAMPLE, VARIABLE CONSTRUCTION, AND DESCRIPTIVE STATISTICS

S&P 500 Index Additions and Deletions

We obtain a list of changes to the S&P 500 index between September 1962 and December 2008 from Chen et al. (2004) and S&P website. We search for the official S&P announcements related to the changes using the LexisNexis database and ascertain the announcement dates and the effective dates. If there is more than one official S&P announcement for an addition or deletion, we use the date of the first announcement as the announcement date[2].

Over the sample period from September 1962 to December 2008, we identify a total of 1,117 additions and 1,117 deletions. We drop 237 additions because they are involved in contemporary corporate events such as mergers and acquisitions (51), spinoffs and curve-outs (76), firms with the same PERMNOs (40), or because no official S&P announcements are available (70). The final sample includes 880 firm additions. We drop 791 of the 1,117 deletions due to mergers and acquisitions or because trading stopped two days prior to the announcement dates. We further drop 22 firms due to liquidations or Chapter 11 filings, 33 firms due to spinoffs, special distributions to shareholders, split-ups, or company restructures, 11 firms due to leveraged buyouts or being taken private, 9 firms due to delisting, and 2 firms due to redomestication to a foreign country. S&P dropped all foreign firms from the S&P 500 index in 2002. As a result, we further drop 13 firms and end up with 236 firms in the final deletion sample[3].

Variable Construction

In this study, we use four proxies for opinion divergence that are constructed from stock prices and trading volumes[4]. We first proxy opinion divergence (*DIVOPN*) using the stock return volatility (*RETVOL*), defined as the standard deviation of a firm's daily excess stock return relative to the CRSP value-weighted index. *RETVOL* is calculated over the 45-day period ending 10 days prior to the announcement date of changes to the S&P 500 index. The second proxy for *DIVOPN* is the average daily share turnover (*TURN*) over the 45-day period ending 10 days prior to the announcement date of changes to the S&P 500 index. The third proxy for *DIVOPN*, historical income volatility (*INCVOL*), is derived from Compustat and defined as the standard deviation of the ratio of quarterly operating income before depreciation divided by total assets over the 20 quarters prior to the announcement date of changes to the S&P 500 index. We require a minimum of eight quarters of data to calculate *INCVOL*. We use firm age

(*AGE*) as our last proxy for *DIVOPN*. *AGE* is defined as the number of years a firm has been covered in CRSP prior to the announcements of changes to the S&P 500 index. To ensure consistent interpretation with other proxies and to reduce skewness, we transform *AGE* to *Ln(1/AGE)*. We measure the price effects using the cumulative excess return (*EXRET*), relative to the CRSP value-weighted market return, over the three days centered at the announcement date of changes to the S&P 500 list.

In our regression analysis, we control for short-sales constraints and the effects of firm size and market-to-book ratio. As pointed out in Boehme et al. (2006), stock price overvaluation exists when both opinion divergence and short-sales constraints are satisfied. Following Asquith et al. (2005), Berkman et al. (2009), D'Avolio (2002), and Nagel (2005), we use institutional ownership (*INSOWN*) to proxy for short-sales constraints. *INSOWN* is calculated as the fraction of the company's shares held by institutional investors reported in the Thomson Financial's CDA/Spectrum Institutional (13f) Holdings data at the end of the quarter prior to the revision announcements. Jain (1987) argues that small firms may be subject to less frequent news announcements, and thus announcements regarding smaller firms may contain more information than larger firms. Consequently, smaller firms earn higher (lower) excess stock returns than larger firms upon the announcements of additions (deletions). We control for firm size by including market capitalization (*MV*) in the analysis. *MV* is defined as the market value of common stocks (price multiplied by number of shares outstanding). Barberis et al. (1998) predict that growth firms react to bad news more strongly and to good news more weakly than value firms, so we control for the effect of growth factor by including market-to-book ratio (*MB*) in our analysis. *MB* is defined as the market value of common stocks divided by book value of common stocks. Both market values and book values are measured at the end of the fiscal quarter prior to S&P announcements. We transform both *MB* and *MV* to the natural logarithm form in the regression analysis.

To control for alternative explanations of excess returns around the announcements of changes to the S&P 500 index, we include abnormal volume (*EXVOL*), return momentum (*MOM*), illiquidity (ILLIQ), and financial leverage (*LEV*) in our regression analysis. Abnormal volume is defined as the ratio of event trading volume to normal trading volume. The event trading volume is the average three-day trading volume around the announcement date, and the normal trading volume is the average trading volume over the 250-day period two days prior to the announcement date. Return momentum is calculated as the excess buy-and-hold return relative to CRSP value-weighted index over the twelve calendar months prior to the addition and deletion announcements. Illiquidity is defined as the ratio of the average daily absolute return to the average dollar trading volume over the 45-day period ending 10 days prior to the announcement date. Financial leverage is calculated as the ratio of total debt divided by total assets, both measured at the end of the quarter prior to S&P announcements.

Descriptive Statistics

Panels A and B of Table 1 present the sample statistics of the variables for additions and deletions, respectively. We do not require every firm to have all the dependent and independent variables; as a result, the number of observations varies across specifications. Specifically, there are 880 (236) observations for additions (deletions) with data on excess returns, and 429 (84) observations on institutional ownership.

The three-day mean cumulative excess return (*EXRET*) centered around the announcements of additions (deletions) is 2.866% (-6.112%), consistent with the findings in prior studies that stocks added to (deleted from) the S&P 500 index experience positive (negative) abnormal returns (see, for example, Cai, 2007; Chen et al., 2004; Dhillon and Johnson, 1991; Jain, 1987). The average market value (*MV*) is $4,014 million for additions and $609 million for deletions, consistent with the practice of S&P to drop firms with the lowest market value among the 500 firms in the index. We also note that the average market value for addition (deletion) firms is greater (smaller) than the average firm size ($1,723 millions) reported in Berkman et al. (2009). The average market-to-book ratio (*MB*) for additions (4.268) is about four times that of deletions (1.193). Besides, the average *MB* for additions (deletions) is higher (lower) than the market average (3.23) reported in Berkman et al. (2009). These statistics are consistent with

TABLE 1
SAMPLE STATISTICS

This table reports the summary statistics for the sample of revisions to the S&P 500 index. The sample includes all additions and deletions from September 1962 to December 2008, free from contemporary corporate events and with ascertained announcement dates and prices from CRSP. *EXRET* is the cumulative excess return (relative to the CRSP value-weighted market return) over the three days centered at the announcement date of changes in the S&P 500 list. Firm size (*MV*) is proxied by the market value of common stocks (price multiplied by number of shares outstanding). Market-to-book ratio (*MB*) is the market value of common stocks divided by book value of common stocks. Both market values and book values are measured at the end of the fiscal quarter prior to S&P's announcements. *RETVOL* is the standard deviation of excess daily stock returns. *TURN* is the average daily turnover. *INCVOL* is the standard deviation of quarterly operating income. *AGE* is the number of years a firm has been covered in CRSP. *INSOWN* is the percentage of stocks owned by institutional investors. Financial leverage (*LEV*) is the ratio of total debt divided by total assets, both measured at the end of the quarter prior to S&P's announcements. *EXVOL* is the ratio of event trading volume to normal trading volume. The event trading volume is the average three-day trading volume around the announcement date, and the normal trading volume is the average trading volume over the 250-day period two days prior to the announcement date. *MOM* is the excess buy-and-hold return relative to CRSP value-weighted index over the twelve calendar months prior to revision announcements. *ILLIQ* is the ratio of the average daily absolute return to the average dollar trading volume over the 45-day period ending 10 days prior to the announcement date. Detailed variable definitions are presented in Variable Construction Section.

