Accounting accruals, heterogeneous investor beliefs, and stock returns

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1.Introduction

Background

- A lot of researchers , like Miller (1977), argues that when investors with heterogeneous beliefs are subject to short-sale constraints, stocks would sell at a premium over their fundamental values. This is because short-sale constraints prevent pessimistic investors from trading in the stock market so that stock prices only reflect the beliefs of optimistic investors.
- However, it is still not well understood what causes heterogeneous investor beliefs.

1.Introduction

What we study

- How the possible management of accounting accruals affects the heterogeneity of investor beliefs.
- How the effect of accruals on investor beliefs could affect future stock returns.

1.Introduction

What we find

- We find that the level of the heterogeneity in investor beliefs on a firm's value is higher when the firm experiences a larger increase in its accounting accruals.
- We find that future stock returns following the earnings announcement are lower when the firm's accounting accruals increases the heterogeneity of investor beliefs to a larger degree.
- we also find that the effect of the accruals-induced heterogeneous investor beliefs on future stock returns is more pronounced when short-sale constraints are more binding.

1.Introduction

Related researches

- Miller (1977) argues that, when investors with heterogeneous beliefs are subject to short-sale constraints, stocks would sell at a premium over their fundamental values.
- Chen et al. (2002) and Diether et al. (2002) find empirical evidence supporting Miller's predictions.
- Higher dispersion in analyst forecasts indicates a higher level of heterogeneity in investor beliefs (see, e.g., Diether et al., 2002; Verardo, 2009).
- Sloan (1996) shows that the stocks of high accrual firms earn negative abnormal returns in the future.

1.Introduction

Contribution

- our paper is the first to identify the impact of accounting accruals on the heterogeneity of investor beliefs. It is also the first to study how this impact affects future stock returns.
- Our results extend the literature on heterogeneous investor beliefs and stock pricing .
- By linking the impact of accruals on investors' heterogeneous beliefs to future stock returns, our paper also extends the literature on the accrual anomaly.

2. Hypothesis development

The origin of the Hypothesis:

two realities of the stock market: investors have heterogeneous beliefs regarding a stock's intrinsic value, and, there exist short-sale constraints.

Miller (1977)argues that when pessimistic investors are prevented from selling short, stock prices reflect the beliefs of optimistic investors and securities would sell at a premium over their fundamental values. When the heterogeneity of investor beliefs on a stock's value increases, the stock will be purchased by investors with higher valuations and therefore is priced contemporaneously at a higher level.

2. Hypothesis development

What we focus on : Accounting accruals

Accounting accruals include revenues and expenses recognized in a period of time either before or after when cash is received and paid.

For instance, managers can advance recognition of revenue with credit sales, a type of income-increasing accruals . As a result, credit sales increase reported earnings but have no effect on current cash flows. On the other hand, depreciation expenses, a type of income-decreasing accruals that record the allocation of the acquisition cost of plant assets, are deducted from revenue, although depreciation entails no cash outflows.

Accruals are difficult to be completely verified and need investors' discretion to interpret.

2. Hypothesis development

hypotheses

- H1**:**an increase in accruals would increase the heterogeneity of investor beliefs among investors.
- H2:whether the impact of accruals on heterogeneous investor beliefs could affect future stock returns.
- H3:whether or not the accrual-induced investor belief channel as proposed in H2 is more effective when short-sale constraints are more binding.

3. Sample and variable

Sample selection

Period : 1994–2007

proprietary database of firm : voluntarily disclose operating cash flows in their preliminary earnings announcements

stock prices : the Center for Research in Securities Prices (CRSP)

financial analysts' forecasts: I/B/E/S

We exclude utilities and financial services firms (two-digit SIC codes 49 and 60–67). We exclude firms with stock prices less than $1 per share. We also exclude firms with no information available on I/B/E/S.

3. Sample and variable

Sample selection

Table 1
Distribution of sample across years.

Year	Number of firms	Number of firm-quarters	Average market capitalization ($ thousands)	Median market capitalization ($ thousands)
1994	64	103	3394.15	1915.52
1995	75	111	3201.22	1701.31
1996	125	208	6426.33	1942.34
1997	129	258	4382.50	2012.57
1998	159	377	5240.56	1941.96
1999	66	83	3812.38	1577.45
2000	173	401	6704.86	1557.05
2001	204	544	8333.55	1851.88
2002	289	711	11,159.93	1974.98
2003	450	1222	9232.61	2076.82
2004	548	1563	10,358.13	2477.43
2005	609	1757	9424.86	2337.06
2006	652	1824	10,043.79	2529.81
2007	404	407	10,356.66	2610.86
Total	1116	9569	9111.48	2210.15

3. Sample and variable

Measures of accruals

total accruals (ACCA) :firms' quarterly net income before extraordinary items and discontinued operations minus quarterly net operating cash flows, scaled by the average total assets during the quarter.

change in total accruals (ACCA):the change from the previous quarter q − 1 to the current quarter q

discretionary accruals (DACC): the residuals from Eq. (1).

$$\frac{ACCA_q}{Assets_{q-1}} = \alpha_0 + \beta_1 \frac{\Delta Sales_q - \Delta Rec_q}{Assets_{q-1}} + \beta_2 \frac{PPE_q}{Assets_{q-1}} + \varepsilon_q \qquad (1)$$

Assets is the book value of assets, $\Delta \mathrm{Sales}$ is current sales less prior-quarter sales ,$\Delta \mathrm{Rec}$ is the change in accounts receivable from the prior quarter, PPE is quarter-end gross property, plant and equipment

3. Sample and variable

Proxies for heterogeneous investor beliefs

Dispersion : the dispersion of financial analysts' forecasts on firm's one-year-ahead earnings.

