Crowdsourced employer reviews and stock returns

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Backgrounds & Motivation

- Firm economic conditions naturally influence employee satisfaction, as changes in firm performance influence compensation, employee benefits, and company morale.

- Employees also routinely observe nonpublic value-relevant unique information that may color their assessments of their employers.

➢ The extent to which rank and file employees possess valuable information is less clear.
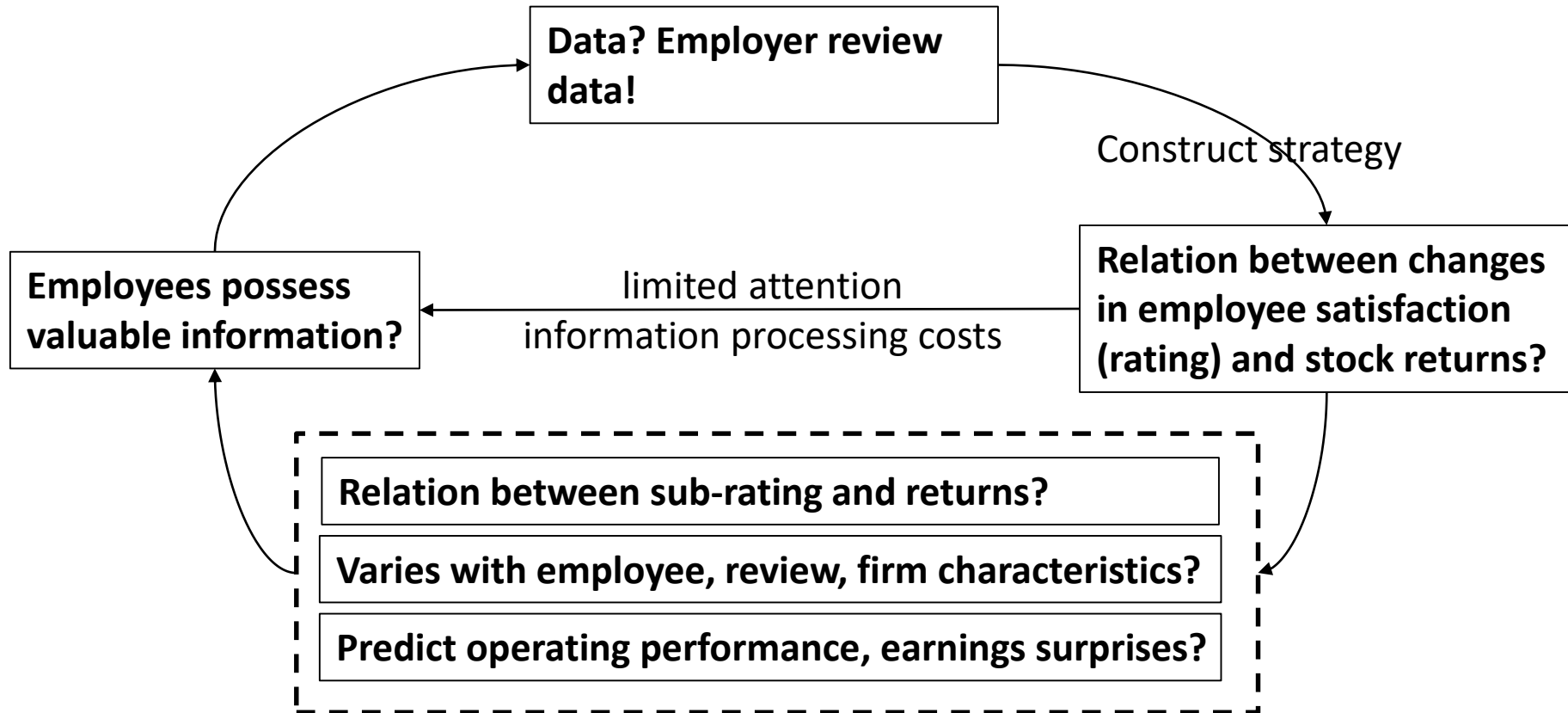
Research Problem

- Whether employees possess valuable information?

  ➢ Yes, we consider employee crowds as sources of fundamental information about their employers, and find the relation between crowdsourced employer reviews and stock returns.

Contribution

- Our work also adds to a growing literature that studies the wisdom of the crowd. We find that the opinions of firm employees also carry value-relevant information.

- Our findings contribute to a growing literature that studies investors' limited attention and resulting market inefficiencies.

Outline

Data? Employer review data!

Construct strategy

Relation between changes in employee satisfaction (rating) and stock returns?

limited attention
information processing costs

Employees possess valuable information?

Relation between sub-rating and returns?

Varies with employee, review, firm characteristics?