Variables	# obs	Mean	Min	Q1	Median	Q3	Max
			Panel A: S&P 500 additions				
EXRET (%)	880	2.866	−16.186	0.023	2.538	5.307	26.991
MV	854	4,013.997	9.964	453.038	1,353.194	5,587.911	120,894.767
MB	723	4.268	0.232	1.571	2.708	4.711	78.226
INCVOL (%)	647	2.194	0.026	0.683	1.305	2.760	20.014
RETVOL (%)	880	2.067	0.461	1.351	1.771	2.440	8.569
AGE	880	15	0	6	12	21	75
TURN	860	0.545	0.010	0.125	0.264	0.595	7.344
INSOWN (%)	429	53.646	0.030	39.556	55.241	71.230	99.192
LEV	611	0.217	0.000	0.091	0.188	0.309	0.946
EXVOL	861	2.603	0.080	1.083	1.805	2.977	36.458
MOM (%)	879	19.069	−106.848	−4.959	12.580	36.628	262.942
ILLIQ	860	0.081	0.000	0.001	0.005	0.043	5.209
			Panel B: S&P 500 deletions				
EXRET (%)	236	−6.112	−130.747	−6.578	−1.735	0.643	14.447
MV	228	609.063	7.025	69.371	201.113	584.496	20,722.030
MB	179	1.193	0.039	0.595	0.866	1.309	21.969
INCVOL (%)	157	2.187	0.097	0.893	1.517	2.941	12.100
RETVOL (%)	236	2.841	0.709	1.458	2.194	3.305	22.535
AGE	236	30	0	16	28	42	81
TURN	429	0.407	0.016	0.064	0.148	0.417	4.457
INSOWN (%)	84	49.248	0.200	34.723	51.329	67.432	97.813
LEV	151	0.341	0.000	0.204	0.338	0.457	0.910
EXVOL	236	2.067	0.148	0.648	1.390	2.151	24.916
MOM (%)	236	−16.965	−176.999	−37.056	−5.441	12.584	148.280
ILLIQ	236	0.676	0.000	0.014	0.089	0.445	19.058

S&P's statement that it revises the S&P 500 index to keep the index representative of the market, and consistent with the stylized facts that added firms are generally in expansion while deleted firms are in contraction.

There is no evidence that additions and deletions have significantly different divergence in opinions prior to the announcements of revisions: the averages are 2.194% (2.187%), 2.067% (2.841%), 15 (30), and 0.545 (0.407) for *INCVOL*, *RETVOL*, *AGE*, and *TURN*, respectively, for additions (deletions). Both additions and deletions have around 50% of their shares owned by institutional investors (*INSOWN*), which is higher than the market average of 37% reported in Berkman et al. (2009). This statistic is reasonable given that Berkman et al. (2009) study all firms with quarterly earnings announcements during 1985-2005, while our study focuses on S&P 500 stocks with relatively large market capitalization and are widely tracked by index and mutual funds. The mean leverage (*LEV*) is 0.217 (0.341) for additions (deletions). The mean abnormal volume (*EXVOL*) is 2.603 (2.067) for additions (deletions), indicating substantial trading activities by index funds and self-indexed individuals when S&P announces the changes. The average 12-month buy-and-hold returns for additions (deletions) (*MOM*) is significant at 19.069% (-16.965%), indicating significant price run-ups (downs) for additions (deletions) prior to the announcements of revisions. The average *ILLIQ*, a proxy for illiquidity, is 0.081 for additions and 0.676 for deletions, showing that deletion stocks are less liquid than addition stocks.

EMPIRICAL RESULTS FROM OUR BASELINE REGRESSION ANALYSIS

In this section, we present estimation results from our regression analysis. We calculate proxies for opinion divergence over the pre-announcement periods, thus our ex ante measures are free from endogenous contaminations and reverse causality problems.

Table 2 presents the results of the baseline regressions to test the association between the proxies for opinion divergence and cumulative excess returns around the announcements of changes to the S&P 500 index after controlling for short-sales constraints and the effects of firm size and market-to-book ratio. For both samples of additions and deletions, we estimate the following model with one *DIVOPN* proxy at a time (*i* in the equation identifies firms):

$$EXRET_i = \alpha_{i+}\beta_1 DIVOPN_i + \beta_2 INSOWN_i + \beta_3 Ln(MB)_i + \beta_4 Ln(MV)_i + \varepsilon_i \quad (1)$$

The first two columns of Table 2 present the results of using *RETVOL* to proxy for the pre-event divergence in investors' beliefs. For additions, the estimated coefficient on *RETVOL* is significantly positive (0.387), indicating that investors' opinions about added stocks diverge further upon the arrival of S&P's announcements of the revisions. On the other hand, the estimated coefficient on *RETVOL* for deletion firms is significantly negative (-4.129), implying that investors' opinions converge upon the announcements of firms' removal from the index. We use the standard F-test to examine whether the regression coefficients on *RETVOL* predicting excess stock returns differ across the two groups. The results are reported at the last two rows of Table 2. The estimation result shows that the null hypothesis can be rejected (F=123.464, p = 0.000), suggesting the association between opinion divergence and excess stock returns does significantly differ across the two groups.

Columns (3) - (8) present the test results when we use other proxies for opinion divergence in the regressions. When we use *TURN* and *INCVOL* as proxies, we find that the negative association between opinion divergence and excess stock returns around the announcements of deletions is greater than that of additions. When *Ln(1/AGE)* is used as a proxy, the estimated coefficient on opinion divergence is significantly negative (-3.538) for deletions and insignificantly positive (0.383) for additions. Moreover, all four F-tests reject the hypothesis that the association between opinion divergence and excess stock returns is equal for addition and deletion firms.