Calculate as the standard deviation of analysts' earnings forecasts in the month subsequent to the earnings announcement date, scaled by the absolute value of the firm's actual earnings.

We code Dispersion as missing if there are less than three financial analysts covering the firm

3. Sample and variable

Measures of short-sale constraints

the fraction of stock holdings by institutional investors

the level of stock illiquidity :the ratio of the absolute value of daily return to the value of daily trading volume, averaged in the quarter prior to day −6.

3. Sample and variable

Construction of other variables

Historical Return : the historical cumulative stock return in the three months prior to announcement date

Beta:is estimated based on a period of 200 days ending 6 days prior to the earnings announcement date

GrLTNOA : growth in non-accrual net operating assets scaled by the average total assets

Error : the difference between the average earnings forecast and the actual earnings per share, scaled by the absolute value of the actual earnings per share.

stock returns:[a, 42], [a, 63], and [a, 126], where ‘a’ denotes the date subsequent to the first reporting date of analysts’ forecasts after earnings are announced.

Nforecast:the number of analysts’ one-year-ahead earnings forecasts reported in I/B/E/S

3. Sample and variable

Variable	Number of observations	Mean	Median	Min	Max	Skewness	Kurtosis
Ret [0, 63]	9569	0.042	0.036	−0.816	1.910	0.631	7.027
Ret [6, 63]	9569	0.038	0.032	−0.819	1.750	0.581	6.526
Ret [a, 63]	9543	0.035	0.030	−0.841	1.446	0.553	6.622
ACCA	9569	−0.016	−0.014	−0.610	0.500	−1.449	27.391
ΔACCA	9569	0.000	−0.001	−0.601	1.288	0.871	33.587
Dispersion	9569	0.113	0.032	0.000	2.500	5.910	43.001
Institutional holdings	9569	0.708	0.732	0.038	3.302	−0.147	6.064
Beta	9569	1.140	1.053	−2.844	5.339	0.671	4.453
BM	9569	0.414	0.345	0.035	1.761	7.470	1.806
Size	9569	7.350	7.228	2.479	12.697	0.459	3.270
Illiquidity	9569	0.003	0.000	0.000	0.964	27.286	974.598
Historical return	9569	0.019	0.015	−0.731	2.047	1.148	18.946
SUE	9569	0.000	0.002	−1.000	1.000	−0.746	142.126
ROA	9569	0.013	0.015	−0.260	0.083	−3.479	29.195
GrLTNOA	9367	0.012	0.001	−11,668	133,447	61	4705
NForecast	9569	10.465	8.000	3.000	45.000	1.294	4.573
Error	9569	0.346	0.079	0.000	10.000	6.769	54.525

4.Empirical findings

Accruals and investors' heterogeneous beliefs

H1: an increase in accruals causes a higher level of heterogeneous beliefs among investors on the value of the firm. We test H1 by running the following regression:

$$Dispersion = \alpha_0 + \alpha_1 \Delta ACCA + \alpha_2 Control \quad variables + \varepsilon. \qquad (2)$$

We measure Dispersion based on analysts' forecasts in the first month subsequent to the earnings announcement date. In doing so, we ensure the causality is from ACCA to Dispersion, not the other way around.

The control variables consist of ROA, SUE, GrLTNOA, Error, NForecast, Size, BM, Beta, Illiquidity, and Historical Return.

4.Empirical findings

Total accruals and analyst

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.165***	0.383***	0.323***	0.309***	0.320***	0.519***
	[0.014]	*[0.074]*	*[0.075]*	*[0.038]*	*[0.039]*	*[0.063]*
ΔACCA	0.304***	0.256***	0.200**	0.161***	0.156***	0.121***
	[0.099]	*[0.092]*	*[0.080]*	*[0.054]*	*[0.055]*	*[0.041]*
NForecast	0.001	0.008***	0.008***	0.006***	0.006***	0.001
	[0.001]	*[0.002]*	*[0.002]*	*[0.001]*	*[0.001]*	*[0.001]*
SUE	0.032	0.085	0.474	0.008	0.014	−0.033
	[0.380]	*[0.324]*	*[0.345]*	*[0.099]*	*[0.098]*	*[0.047]*
ROA	−4.528***	−3.673***	−2.849***	−2.051***	−2.019***	−1.136***
	[0.646]	*[0.712]*	*[0.487]*	*[0.196]*	*[0.195]*	*[0.136]*
GrLTNOA		0.325	0.495	0.004	0.002	0.004
		[0.812]	*[1.300]*	*[0.006]*	*[0.005]*	*[0.018]*
Beta		−0.009	−0.004	0.008	0.009	−0.002
		[0.016]	*[0.012]*	*[0.006]*	*[0.006]*	*[0.005]*
BM		0.034	0.021	0.078***	0.083***	0.077***
		[0.042]	*[0.044]*	*[0.023]*	*[0.022]*	*[0.016]*
Size		−0.046***	−0.042***	−0.039***	−0.039***	−0.059***
		[0.010]	*[0.011]*	*[0.005]*	*[0.005]*	*[0.008]*
Illiquidity		7.496***	6.557***	0.202	0.193	0.032
		[2.126]	*[1.911]*	*[0.171]*	*[0.172]*	*[0.178]*
Historical return		−0.096	−0.114	0.000	0.007	−0.034
		[0.098]	*[0.134]*	*[0.041]*	*[0.041]*	*[0.024]*
Error			0.028	0.058***	0.058***	0.007
			[0.038]	*[0.010]*	*[0.010]*	*[0.005]*
Observations	9569	9367	9046	9360	9360	9360
R-squared	0.190	0.278	0.362	0.136	0.142	0.041
Regression type	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	OLS without year dummies	OLS with year dummies	Fixed effect

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

4.Empirical findings

Three robustness tests： 1

we run regressions against the change in discretionary accruals (DACC) rather than the change in total accruals (ACCA).

Panel A: Discretionary accruals and analyst dispersion

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.164***	0.377***	0.305***	0.307***	0.329***	0.545***
	[0.013]	*[0.075]*	*[0.067]*	*[0.040]*	*[0.051]*	*[0.066]*
ΔDACC	0.410***	0.322***	0.425***	0.188***	0.185***	0.155***
	[0.116]	*[0.084]*	*[0.138]*	*[0.061]*	*[0.060]*	*[0.051]*
NForecast	0.001	0.009***	0.009***	0.006***	0.006***	0.001
	[0.001]	*[0.002]*	*[0.002]*	*[0.001]*	*[0.001]*	*[0.001]*
SUE	0.411	0.650	1.148*	0.008	0.014	−0.001
	[0.537]	*[0.494]*	*[0.652]*	*[0.111]*	*[0.110]*	*[0.050]*
ROA	−4.540***	−3.441***	−2.653***	−2.091***	−2.056***	−1.259***
	[0.614]	*[0.644]*	*[0.512]*	*[0.213]*	*[0.211]*	*[0.145]*
Error			0.011	0.055***	0.055***	0.002
			[0.045]	*[0.010]*	*[0.010]*	*[0.005]*
Other controls	N	Y	Y	Y	Y	Y
Observations	8955	8769	8458	8762	8762	8762
R-squared	0.181	0.268	0.362	0.135	0.142	0.044
Regression type	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	OLS without year dummies	OLS with year dummies	Fixed effect

4.Empirical findings

Three robustness tests： 2

we run regressions on the change in analyst dispersion, ΔDispersion, rather than on the level of dispersion。

Panel B: Regressions using changes in variables

Variables	(1)	(2)	(3)	(4)	(5)
Constant	0.012*	0.016**	0.002	0.006	0.130*
	[0.007]	*[0.008]*	*[0.007]*	*[0.004]*	*[0.067]*
ΔACCA	0.311**	0.257*	0.192**	0.213**	0.261**
	[0.153]	*[0.150]*	*[0.079]*	*[0.088]*	*[0.126]*
ΔNForecast	0.002	0.003	0.014	0.014	0.009*
	[0.013]	*[0.015]*	*[0.010]*	*[0.010]*	*[0.005]*
ΔSUE	−0.489*	−0.284	−0.273	−0.287**	−0.339
	[0.247]	*[0.242]*	*[0.188]*	*[0.135]*	*[0.221]*
ΔROA	0.631	−0.486	−0.213	−0.251	−0.416
	[0.745]	*[0.453]*	*[0.165]*	*[0.160]*	*[0.318]*
ΔError			0.229***	0.220***	0.198***
			[0.029]	*[0.032]*	*[0.021]*
Lagged ACCA				0.073	0.112
				[0.109]	*[0.195]*
Lagged dispersion				−0.117**	−0.293***
				[0.054]	*[0.087]*
Lagged NForecast					0.003**
					[0.001]
Lagged SUE					−0.21
					[0.314]
Lagged ROA					−0.472
					[0.373]
Lagged error					0.065***
					[0.022]
Other controls	N	Y	Y	Y	Y
Observations	6707	6707	6707	6707	6707
R-squared	0.247	0.377	0.704	0.795	0.863

4.Empirical findings

Three robustness tests：3

we address the concern of sample selectivity. Our sample consists of the firms disclosing both the earnings and the operating cash flow information at the earnings announcement date.

To address the potential sample selection concern, we estimate Heckman's (1979) selection model.

The Heckman selection model consists of a selection equation and a dispersion equation. The sample in the estimation of the selection equation consists of all firms that are covered by Compustat and I/B/E/S. The specification of the dispersion equation is the same as in the previous regression.