TABLE 2
OPINION DIVERGENCE AND CUMULATIVE EXCESS RETURNS AROUND THE ANNOUNCEMENTS OF REVISIONS TO THE S&P 500 INDEX

This table investigates the association between opinion divergence and cumulative excess returns around the announcements of revisions to the S&P 500 index, controlling for short-sales constraints and the effects of firm size and market-to-book ratio. The dependent variable is the cumulative excess returns over the three days centered around the announcements (*EXRET*). Opinion divergence (*DIVOPN*) is measured by four proxies: the standard deviation of excess daily stock returns (*RETVOL*), average daily turnover (*TURN*), operating income volatility (*INCVOL*), and the natural logarithm of ratio one to firm age (*Ln(1/AGE)*). Institutional ownership (*INSOWN*) is the percentage of stocks owned by institutional investors. *Ln(MB)* is the natural logarithm of the market value of common stocks divided by book value of common stocks. *Ln(MV)* is the natural logarithm of the market value of common stocks. Proxies for opinion divergence are different in every two columns and are presented on the header of each column. Detailed variable definitions are presented in Variable Construction Section. We report the F-test statistic and its p-value on the hypothesis that the estimated coefficients on *DIVOPN* for the addition sample equal to that for the deletion sample. We also report, in the parentheses, the t-statistic that the estimated coefficient equals to zero. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	RETVOL		TURN		INCVOL		LN(1/AGE)	
Model	Additions	Deletions	Additions	Deletions	Additions	Deletions	Additions	Deletions
DIVOPN	0.387 *	−4.129 ***	−0.123	−7.178 ***	−0.062	−2.204 *	0.383	−3.538 *
	(1.830)	(−7.848)	(−0.376)	(−3.970)	(−0.555)	(−1.967)	(1.458)	(−1.991)
INSOWN	−0.007	0.010	−0.006	−0.005	−0.008	−0.057	−0.006	−0.057
	(−0.655)	(0.214)	(−0.526)	(−0.082)	(−0.638)	(−0.893)	(−0.522)	(−0.913)
LN(MB)	0.453	0.687	0.751 **	1.320	0.730 **	3.682 **	0.578 *	3.289 **
	(1.351)	(0.548)	(2.338)	(0.838)	(2.187)	(2.140)	(1.820)	(1.996)
LN(MV)	0.138	−0.546	0.179	0.609	0.199	−1.390	0.156	−0.399
	(0.667)	(−0.659)	(0.824)	(0.552)	(0.815)	(−1.185)	(0.753)	(−0.348)
Intercept	2.005	5.170	2.189	−9.503	2.206	3.658	3.434 **	−17.338 *
	(1.371)	(0.992)	(1.402)	(−1.454)	(1.310)	(0.459)	(2.100)	(−1.769)
Adj-R^2	0.022	0.480	0.013	0.191	0.016	0.055	0.019	0.057
# obs	422	72	418	72	379	68	422	72
F-test	123.464		47.988		5.839		13.880	
p-value	0.000		0.000		0.016		0.000	

Except for the positive (and mostly significant) coefficients on market-to-book ratio, the estimated coefficients on other independent variables are mostly insignificant, regardless of the proxies for opinion divergence used in the regression analysis. The positive coefficient on market-to-book ratio indicates an asymmetric price effect for growth firms. Specifically, the price of a growth firm (i.e., high *LN(MB)*) increases more than that of a value firm (i.e., *low LN(MB)*) when it is added to the index; conversely, the price of a growth firm decreases less than that of a value firm when it is dropped from the index. The findings are different from those predicted in Barberis et al. (1998), who argue that, for growth firms, there is a strong reaction to bad news and a dampened response to good news. The findings are also different from those in La Porta et al. (1997) and Skinner and Sloan (2002), who document evidence in support of the predictions. However, our study is not directly comparable to them. We examine the response coefficients to unexpected good and bad news over a three-day window around the announcements of S&P 500 revisions, whereas the previous studies examine mean returns over longer

periods following pre-scheduled earnings announcements. Also different from the aforementioned studies, Conrad et al. (2002) report that both growth and value stocks react to good and bad news in a similar manner.

Collectively, the findings in Table 2 support our hypothesis based on Miller (1977) and Epstein and Schneider (2008) that investors react asymmetrically to good and bad news when faced with ambiguous information. Specifically, upon the announcements of index deletions, investors react to the bad news by placing more weight on it. This reduces divergence in investors' beliefs and leads to a greater decrease in prices for stocks with high pre-event opinion divergence. This argument is supported by the significantly negative relation between the four proxies for opinion divergence and cumulative excess returns. On the other hand, upon the announcements of index additions, investors react to the good news by placing less weight on it (discount the good news); hence, the opinion divergence among investors decreases by a small magnitude or even increases slightly, leading to a small decrease (or a small increase) in stock prices around the announcements for additions with high pre-event opinion divergence. This argument is supported by the positive and mostly insignificant association between the proxies for opinion divergence and cumulative excess returns.

ADDITIONAL TESTS

The Effects of Abnormal Trading Volume and Return Momentum

Several competing hypotheses have been proposed to explain the abnormal returns around the announcements of changes to the S&P 500 index. Among them, the downward-sloping demand curve hypothesis and the price pressure hypothesis argue that excess stock returns are attributed to the imbalance (either temporary or permanent) in the demand and supply of the shares (Lynch and Mendenhall, 1997; Shleifer, 1986). If the demand (supply) for shares of companies newly added to (deleted from) the index is higher, the excess stock returns around the announcements are higher (lower). Thus, it is possible that the asymmetric association between opinion divergence and excess stock returns reflects asymmetric demand or supply of shares surrounding the announcements of index revisions. To examine the impact of sudden changes in the demand and supply of shares on the association between opinion divergence and event returns, we add to our regression analysis a proxy for abnormal demand or supply of shares, abnormal volume (*EXVOL*), defined as the ratio of event trading volume to normal trading volume.

Jegadeesh and Titman (1993) document that an investment strategy of buying recent past winners and selling recent past losers generates significantly positive returns over the subsequent three- to twelve-month holding periods. As shown in Table 1, many of the addition (deletion) firms have experienced a substantial increase (decline) in stock prices prior to their official addition to (deletion from) the S&P 500 index. It is possible that the positive (negative) association between opinion divergence and cumulative abnormal returns reflects the effects of return momentum. We calculate past return momentum (*MOM*) as the excess buy-and-hold return relative to the CRSP value-weighted index over the twelve calendar months prior to the addition and deletion announcements.

We next examine whether the previous findings are robust to controlling for the additional effects of abnormal trading volume and return momentum in the following regression:

$$EXRET_i = \alpha_{i+}\beta_1 DIVOPN_i + \beta_2 MOM_i + \beta_3 EXVOL_i + \beta_4 INSOWN_i + \beta_5 Ln(MB)_i + \beta_6 Ln(MV)_i + \varepsilon_i \quad (2)$$

We present the results in Table 3, using one proxy for opinion divergence at a time. We focus our discussion on four findings. First, the effect of return momentum (*MOM*) is positive in all specifications for both additions and deletions. However, the effect is more pronounced in deletions than additions. S&P mostly drops stocks with the lowest market values in the 500 list; thus, the market is relatively more confident in guessing which companies will be dropped from the list than those that will be added.

Consequently, the market may anticipate and trade ahead of announcements of deletions and this results in a significantly negative momentum effect.[5] The insignificant coefficient on return momentum for additions may reflect the relative difficulty of speculating stocks to be added to the list.

TABLE 3
OPINION DIVERGENCE AND CUMULATIVE EXCESS RETURNS AROUND THE ANNOUNCEMENTS OF REVISIONS TO THE S&P 500 INDEX, CONTROLLING FOR THE ADDITIONAL EFFECTS OF RETURN MOMENTUM (*MOM*) AND ABNORMAL TRADING VOLUME (*EXVOL*)

This table investigates the association between proxies for opinion divergence and cumulative excess returns around the announcements of revisions to the S&P 500 index, controlling for the additional effects of return momentum (*MOM*) and abnormal trading volume (*EXVOL*). The dependent variable is the cumulative excess returns over the three days centered around the announcements (*EXRET*). Opinion divergence (*DIVOPN*) is measured by four proxies: the standard deviation of excess daily stock returns (*RETVOL*), average daily turnover (*TURN*), operating income volatility (*INCVOL*), and the natural logarithm of ratio one to firm age (*Ln(1/AGE)*). *MOM* is the excess buy-and-hold return relative to CRSP value-weighted index over the twelve calendar months prior to revision announcements. *EXVOL* is the ratio of event trading volume to normal trading volume. *INSOWN* is the percentage of stocks owned by institutional investors. *Ln(MB)* is the natural logarithm of the market value of common stocks divided by book value of common stocks. *Ln(MV)* is the natural logarithm of the market value of common stocks. Proxies for opinion divergence are different in every two columns and are given on the header of each column. Detailed variable definitions are presented in Variables Construction Section. We report the F-test statistic and its p-value on the hypothesis that the estimated coefficients on *DIVOPN* for the addition sample equal to that for the deletion sample. We also report, in the parentheses, the t- statistic that the estimated coefficient equals to zero. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	RETVOL		TURN		INCVOL		LN(1/AGE)	
Model	Additions	Deletions	Additions	Deletions	Additions	Deletions	Additions	Deletions
DIVOPN	0.384*	−2.590***	−0.067	−3.107**	−0.060	−1.461*	0.419	−2.526*
	(1.728)	(−3.889)	(−0.193)	(−2.071)	(−0.525)	(−1.802)	(1.571)	(−1.990)
MOM	0.002	0.033	0.007	0.083***	0.006	0.093***	0.005	0.090***
	(0.262)	(1.358)	(0.969)	(3.929)	(0.914)	(4.331)	(0.741)	(4.325)
EXVOL	0.183**	-1.509***	0.170*	-1.818***	0.160*	-1.927***	0.184**	-1.991***
	(2.125)	(-4.340)	(1.922)	(-5.057)	(1.791)	(-5.328)	(2.133)	(-5.729)
INSOWN	−0.004	0.021	−0.002	0.030	−0.003	0.012	−0.002	0.006
	(-0.349)	(0.495)	(-0.223)	(0.657)	(-0.276)	(0.245)	(−0.187)	(0.126)
LN(MB)	0.404	0.902	0.579*	1.287	0.564	2.409*	0.444	2.140*
	(1.133)	(0.807)	(1.654)	(1.067)	(1.495)	(1.938)	(1.258)	(1.815)
LN(MV)	0.107	−0.047	0.131	0.964	0.165	0.058	0.116	0.785
	(0.510)	(−0.061)	(0.598)	(1.126)	(0.668)	(0.067)	(0.556)	(0.937)
Intercept	1.523	2.147	1.871	−7.865	1.787	-0.522	3.126*	−15.285**
	(1.001)	(0.426)	(1.196)	(−1.533)	(1.027)	(-0.090)	(1.863)	(−2.174)
Adj-R^2	0.026	0.590	0.019	0.526	0.019	0.515	0.025	0.524
# obs	418	72	418	72	375	68	418	72
F-test	86.348		29.166		5.019		10.278	
p-value	0.000		0.000		0.026		0.001	

Second, we also note that, consistent with the price pressure hypothesis and the downward-sloping demand curve hypothesis, abnormal volume (*EXVOL*) is positively (negatively) and significantly related to cumulative excess returns for additions (deletions). Higher purchasing (selling) pressure after the announcements of addition to (deletion from) the S&P 500 index results in higher (lower) excess returns, indicating that the buying and selling pressure of index funds partially explains the positive and negative cumulative excess returns around the index change announcement periods.

Third, we continue to observe a strong asymmetric association between opinion divergence and excess stock returns, after controlling for the additional effects of excess trading volume and return momentum. The estimated coefficients on all four proxies for opinion divergence are significantly negative for deletions, while those for additions are mixed and mostly insignificant (except for one specification). Moreover, all four F-tests reject the hypothesis that the association equals between the samples of additions and deletions.

Finally, we continue to observe an asymmetric effect on growth stocks similar to that documented in Table 2. The positive estimated coefficients on *LN(MB)* indicate that growth firms (high *LN(MB)*) earn higher abnormal returns around announcements of both additions and deletions than value firms (low *LN(MB)*).

The Effects of Illiquidity and Return Momentum

A number of studies have documented a positive relation between illiquidity and stock returns (See, for example, Amihud and Mendelson, 1986; Brennan and Subrahmanyam, 1996; Eleswarapu, 1997). This line of research argues that investors require a premium on illiquid stocks, and thus less liquid stocks should have higher expected returns. A more recent study by Amihud (2002) shows that, over time, ex ante stock excess return is an increasing function of expected stock illiquidity. It is possible that opinion divergence represents illiquidity, and thus illiquidity may explain the negative association documented in Table 2 between opinion divergence and stock returns for deletion firms. Adopting the illiquidity measure utilized by Amihud (2002), we include *ILLIQ*, defined as the ratio of the average daily absolute return to the average dollar trading volume over the 45-day period ending 10 days prior to the announcement date, in the regressions to test whether illiquidity accounts for our previous results. We utilize the following regression model and present the results in Table 4.

$$EXRET_i = \alpha_{i+}\beta_1 DIVOPN_i + \beta_2 MOM_i + \beta_3 ILLIQ_i + \beta_4 INSOWN_i + \beta_5 Ln(MB)_i + \beta_6 Ln(MV)_i + \varepsilon_i \quad (3)$$

We first note that the asymmetric association between opinion divergence and excess stock returns for additions and deletions is robust to controlling for the additional effect of liquidity. For deletions, the estimated coefficients on opinion divergence are all negative; those for additions are all insignificant with mixed signs. F-test statistics on all four proxies reject the hypothesis that the estimated coefficients on opinion divergence for additions and deletions are equal.