4.Empirical findings

Three robustness tests： 3

Table 4 (*Continued*)

Panel C: Accruals and analyst dispersion: Heckman selection model

	The dependent variable is dispersion					The dependent variable is Δdispersion			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	−0.300***	−0.405*	−0.465**	−0.277***	−0.708***	−0.022	−0.193	0.033	−0.324**
	[0.030]	*[0.211]*	*[0.223]*	*[0.044]*	*[0.243]*	*[0.075]*	*[0.690]*	*[0.034]*	*[0.159]*
ΔACCA	0.248***	0.227***	0.213***			0.434**	0.365**		
	[0.049]	*[0.051]*	*[0.052]*			*[0.169]*	*[0.174]*		
ΔDACC				0.307***	0.318***			0.114**	0.121**
				[0.062]	*[0.068]*			*[0.055]*	*[0.057]*
NForecast	0.006***	0.006***	0.006***	0.007***	0.007***				
	[0.001]	*[0.001]*	*[0.001]*	*[0.001]*	*[0.001]*				
ΔNForecast						0.005	0.007	0.005**	0.006***
						[0.008]	*[0.008]*	*[0.002]*	*[0.002]*
SUE	−0.008	0.037	0.028	−0.017	0.023	−0.362**	−0.275	−0.055	−0.050
	[0.050]	*[0.050]*	*[0.051]*	*[0.053]*	*[0.054]*	*[0.184]*	*[0.187]*	*[0.051]*	*[0.052]*
ROA	−2.247***	−1.945***	−1.903***	−2.330***	−1.969***	−2.382***	−2.028***	−0.620***	−0.439***
	[0.116]	*[0.121]*	*[0.124]*	*[0.124]*	*[0.132]*	*[0.408]*	*[0.433]*	*[0.114]*	*[0.120]*
Error			−0.022***		−0.033***		−0.092***		−0.006
			[0.005]		*[0.006]*		*[0.019]*		*[0.005]*
Inverse Mills Ratio	0.254***	0.257***	0.277***	0.262***	0.364***	0.091**	0.134	0.013	0.131**
	[0.014]	*[0.069]*	*[0.073]*	*[0.015]*	*[0.079]*	*[0.036]*	*[0.225]*	*[0.010]*	*[0.054]*
Other controls	N	Y	Y	N	Y	N	Y	N	Y
Obs.	79,055	78,863	78,569	75,669	75,207	78,606	78,424	75,242	61,885

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

4.Empirical findings

Income-inflating versus income-deflating earnings management

Consequently , investors are more concerned with income-inflating manipulation than with income-deflating manipulation. investors are probably aware that managers also manage accruals downward to deflate the current income. if skeptical investors have been concerned about possibility of income-deflating earnings management, would the positive relation between accruals and the heterogeneity of investor beliefs be weakened

4.Empirical findings

Income-inflating versus income-deflating earnings management

we create a subsample of high ACCA (consisting of firms with ACCA higher than the sample median) and a subsample of low ACCA (consisting of firms with ACCA lower than the sample median). we expect strong positive relation between accruals and dispersion.

Next, we create subsamples of firms with ACCA in the bottom 25% and bottom 10% of the sample distribution to assess the offset reaction.

4.Empirical findings

Income-inflating versus income-deflating earnings management

Sample	High ΔACCA	Low ΔACCA	Bottom quartile ΔACCA	Bottom decile ΔACCA	High ΔDACC	Low ΔDACC	Bottom quartile ΔDACC	Bottom decile ΔDACC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.386**	0.230***	0.206***	0.042	0.216***	0.580**	0.314**	0.006
	[0.155]	*[0.064]*	*[0.077]*	*[0.089]*	*[0.056]*	*[0.275]*	*[0.123]*	*[0.143]*
ΔACCA	0.208**	0.395**	0.125	−0.397				
	[0.099]	*[0.177]*	*[0.303]*	*[0.344]*				
ΔDACC					0.521***	0.586**	−0.710	−0.234
					[0.159]	*[0.284]*	*[0.753]*	*[0.283]*
NForecast	0.010***	0.008**	0.007***	0.007	0.008***	0.011***	0.008***	0.002
	[0.003]	*[0.003]*	*[0.002]*	*[0.005]*	*[0.002]*	*[0.004]*	*[0.003]*	*[0.003]*
SUE	−0.179	0.069	−0.066	−0.303	0.504	0.863	0.057	−1.266*
	[0.739]	*[0.211]*	*[0.208]*	*[0.422]*	*[0.538]*	*[0.641]*	*[0.673]*	*[0.742]*
ROA	−1.561***	−1.950***	−1.005***	−0.700**	−2.544***	−2.335***	−1.051**	−0.395
	[0.389]	*[0.269]*	*[0.170]*	*[0.267]*	*[0.346]*	*[0.560]*	*[0.507]*	*[0.319]*
GrLTNOA	−0.550	0.265	−1.228	−0.478	−0.066	0.076	3.759	−1.142*
	[0.537]	*[0.457]*	*[1.271]*	*[0.596]*	*[0.795]*	*[0.765]*	*[2.739]*	*[0.574]*
Beta	−0.003	0.032	0.008	0.019*	−0.008	−0.017	−0.027	0.023
	[0.022]	*[0.020]*	*[0.014]*	*[0.011]*	*[0.019]*	*[0.022]*	*[0.032]*	*[0.025]*
BM	0.012	0.123***	0.081**	0.143***	0.076***	0.067	0.053	0.050
	[0.047]	*[0.043]*	*[0.031]*	*[0.041]*	*[0.028]*	*[0.052]*	*[0.047]*	*[0.061]*
Size	−0.058**	−0.037***	−0.032**	−0.020	−0.032***	−0.082**	−0.046**	−0.001
	[0.024]	*[0.012]*	*[0.012]*	*[0.015]*	*[0.008]*	*[0.040]*	*[0.020]*	*[0.018]*
Illiquidity	0.137	2.321	5.277	−2.210	4.147**	1.171	6.391	0.015
	[3.541]	*[3.097]*	*[5.187]*	*[3.598]*	*[1.704]*	*[3.896]*	*[8.201]*	*[3.653]*
Historical return	−0.073	0.127***	0.124	−0.066	0.088	−0.278	−0.070	0.071
	[0.129]	*[0.044]*	*[0.080]*	*[0.081]*	*[0.053]*	*[0.302]*	*[0.261]*	*[0.120]*
Error	0.151***	0.084***	0.076***	0.045	0.069**	0.032*	0.028	0.069
	[0.031]	*[0.020]*	*[0.018]*	*[0.035]*	*[0.034]*	*[0.016]*	*[0.020]*	*[0.049]*
Observations	4698	4669	2218	853	4398	4364	2081	808
R-squared	0.514	0.529	0.542	0.700	0.346	0.321	0.390	0.484

4.Empirical findings

Accruals, investors' heterogeneous beliefs, and future stock returns

H2: We predict that the negative relation between future stock returns and increased accruals is more pronounced if the increase in accruals causes a higher level of heterogeneous investor beliefs

$$Ret = \beta_0 + \beta_1 \Delta ACCA + \beta_2 Dispersion + \beta_3 DACCA \times Dispersion + \beta_4 Control \quad variables + \varepsilon. \tag{3}$$

According to hypothesis H2, we expect the coefficient of the interaction term ACCA × Dispersion to be negative.

4.Empirical findings

Variables	Ret [0, 63]			Ret [6, 63]			Ret [a, 63]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	0.004	0.007	0.111***	−0.015	−0.012	0.129***	0.0002	−0.024	0.132***
	[0.029]	[0.056]	[0.017]	[0.030]	[0.063]	[0.017]	[0.025]	[0.059]	[0.015]
ΔACCA	−0.146**	−0.069	−0.071**	−0.127**	−0.077	−0.072**	−0.126*	−0.024	−0.028
	[0.064]	[0.118]	[0.034]	[0.059]	[0.114]	[0.033]	[0.074]	[0.121]	[0.030]
Dispersion		0.059	0.011		0.058	0.013*		0.085	0.009
		[0.058]	[0.007]		[0.057]	[0.007]		[0.062]	[0.006]
ΔACCA × dispersion		−1.932**	−0.230***		−1.623*	−0.220***		−1.843**	−0.184**
		[0.893]	[0.082]		[0.940]	[0.081]		[0.899]	[0.074]
Beta	0.016	0.014	0.007**	0.015	0.016	0.005*	0.014	0.013	0.004
	[0.010]	[0.011]	[0.003]	[0.010]	[0.012]	[0.003]	[0.008]	[0.010]	[0.003]
BM	0.029**	0.066***	0.050***	0.029**	0.063***	0.047***	0.022*	0.066***	0.034***
	[0.012]	[0.018]	[0.007]	[0.011]	[0.018]	[0.007]	[0.013]	[0.024]	[0.006]
Size	0.001	−0.001	−0.003*	0.003	0.001	−0.003	0.001	0.002	−0.004**
	[0.003]	[0.006]	[0.002]	[0.003]	[0.007]	[0.002]	[0.003]	[0.006]	[0.002]
Illiquidity	−18.458	−19.749	−0.084	−18.539	−18.924	−0.054	−16.855	−16.393	0.077
	[15.341]	[17.664]	[0.085]	[16.349]	[17.915]	[0.084]	[15.193]	[15.757]	[0.076]
Historical return	−0.134***	−0.167***	−0.137***	−0.125***	−0.146***	−0.147***	−0.083**	−0.082	−0.125***
	[0.042]	[0.053]	[0.017]	[0.040]	[0.053]	[0.017]	[0.032]	[0.061]	[0.016]
SUE		0.179	0.032		0.108	0.050		0.181	0.115***
		[0.177]	[0.034]		[0.200]	[0.033]		[0.160]	[0.030]
ROA		0.260	−0.100		0.231	−0.071		0.417	−0.107
		[0.371]	[0.079]		[0.329]	[0.078]		[0.483]	[0.071]
GrLTNOA		−0.956	−0.003		−0.872	−0.005		−1.357	−0.007
		[0.785]	[0.011]		[0.713]	[0.011]		[0.958]	[0.010]
Error		−0.081***	−0.072***		−0.077***	−0.071***		−0.077***	−0.060***
		[0.020]	[0.003]		[0.019]	[0.003]		[0.027]	[0.003]
NForecast		0.000	0.000		0.000	0.000		0.000	0.000
		[0.001]	[0.000]		[0.001]	[0.000]		[0.001]	[0.000]
Observations	9569	9360	9360	9569	9360	9360	9543	9334	9334
R-squared	0.085	0.188	0.117	0.086	0.189	0.113	0.078	0.185	0.097
Reg. type	Fama–MacBeth		OLS	Fama–MacBeth		OLS	Fama–MacBeth		OLS

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

4.Empirical findings

Robustness checks on accruals, heterogeneous beliefs, and future stock returns

the concern on the potential sample selection bias by running the Heckman selection model.