Moreover, we find no evidence of the illiquidity effect. The estimated coefficients on illiquidity are all insignificantly negative for both additions and deletions. Similar to the findings in Table 3, we continue to observe asymmetric effects of return momentum and growth stock on stock excess returns. Return momentum (*MOM*) is positively and significantly related to excess stock returns for deletions, but insignificantly associated with the stock returns for additions. The positive estimated coefficients on *LN(MB)* indicate that growth firms earn higher abnormal returns than value firms for announcements of both additions and deletions.

TABLE 4
OPINION DIVERGENCE AND CUMULATIVE EXCESS RETURNS AROUND THE ANNOUNCEMENTS OF REVISIONS TO THE S&P 500 INDEX, CONTROLLING FOR THE ADDITIONAL EFFECTS OF RETURN MOMENTUM (*MOM*) AND ILLIQUIDITY (*ILLIQ*)

This table investigates the association between proxies for opinion divergence and cumulative excess returns around the announcements of revisions to the S&P 500 index, controlling for the additional effects of return momentum (*MOM*) and illiquidity (*ILLIQ*). The dependent variable is the cumulative excess returns over the three days centered around the announcements (*EXRET*). Opinion divergence (*DIVOPN*) is measured by four proxies: the standard deviation of excess daily stock returns (*RETVOL*), average daily turnover (*TURN*), operating income volatility (*INCVOL*), and the natural logarithm of ratio one to firm age (*Ln(1/AGE)*). *MOM* is the excess buy-and-hold return relative to CRSP value-weighted index over the twelve calendar months prior to revision announcements. *ILLIQ* is the ratio of average daily absolute return over the 45-day period ending 10 days prior to the announcement date to the dollar trading volume on the announcement day. *INSOWN* is the percentage of stocks owned by institutional investors. *Ln(MB)* is the natural logarithm of the market value of common stocks divided by book value of common stocks. *Ln(MV)* is the natural logarithm of the market value of common stocks. Proxies for opinion divergence are different in every two columns and are given on the header of each column. Detailed variable definitions are presented in Variable Construction Section. We report the F-test statistic and its p-value on the hypothesis that the estimated coefficients on *DIVOPN* for the addition sample equal to that for the deletion sample. We also report, in the parentheses, the t-statistic that the estimated coefficient equals to zero. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	RETVOL		TURN		INCVOL		LN(1/AGE)	
Model	Additions	Deletions	Additions	Deletions	Additions	Deletions	Additions	Deletions
DIVOPN	0.369	−3.592***	−0.208	−4.857***	−0.064	−1.831*	0.389	−2.553
	(1.606)	(−4.984)	(−0.607)	(−2.844)	(−0.559)	(−1.864)	(1.440)	(−1.648)
MOM	0.001	0.030	0.006	0.104***	0.007	0.122***	0.004	0.121***
	(0.164)	(1.061)	(0.943)	(4.244)	(0.926)	(4.870)	(0.609)	(4.932)
ILLIQ	−1.803	−1.250	−0.758	−3.199	−15.073	−3.290	−2.223	−3.736
	(−0.310)	(−0.486)	(−0.130)	(−1.144)	(−1.309)	(−1.094)	(−0.379)	(−1.288)
INSOWN	−0.007	0.011	−0.005	0.014	−0.009	−0.012	−0.006	−0.018
	(−0.695)	(0.220)	(−0.421)	(0.261)	(−0.762)	(−0.212)	(−0.554)	(−0.311)
LN(MB)	0.431	0.882	0.618*	1.467	0.551	3.095**	0.470	2.752*
	(1.205)	(0.691)	(1.761)	(1.036)	(1.458)	(2.087)	(1.327)	(1.930)
LN(MV)	0.105	−0.596	0.167	0.398	0.033	−0.936	0.107	−0.220
	(0.455)	(−0.559)	(0.695)	(0.320)	(0.119)	(−0.739)	(0.464)	(−0.174)
Intercept	2.360	5.062	2.297	−6.230	3.805*	3.513	3.915**	−11.898
	(1.371)	(0.703)	(1.275)	(−0.770)	(1.837)	(0.404)	(2.025)	(−1.126)
Adj-R^2	0.016	0.473	0.011	0.353	0.015	0.303	0.015	0.301
# obs	418	72	418	72	375	68	418	72
F-test	89.241		36.336		4.419		10.535	
p-value	0.000		0.000		0.036		0.001	

The Effect of Leverage

Johnson (2004) challenges the association between opinion divergence and stock returns as claimed in Diether et al. (2002). He argues that opinion divergence proxy for idiosyncratic parameter risk - one of the two components of the total uncertainty faced by investors. He further argues that the strength of the association between opinion divergence and stock returns increases with leverage. In Table 5, we examine whether or not idiosyncratic risk accounts for our previous findings. If so, we expect the estimated

TABLE 5
OPINION DIVERGENCE AND CUMULATIVE EXCESS RETURNS AROUND THE ANNOUNCEMENTS OF REVISIONS TO THE S&P 500 INDEX, CONTROLLING FOR THE ADDITIONAL EFFECTS OF LEVERAGE (*LEV*), ABNORMAL TRADING VOLUME (*EXVOL*), AND RETURN MOMENTUM (*MOM*)