Panel A: Heckman selection model

Variables	Ret [0, 63] (1)	Ret [0, 63] (2)	Ret [6, 63] (3)	Ret [6, 63] (4)	Ret [a, 63] (5)	Ret [a, 63] (6)
Constant	0.582***	0.664***	0.638***	0.739***	0.598***	0.741***
	[0.103]	*[0.143]*	*[0.102]*	*[0.144]*	*[0.101]*	*[0.132]*
ΔACCA	−0.191***	−0.133***	−0.193***	−0.139***	−0.136***	−0.102***
	[0.031]	*[0.037]*	*[0.031]*	*[0.037]*	*[0.028]*	*[0.034]*
ΔACCA × dispersion		−0.300***		−0.269***		−0.231***
		[0.088]		*[0.086]*		*[0.078]*
Inverse Mills Ratio	−0.194***	−0.184***	−0.210***	−0.203***	−0.190***	−0.202***
	[0.039]	*[0.047]*	*[0.039]*	*[0.047]*	*[0.037]*	*[0.043]*
Observations	81,638	78,859	81,638	78,859	80,942	78,833
Other controls	N	Y	N	Y	N	Y

4.Empirical findings

Robustness checks on accruals, heterogeneous beliefs, and future stock returns

we use discretionary accruals as the accrual measure.

Panel B: Discretionary accruals, analyst dispersion, and stock returns

Variables	Ret [0, 63] (1)	Ret [0, 63] (2)	Ret [6, 63] (3)	Ret [6, 63] (4)	Ret [a, 63] (5)	Ret [a, 63] (6)
Constant	−0.043	0.004	−0.042	−0.000	−0.062	0.028**
	[0.066]	*[0.024]*	*[0.060]*	*[0.024]*	*[0.067]*	*[0.014]*
ΔDACC	0.257	−0.026	0.223	−0.026	0.280	−0.009
	[0.191]	*[0.043]*	*[0.167]*	*[0.042]*	*[0.199]*	*[0.040]*
ΔDACC × dispersion	−4.027**	−0.283**	−3.038**	−0.232**	−4.408*	−0.163*
	[1.932]	*[0.111]*	*[1.455]*	*[0.110]*	*[2.277]*	*[0.099]*
Observations	8461	8451	8461	8451	8436	8426
Other controls	Y	Y	Y	Y	Y	Y
R-squared	0.190	0.080	0.192	0.071	0.167	0.057
Reg. type	Fama–MacBeth	OLS	Fama–MacBeth	OLS	Fama–MacBeth	OLS

4.Empirical findings

Robustness checks on accruals, heterogeneous beliefs, and future stock returns

whether there is an asymmetry on the accrual-induced investor belief channel as proposed in H2 between the high-heterogeneity and the low-heterogeneity stocks.

we run regression (3) in two subsamples: the subsample with a high level of analyst dispersion and the subsample with a low level of dispersion

We expect the investor belief channel to be stronger in the subsample of high analyst dispersion, compared to the subsample of low analyst dispersion

4.Empirical findings

Robustness checks on accruals, heterogeneous beliefs, and future stock returns

Panel C: Total accruals, analyst dispersion, and stock returns – subsample test

Variables	Ret [0, 63] (1)	Ret [6, 63] (2)	Ret [a, 63] (3)	Ret [0, 63] (4)	Ret [6, 63] (5)	Ret [a, 63] (6)
	High dispersion			Low dispersion		
Constant	0.124	0.137	0.105	0.990	2.403	−0.608
	[0.117]	*[0.135]*	*[0.093]*	*[0.949]*	*[2.307]*	*[0.644]*
ΔACCA	0.226	0.179	0.113	1.733	4.023	−0.821
	[0.263]	*[0.229]*	*[0.204]*	*[1.718]*	*[3.884]*	*[0.920]*
ΔACCA × dispersion	−3.390**	−3.125**	−2.331**	−56.120	−127.049	23.571
	[1.426]	*[1.366]*	*[1.041]*	*[63.222]*	*[130.890]*	*[24.747]*
Observations	4522	4522	4507	4524	4524	4513
Other controls	Y	Y	Y	Y	Y	Y
R-squared	0.237	0.242	0.209	0.188	0.178	0.132

4.Empirical findings

Robustness checks on accruals, heterogeneous beliefs, and future stock returns

we use the change in analyst dispersion, ΔDispersion, rather than the level of dispersion to proxy for the heterogeneity of investor beliefs.