This table investigates the association between proxies for opinion divergence and cumulative excess returns around the announcements of revisions to the S&P 500 index, controlling for the additional effects of leverage (*LEV*), abnormal trading volume (*EXVOL*), and return momentum (*MOM*). The dependent variable is the cumulative excess returns over the three days centered around the announcements (*EXRET*). Opinion divergence (*DIVOPN*) is measured by four proxies: the standard deviation of excess daily stock returns (RETVOL), average daily turnover (*TURN*), operating income volatility (*INCVOL*), and the natural logarithm of ratio one to firm age (*Ln(1/AGE)*). *LEV* is the ratio of total debt divided by total assets. *DIVOPN_LEV* is the interaction of leverage with the proxies for opinion divergence. *MOM* is the excess buy-and-hold return relative to CRSP value-weighted index over the twelve calendar months prior to revision announcements. *EXVOL* is the ratio of event trading volume to normal trading volume. INSOWN is the percentage of stocks owned by institutional investors. *Ln(MB)* is the natural logarithm of the market value of common stocks divided by book value of common stocks. *Ln(MV)* is the natural logarithm of the market value of common stocks. Proxies for opinion divergence are different in every two columns and are given on the header of each column. Detailed variable definitions are presented in Variable Construction Section. We report the F-test statistic and its p-value on the hypothesis that the estimated coefficients on *DIVOPN* for the addition sample equal to that for the deletion sample. We also report, in the parentheses, the t-statistic that the estimated coefficient equals to zero. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	RETVOL		TURN		INCVOL		LN(1/AGE)	
Model	Additions	Deletions	Additions	Deletions	Additions	Deletions	Additions	Deletions
DIVOPN	0.412	−3.828***	−0.261	-2.021	0.125	−2.826**	0.536	−6.561***
	(1.405)	(−3.004)	(−0.592)	(−0.823)	(0.659)	(−2.504)	(1.264)	(−2.732)
LEV	−1.252	−13.104	−1.442	2.893	1.797	−9.251	0.976	48.917*
	(−0.422)	(−1.172)	(−0.714)	(0.402)	(0.884)	(−0.862)	(0.221)	(1.869)
DIVOPN× *LEV*	0.580	4.855	1.830	−2.362	−1.282*	3.824	0.343	16.503*
	(0.485)	(1.483)	(0.880)	(−0.331)	(−1.680)	(0.799)	(0.202)	(1.960)
MOM	−0.009	0.030	−0.003	0.074***	−0.001	0.076***	−0.005	0.062***
	(−1.206)	(1.196)	(−0.458)	(3.338)	(−0.098)	(3.465)	(−0.734)	(2.794)
EXVOL	0.269***	−1.462***	0.251***	−1.728***	0.267***	−1.732***	0.275***	−1.772***
	(2.873)	(−4.157)	(2.599)	(−4.667)	(2.728)	(−4.887)	(2.935)	(−5.185)
INSOWN	−0.009	−0.009	−0.009	−0.002	−0.007	−0.034	−0.007	−0.056
	(−0.768)	(−0.193)	(−0.772)	(−0.044)	(−0.510)	(−0.684)	(−0.553)	(−1.127)
LN(MB)	0.868**	2.469*	1.062***	2.883**	1.045**	4.700***	0.890**	5.167***
	(2.198)	(1.838)	(2.732)	(2.013)	(2.488)	(3.234)	(2.270)	(3.450)
LN(MV)	0.094	0.067	0.127	1.011	0.005	0.316	0.096	0.706
	(0.414)	(0.082)	(0.533)	(1.132)	(0.018)	(0.313)	(0.426)	(0.842)
Intercept	1.520	5.737	2.108	−8.210	2.392	2.267	3.430*	−24.682***
	(0.908)	(0.919)	(1.250)	(-1.404)	(1.262)	(0.348)	(1.759)	(-2.866)
Adj-R^2	0.048	0.587	0.039	0.524	0.045	0.553	0.049	0.558
# obs	369	67	369	67	336	63	369	67
F-test	74.087		18.974		7.952		10.443	
p-value	0.0000		0.0000		0.005		0.001	

coefficient on the interaction term between opinion divergence and financial leverage (β_3) to be significantly negative in the following model:

$$EXRET_i = \alpha_{i+}\beta_1 DIVOPN_i + \beta_2 LEV_i + \beta_3 DIVOPN_i \times LEV_i + \beta_4 MOM_i + \beta_5 EXVOL_i + \beta_6 INSOWN_i + \beta_7 Ln(MB)_i + \beta_8 Ln(MV)_i + \varepsilon_i \quad (4)$$

We first notice that the signs of the estimated coefficients on *DIVOPN_LEV* are mixed, and the majority of them are not statistically different from zero (six of the eight specifications). Moreover, majority of the estimated coefficients on *LEV* (seven of the eight specifications) are insignificant. Therefore, we do not find the negative interaction effect between leverage and divergence in opinions proposed by Johnson (2004).

Furthermore, similar to the results reported earlier, the estimated coefficients on *DIVOPN* for deletions are all significantly negative (except *TURN*), while those for additions are mostly positive and statistically insignificant. More importantly, all F-test statistics based on four proxies for opinion divergence reject the hypothesis that the estimated coefficients on opinion divergence equal across the good and bad news samples. Therefore, we conclude that the asymmetric association between opinion divergence and excess stock returns in response to good and bad news persists after controlling for the additional leverage effect. As a comparison, the association between opinion divergence and excess stock returns documented in Berkman et al. (2009) is also robust to controlling for the leverage effect.

Similar to the findings in Table 2 to Table 4, we continue to observe significant momentum effect for deletions, strong impact of abnormal trading volume on excess stock returns, and higher stock returns for growth firms than for value firms around the announcements of both additions and deletions.

Ex post Changes in Opinion Divergence and Changes in Stock Prices

The previous results from our regression analysis are based on ex ante measures of divergence of opinion. So far we've avoided ex post measures of opinion divergence due to the well-known reverse causality problem. With the serious flaw in ex post measures in mind, we next incorporate the change in opinion divergence ($\Delta DIVOPN$) in our regressions to offer additional evidence on the association between opinion divergence and cumulative stock returns. Two of the four proxies that we can calculate ex post measures - *RETVOL* and *TURN* - are estimated from stock return volatilities and trading volumes, whose contemporaneous links with stock prices are well-documented in the literature (Berkman et al., 2009; Kumar et al., 2008). Therefore any conclusion we get from the ex post proxies for opinion divergence at least needs to be interpreted with caution. Table 6 presents the estimation results of the following regression model:

$$EXRET_i = \alpha_{i+}\beta_1 DIVOPN_i + \beta_2 \Delta DIVOPN_i + \beta_3 MOM_i + \beta_4 EXVOL_i + \beta_5 INSOWN_i + \beta_6 Ln(MB)_i + \beta_7 Ln(MV)_i + \varepsilon_i \quad (5)$$

The estimated coefficients on $\Delta RETVOL$ are significantly positive for additions and significantly negative for deletions, while those on $\Delta TURN$ are negative for additions and significantly positive for deletions. The mixed sign of the estimated coefficients on $\Delta DIVOPN$ demonstrates the difficulty in interpreting the results at the presence of reverse causality between changes in opinion divergence and stock prices.

More importantly, we want to examine whether the estimated coefficients on *DIVOPN* changes when $\Delta DIVOPN$ is included in our regression analysis. For deletion firms, the estimated coefficient on *RETVOL* is significantly negative at -2.490 and that on *TURN* is negative at -1.693. Moreover, the estimated coefficients on *RETVOL* and *TURN* for the deletion sample are lower than those for the addition sample. The F-test statistics of equal estimated coefficients on opinion divergence are both significant at the 1% level. We conclude that, even after including ex post changes in opinion divergence, our previous findings of the asymmetric association between opinion divergence and excess stock returns to good and bad news continue to hold.