Panel D: Total accruals, analyst dispersion, and stock returns, alternative specification

Variables	Ret [0, 63] (1)	Ret [0, 63] (2)	Ret [6, 63] (3)	Ret [6, 63] (4)	Ret [a, 63] (5)	Ret [a, 63] (6)
Constant	0.079**	0.116***	0.072**	0.134***	0.079**	0.131***
	[0.035]	*[0.018]*	*[0.033]*	*[0.018]*	*[0.034]*	*[0.016]*
ΔACCA	0.260	−0.074	0.230	−0.073	0.260	−0.036
	[0.195]	*[0.047]*	*[0.179]*	*[0.048]*	*[0.190]*	*[0.046]*
Lagged dispersion	−0.061	0.013	−0.060	0.019*	−0.061	0.014
	[0.050]	*[0.010]*	*[0.042]*	*[0.010]*	*[0.048]*	*[0.009]*
ΔDispersion	0.117	0.012	0.090	0.010	0.117	0.007
	[0.145]	*[0.011]*	*[0.145]*	*[0.010]*	*[0.142]*	*[0.011]*
ΔACCA × lagged dispersion	−10.205	−0.451***	−9.613	−0.450***	−10.205	−0.359***
	[6.315]	*[0.124]*	*[6.038]*	*[0.122]*	*[6.277]*	*[0.110]*
ΔACCA × ΔDispersion	−3.527**	−0.366***	−2.841*	−0.317**	−3.527**	−0.261**
	[1.718]	*[0.121]*	*[1.567]*	*[0.128]*	*[1.663]*	*[0.122]*
Observations	8886	8886	8886	8886	8886	8860
Other controls	Y	Y	Y	Y	Y	Y
R-squared	0.204	0.119	0.209	0.114	0.204	0.098
Regression type	Fama–MacBeth	OLS	Fama–MacBeth	OLS	Fama–MacBeth	OLS

4.Empirical findings

Robustness checks on accruals, heterogeneous beliefs, and future stock returns

We add additional control variables to make sure our findings are not driven by alternative explanations.

Panel E: Total accruals, analyst dispersion, and stock returns, additional controls

Variables	Ret [0, 63]			Ret [6, 63]			Ret [a, 63]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	−0.015	−0.022	−0.043	−0.026	−0.039	−0.066	−0.035	−0.041	−0.073
	[0.045]	*[0.051]*	*[0.065]*	*[0.051]*	*[0.057]*	*[0.066]*	*[0.048]*	*[0.053]*	*[0.074]*
ΔACCA	−0.018	0.081	0.220	−0.025	0.065	0.196	−0.044	−0.007	0.078
	[0.088]	*[0.125]*	*[0.162]*	*[0.072]*	*[0.102]*	*[0.146]*	*[0.111]*	*[0.119]*	*[0.110]*
ΔACCA × SUE	6.866	5.304	−5.616	5.855	4.110	−6.187	5.487	4.279	−2.320
	[6.991]	*[7.419]*	*[11.075]*	*[7.897]*	*[8.351]*	*[10.101]*	*[6.273]*	*[6.213]*	*[8.300]*
ΔACCA × GrLTNOA		−23.615*	−20.022*		−22.458**	−19.799*		−7.412	−4.578
		[12.111]	*[11.014]*		*[10.906]*	*[10.599]*		*[9.673]*	*[10.229]*
ΔACCA × error			−1.056			−1.275			−0.395
			[0.824]			*[0.875]*			*[0.413]*
ΔACCA × dispersion	−2.429**	−2.340**	−2.449***	−2.204**	−2.086**	−2.006***	−1.935**	−1.792**	−1.811**
	[0.975]	*[0.986]*	*[0.876]*	*[0.873]*	*[0.884]*	*[0.739]*	*[0.868]*	*[0.804]*	*[0.891]*
Observations	9049	9049	9049	9049	9049	9049	9023	9023	9008
Other controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
R-squared	0.194	0.179	0.187	0.194	0.178	0.186	0.178	0.153	0.132
Regression type	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth	Fama–MacBeth

4.Empirical findings

Robustness checks on accruals, heterogeneous beliefs, and future stock returns

we run Fama–MacBeth regressions with the alternative measurement windows for future stock returns

Panel F: Total accruals, analyst dispersion, and stock returns, alternative event windows

Variables	Ret [0, 42]		Ret [6, 42]		Ret [a, 42]		Ret [0, 126]		Ret [6, 126]		Ret [a, 126]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	0.079**	0.046***	0.091***	0.059***	0.052**	0.044***	0.057	0.126***	0.046	0.144***	0.032	0.147***
	[0.034]	*[0.013]*	*[0.031]*	*[0.015]*	*[0.022]*	*[0.011]*	*[0.048]*	*[0.018]*	*[0.043]*	*[0.018]*	*[0.042]*	*[0.016]*
ΔACCA	0.041	−0.053	0.052	−0.050	0.079	−0.018	−0.003	−0.073	−0.018	−0.074	0.031	−0.038
	[0.073]	*[0.034]*	*[0.085]*	*[0.035]*	*[0.068]*	*[0.029]*	*[0.086]*	*[0.045]*	*[0.085]*	*[0.046]*	*[0.085]*	*[0.043]*
ΔACCA × Dispersion	−2.087**	−0.236**	−2.414**	−0.239**	−1.713*	−0.173**	−3.383***	−0.248*	−3.018**	−0.238**	−3.112**	−0.200*
	[0.884]	*[0.093]*	*[1.035]*	*[0.105]*	*[0.966]*	*[0.069]*	*[1.252]*	*[0.128]*	*[1.139]*	*[0.121]*	*[1.354]*	*[0.112]*
Observations	9089	9089	9089	9089	9089	9089	9089	9089	9089	9089	9089	9089
Other controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
R-squared	0.201	0.087	0.198	0.086	0.206	0.063	0.204	0.117	0.210	0.112	0.189	0.095
Regression type	Fama–MacBeth	OLS	Fama–MacBeth	OLS	Fama–MacBeth	OLS	Fama–MacBeth	OLS	Fama–MacBeth	OLS	Fama–MacBeth	OLS