TABLE 6
EX ANTE LEVELS OF OPINION DIVERGENCE, EX POST CHANGES IN OPINION DIVERGENCE, AND CUMULATIVE EXCESS RETURNS AROUND THE ANNOUNCEMENTS OF REVISIONS TO THE S&P 500 INDEX

This table examines the association between ex ante levels of opinion divergence (*DIVOPN*), ex post changes in opinion divergence (*ΔDIVOPN*), and excess returns around the announcements of revisions to the S&P 500 index (*EXRET*). Opinion divergence (*DIVOPN*) is measured by two proxies: the standard deviation of excess daily stock returns (*RETVOL*) and average daily turnover (*TURN*). *ΔDIVOPN* is the difference between post- and pre-event divergences of opinions. The pre-event (post-event) *RETVOL* is the standard deviation of excess stock returns over the 45-day (30-day) period ending (starting) 10 days before (after) the announcement (effective) date. Similarly, the pre-event (post-event) *TURN* is the average daily turnover over the 45-day (30-day) period ending (starting) 10 days before (after) the announcement (effective) date. *MOM* is the excess buy-and-hold return relative to CRSP value-weighted index over the twelve calendar months prior to revision announcements. *EXVOL* is the ratio of event trading volume to normal trading volume. *INSOWN* is the percentage of stocks owned by institutional investors. *Ln(MB)* is the natural logarithm of the market value of common stocks divided by book value of common stocks. *Ln(MV)* is the natural logarithm of the market value of common stocks. *ΔDIVOPN* is different in every two columns and is given in the header of each column. Detailed variable definitions are presented in Variable Construction Section. We report the F-test statistic and its p-value on the hypothesis that the estimated coefficients on *DIVOPN* for the addition sample equal to that for the deletion sample. We also report, in the parentheses, the t-statistic that the estimated coefficient equals to zero. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	RETVOL		TURN	
Model	Additions	Deletions	Additions	Deletions
DIVOPN	0.584**	−2.490***	−0.029	−1.693
	(2.433)	(−4.196)	(−0.081)	(−1.114)
ΔDIVOPN	0.593***	−1.606***	−0.107	1.385*
	(2.612)	(−4.662)	(−0.208)	(1.926)
MOM	0.000	0.021	0.006	0.089***
	(0.007)	(0.874)	(0.941)	(4.101)
EXVOL	0.192**	−1.033**	0.163*	−1.965***
	(2.235)	(−2.564)	(1.839)	(−4.525)
INSOWN	−0.007	0.032	−0.005	0.029
	(−0.645)	(0.893)	(−0.444)	(0.665)
LN(MB)	0.324	1.888*	0.578	0.849
	(0.910)	(1.879)	(1.639)	(0.734)
LN(MV)	0.111	−0.022	0.146	1.028
	(0.529)	(−0.033)	(0.660)	(1.266)
Intercept	1.369	0.462	1.894	−7.870
	(0.903)	(0.104)	(1.201)	(−1.590)
Adj-R^2	0.040	0.668	0.018	0.527
# obs	415	70	415	70
F-test	61.654		9.749	
p-value	0.000		0.002	

CONCLUSION

Recent studies show that investors react differently to good and bad news. As an example, Epstein and Schneider (2003, 2008) model investors' behavior when they receive ambiguous information, and argue for a strong response to bad news and a dampened response to good news. Moreover, Miller (1977) hypothesizes that stocks with short-sales constraints are overvalued, reflecting the view of optimistic investors. The overvaluation is corrected upon the arrival of divergence-reducing news. He predicts lower stock returns around the arrival of news for firms with high divergence in investors' opinions. Based on these two lines of studies, we hypothesize that opinion divergence decreases after the arrival of bad news, leading to lower stock returns for firms with high opinion divergence. We further hypothesize that opinion divergence does not decrease - or even increases - after the arrival of good news, leaving stock returns unchanged or leading to higher stock returns for firms with high opinion divergence.

Using the announcements of revisions to the S&P 500 index as information events, we find that deletion firms with high pre-announcement opinion divergence observe lower stock returns around S&P's announcements. However, such an association between pre-announcement opinion divergence and three-day excess stock returns does not exist in the sample of addition firms. We interpret the results as evidence of reduction in divergence opinions upon the announcements of deletions (bad news), but no such reduction upon the announcements of additions (good news).

Our findings provide new evidence on the dynamics of opinion divergence around the announcements of news events. Specifically, the results suggest that good news is less effective than bad news in helping investors form more homogenous expectations about the value of firms. Such asymmetric impact of news on opinion divergence is consistent with the implications of the ambiguity theory and has been missing in the literature. Finally, we also note that our findings are limited to how subgroups of deletion (or addition) firms with different degrees of opinion divergence respond to announcements of revisions to the S&P 500 index. Our findings are silent on the permanent (temporary) price increases (decreases) experienced by addition (deletion) firms (See, for example, Chen et al., 2004) because the ambiguity theory makes no prediction on the price movements for addition (deletion) firm as a whole.

ENDNOTES

1. Later studies find that the results documented in Diether et al. (2002) can be explained by financial leverage or post-earnings-announcement drift (Johnnes, 2004).
2. For example, on December 21, 1999, S&P announced that First Security will replace Foster Wheeler in the S&P 500 index after the close of trading on Friday, December 31, 1999. However, on January 24, 2000, S&P announced that S&P MidCap 400 components Biogen and Harley-Davidson will replace Foster Wheeler and Fleetwood Enterprises in the S&P 500 index after the close of trading on Friday, January 28, 2000. First Security was scheduled to be included in the S&P 500 index after its merger with Zions by the end of 1999. However, the merger was not finalized by that time and officially fell apart when shareholders of Zions rejected the merger deal.
3. The change in sample sizes from the initial sample to the final sample is similar to those documented in other studies. Chen et al. (2004) start with 905 additions and 905 deletions and end with 760 additions and 235 deletions, Denis et al. (2003) keep 236 of the 314 initial additions, Beneish and Whaley (1996) retain 103 of the 177 additions in their initial sample, and the final sample of Cai (2007) consists of 427 of the 566 initial additions.
4. Recent empirical studies, such as Berkman et al. (2009), Boehme et al. (2006), and Diether et al. (2002), among others, utilize some or all of the four proxies for opinion divergence.
5. In supporting our arguments, Shankar and Miller (2006) document significant abnormal trading volumes two days before announcements of stocks being dropped from the S&P 600 index but not before announcements of S&P 600 stocks upgraded to the S&P 500 index.

REFERENCES

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

Amihud, Y. and Mendelson, H. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics*, 17, (2), 223-249.

Ang, A., Hodrick, R. J., Xing, Y., and Zhang, X. (2006). The cross-section of volatility and expected returns. *Journal of Finance*, 61, (1), 259-299.

Arnold, T., Fishe, R. P. H., and North, D. (2010). The effects of ambiguous information on initial and subsequent IPO returns. *Financial Management*, 39, (4), 1497-1519.