4.Empirical findings

- The role of short-sale constraints

Whether the investor belief channel as hypothesized in H2 is stronger for firms facing a higher degree of short-selling constraints?

we divide the sample into the subsamples with high and low institutional investor holdings based on the level of institutional holdings at the end of the previous quarter

4.Empirical findings

- The role of short-sale constraints

Panel A: Institutional holdings as proxy for the short-sales constraints

Variables	Ret [0, 42] (1)	Ret [6, 42] (2)	Ret [a, 42] (3)	Ret [0, 42] (4)	Ret [6, 42] (5)	Ret [a, 42] (6)
	High institutional holding			Low institutional holding		
Constant	0.067	0.109	0.091	0.138	0.114	0.128
	[0.107]	*[0.121]*	*[0.123]*	*[0.096]*	*[0.079]*	*[0.098]*
ΔACCA	0.819	0.768	0.807	−0.104	−0.094	−0.033
	[0.589]	*[0.578]*	*[0.566]*	*[0.120]*	*[0.100]*	*[0.084]*
ΔACCA × dispersion	−41.496	−38.916	−36.026	−2.559**	−2.222**	−1.979**
	[37.973]	*[36.769]*	*[32.403]*	*[1.104]*	*[1.033]*	*[0.789]*
Observations	4528	4528	4505	4518	4518	4515
Other controls	Y	Y	Y	Y	Y	Y
R-squared	0.187	0.183	0.172	0.217	0.219	0.196
Number of groups	51	51	51	53	53	53

4.Empirical findings

- The role of short-sale constraints

Whether the investor belief channel as hypothesized in H2 is stronger for firms facing a higher degree of short-selling constraints?

we divide the sample into the subsamples of liquid and illiquid stocks based on Amihud's illiquidity measure in the quarter prior to the earnings announcement date.

4.Empirical findings

- The role of short-sale constraints

Panel B: Illiquidity as proxy for the short-sales constraints

Variables	Ret [0, 42] (1)	Ret [6, 42] (2)	Ret [a, 42] (3)	Ret [0, 42] (4)	Ret [6, 42] (5)	Ret [a, 42] (6)
	High level of illiquidity			Low level of illiquidity		
Constant	0.285**	0.212**	0.204**	0.148	0.184	0.058
	[0.115]	*[0.093]*	*[0.080]*	*[0.216]*	*[0.211]*	*[0.115]*
ΔACCA	0.058	0.006	0.017	−0.080	−0.074	0.019
	[0.194]	*[0.153]*	*[0.147]*	*[0.170]*	*[0.168]*	*[0.091]*
ΔACCA × dispersion	−4.091***	−3.433***	−3.117***	−0.050	−0.229	−0.509
	[1.492]	*[1.171]*	*[1.127]*	*[2.866]*	*[2.779]*	*[3.416]*
Observations	4503	4503	4496	4543	4543	4524
Other controls	Y	Y	Y	Y	Y	Y
R-squared	0.188	0.195	0.193	0.155	0.142	0.141
Number of groups	53	53	53	53	53	53

5.Other explanations and Conclusion

- Many studies in the literature also use dispersion of analysts' earnings forecasts to proxy for the degree of asymmetric information

The rational investors will learn instantaneously the information conveyed by the corporate event, so that asymmetric information models cannot generate a systematic bias in the long-run stock prices (either upward or downward) subsequent to any corporate event. Thus, the impact of the accrual-driven analyst dispersion on future stock returns is clearly not driven by the information asymmetry theory.

5.Other explanations and Conclusion

- A higher level of analyst dispersion can be viewed as indicating an increased degree of information uncertainty.

This information risk argument would predict that firms with higher information risk, such as those reporting higher accruals and experiencing higher analyst dispersion, would experience a decrease in contemporaneous stock price and higher long-term stock return.

our results could be consistent with the information risk argument if the market underreacts contemporaneously to an unexpected increase in information risk and if the under-reaction lasts for three months.

5.Other explanations and Conclusion

Conclusion

- The level of heterogeneity in investor beliefs on a firm's value is higher when the firm experiences a larger increase in its accounting accruals。
- Future stock returns following earnings announcement are lower when the firm's accounting accruals increase the heterogeneity of investor beliefs to a larger degree
- The effect of the accruals-induced heterogeneous investor beliefs on future stock returns is more pronounced when shortsale constraints are more binding