Asquith, P., Pathak, P. A., and Ritter, J. R. (2005). Short interest, institutional ownership, and stock returns. *Journal of Financial Economics*, 78, (2), 243-276.

Bali, T. G. and Cakici, N. (2008). Idiosyncratic volatility and the cross section of expected returns. *Journal of Financial and Quantitative Analysis*, 43, (1), 29-58.

Barberis, N., Shleifer, A., and Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49, (3), 307-343.

Beneish, M. D. and Whaley, R. E. (1996). An anatomy of the "S&P game": The effects of changing the rules. *Journal of Finance*, 51, (5), 1909-1930.

Berkman, H., Dimitrov, V., Jain, P. C., Koch, P. D., and Tice, S. (2009). Sell on the news: Differences of opinion, short-sales constraints, and returns around earnings announcements. *Journal of Financial Economics*, 92, (3), 376-399.

Boehme, R. D., Danielsen, B. R., and Sorescu, S. M. (2006). Short-sale constraints, differences of opinion, and overvaluation. *Journal of Financial and Quantitative Analysis*, 41, (2), 455-487.

Bowman, D., Minehart, D., and Rabin, M. (1999). Loss aversion in a consumption-savings model. *Journal of Economic Behavior and Organization*, 38, (2), 155-178.

Brennan, M. J. and Subrahmanyam, A. (1996). Market microstructure and asset pricing: on the compensation for illiquidity in stock returns. *Journal of Financial Economics*, 41, (3), 441-464.

Cai, J. (2007). What's in the news? Information content of S&P 500 additions. *Financial Management*, 36, (3), 113-124.

Chen, H., Noronha, G., and Singal, V. (2004). The price response to S&P 500 index additions and deletions: Evidence of asymmetry and a new explanation. *Journal of Finance*, 59, (4), 1901-1930.

Conrad, J., Cornell, B., and Landsman, W. R. (2002). When is bad news really bad news? *Journal of Finance*, 57, (6), 2507-2532.

D'Avolio, G. (2002). The market for borrowing stock. *Journal of Financial Economics*, 66, (2-3), 271-306.

Denis, D. K., McConnell, J. J., Ovtchinnikov, A. V., and Yu, Y. (2003). S&P 500 index additions and earnings expectations. *Journal of Finance*, 58, (5), 1821-1840.

Dhillon, U. and Johnson, H. (1991). Changes in the Standard and Poor's 500 list. *Journal of Business*, 64, (1), 75-85.

Diether, K. B., Malloy, C. J., and Scherbina, A. (2002). Differences of opinion and the cross section of stock returns. *Journal of Finance*, 57, (5), 2113-2141.

Doukas, J. A., Kim, C., and Pantzalis, C. (2004). Divergent opinions and the performance of value stocks. *Financial Analysts Journal*, 60, (6), 55-64.

Eleswarapu, V. R. (1997). Cost of transacting and expected returns in the Nasdaq market. *Journal of Finance*, 52, (5), 2113-2127.

Epstein, L. G. and Schneider, M. (2003). Recursive multiple-priors. *Journal of Economic Theory*, 113, (1), 1-31.

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

Gilboa, I. and Schmeidler, D. (1989). Maxmin expected utility with non-unique prior. *Journal of Mathematical Economics*, 18, (2), 141-153.

Hegde, S. P. and McDermott, J. B. (2003). The liquidity effects of revisions to the S&P 500 index: an empirical analysis. *Journal of Financial Markets*, 6, (3), 413-459.

Holbrook, A. L., Krosnick, J. A., Visser, P. S., Gardner, W. L., and Cacioppo, J. T. (2001). Attitudes toward presidential candidates and political parties: Initial optimism, inertial first impressions, and a focus on flaws. *American Journal of Political Science*, 45, (4), 930-950.

Jain, P. C. (1987). The effect on stock price of inclusion in or exclusion from the S&P 500. *Financial Analysts Journal*, 43, (1), 58-65.

Jegadeesh, N. and Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *Journal of Finance*, 48, (1), 65-91.

Johnnes, M. (2004). The statistical and economic role of jumps in continuous-time interest rate models. *Journal of Finance*, 59, 227-260.

Johnson, T. C. (2004). Forecast dispersion and the cross section of expected returns. *Journal of Finance*, 59, (5), 1957-1978.

Kumar, P., Sorescu, S. M., Boehme, R. D., and Danielsen, B. R. (2008). Estimation risk, information, and the conditional CAPM: Theory and evidence. *Review of Financial Studies*, 21, (3), 1037-1075.

La Porta, R., Lakonishok, J., Shleifer, A., and Vishny, R. (1997). Good news for value stocks: Further evidence on market efficiency. *Journal of Finance*, 52, (2), 859-874.

Lynch, A. W. and Mendenhall, R. R. (1997). New evidence on stock price effects associated with changes in the S&P 500 index. *Journal of Business*, 70, (3), 351-383.

Miller, E. M. (1977). Risk, uncertainty, and divergence of opinion. *Journal of Finance*, 32, (4), 1151-1168.

Nagel, S. (2005). Short sales, institutional investors and the cross-section of stock returns. *Journal of Financial Economics*, 78, (2), 277-309.

Shankar, S. G. and Miller, J. M. (2006). Market reaction to changes in the S&P Small Cap 600 Index. *The Financial Review*, 41, (3), 339-360.

Shleifer, A. (1986). Do demand curves for stocks slope down? Journal of Finance, 41, (3), 579-590.

Siegel, J. J. and Schwartz, J. D. (2006). Long-term returns on the original S&P 500 companies. *Financial Analysts Journal*, 62, (1), 18-31.

Singh, R. and Teoh, B. P. (2000). Impression formation from intellectual and social traits: Evidence for behavioral adaptation and cognitive processing. *British Journal of Social Psychology*, 39, (4), 537-554.

Skinner, D. J. and Sloan, R. G. (2002). Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies*, 7, (2-3), 289-312.

Soroka, S. N. (2006). Good news and bad news: Asymmetric responses to economic information. *Journal of Politics*, 68, (14), 372-385.

Williams, C. D. (2009). Asymmetric responses to good and bad news: An empirical case for ambiguity. Working paper, University of Michigan.

Zhou, H. (2011). Asymmetric changes in stock prices and investor recognitions around revisions to the S&P 500 index. *Financial Analyst Journal*, 67, (1), 72-84.

Jin Yu, Department of Finance, Insurance, and Real Estate, Herberger Business School, St. Cloud State University, 720 Fourth Ave. South, St. Cloud, MN 56301. Phone (320) 308-3928.

Haigang, Zhou, Department of Finance, Monte Ahuja College of Business, Cleveland State University, 2121 Euclid Ave. BU 324, Cleveland, OH 44115. Phone: (216)-687-3687.