Predict operating performance, earnings surprises?

Model Design: Employer review data

- Glassdoor employer reviews contain employees' one-to-five star overall rating of the firm, as well as optional ratings for Career Opportunities, Compensation & Benefits, Work Balance, Senior Management, and Culture & Values since June 2008, and added a Business Outlook question in September 2012.

- Employees are able to enter textual responses for Pros and Cons.

- The data can help discern employee status and employee location.

- CRSP to obtain stock return, Compustat databases to obtain accounting information.

Model Design: Sample

- Sample period: June 2008 - June 2016

- The sample is comprised of over one million reviews for 3906 firms, which accounts for 65% of firms in the CRSP database and covers 81% of the total market capitalization.

Panel A: Employee reviews

	# of Reviews	Mean	Std. dev.	Q1	Median	Q3
Employer Rating	1023,217	3.20	1.24	2.00	3.00	4.00
Career Opportunities	927,140	3.02	1.28	2.00	3.00	4.00
Compensation & Benefits	927,067	3.21	1.21	2.00	3.00	4.00
Senior Management	916,898	2.79	1.35	2.00	3.00	4.00
Work/Life Balance	927,411	3.18	1.31	2.00	3.00	4.00
Culture & Values	799,834	3.18	1.40	2.00	3.00	4.00
Business Outlook	725,335	3.35	1.60	3.00	3.00	5.00

Panel B: Correlation among component ratings

	Emp. Rating	Career Opp.	Comp. & Benefits	Senior Mgmt.	Work/Life Balance	Cult. & Values	Bus. Outlook
Employer Rating		0.73	0.59	0.76	0.61	0.77	0.62
Career Opportunities	0.72		0.56	0.65	0.47	0.64	0.55
Comp. & Benefits	0.58	0.55		0.49	0.43	0.50	0.41
Senior Management	0.76	0.65	0.49		0.57	0.74	0.58
Work/Life Balance	0.60	0.46	0.42	0.57		0.58	0.40
Culture & Values	0.76	0.64	0.50	0.74	0.58		0.56
Business Outlook	0.62	0.55	0.41	0.59	0.40	0.56	

Model Design: Measure

- Rating: primary measure of employee satisfaction, the average employer rating in a given calendar quarter

- $\triangle$Rating: the quarterly change in employer star rating

- We require a minimum of 15 reviews in each quarter to help average out idiosyncratic views

Model Design: Determinants of ratings

	Rating		ΔRating	
	(1)	(2)	(3)	(4)
Book-to-market	−0.108**	0.002	−0.050	−0.030
	(−2.26)	(0.03)	(−0.51)	(−0.13)
Size	0.144***	0.040***	−0.016	−0.008
	(18.90)	(3.23)	(−1.28)	(−0.46)
Return on assets	0.006	0.014**	0.006	0.017
	(0.98)	(2.23)	(0.34)	(0.98)
Forecast dispersion	−0.001	−0.002**	0.010**	0.001
	(−0.54)	(−2.71)	(2.20)	(0.16)
Turnover	0.018***	−0.014*	−0.013	−0.003
	(3.43)	(−2.01)	(−1.63)	(−0.20)
Illiquidity	−0.012***	−0.011***	−0.005	−0.023
	(−4.75)	(−3.51)	(−1.30)	(−1.50)
Idiosyncratic volatility	−0.003	−0.002	0.002	0.010
	(−0.30)	(−0.44)	(0.14)	(0.47)
Institutional ownership	−0.027***	−0.000	−0.009	−0.008
	(−2.87)	(−0.04)	(−1.05)	(−0.84)
$Return_{t-1:t-3}$	0.002	0.001	0.012	0.014
	(0.44)	(0.43)	(1.20)	(1.39)
$Return_{t-4:t-6}$	0.014**	0.009**	0.009	0.010
	(2.54)	(2.57)	(0.94)	(0.95)
ΔRecommendation	0.004	−0.000	−0.009	−0.010
	(0.93)	(−0.19)	(−0.99)	(−1.34)
Insider trading	−0.017***	−0.000	0.010	0.012
	(−3.65)	(−0.04)	(0.71)	(1.07)
Fixed effects	Time	Time,Firm	Time	Time,Firm

➢ Changes in employer ratings are largely independent of stock, firm characteristics and the information provided by financial professionals or other firm insiders.

Empirical Results: Main Results

- Whether △rating signal fundamental information?

➢ Strategy: At the end of each quarter, we sort stocks into three portfolios (the bottom quintile, the middle three quintiles, and the top quintile) based on the △rating, and hold for 3 months.

Panel A: Future portfolio returns sorted by △Rating

	Equal-weighted portfolios		Value-weighted portfolios	
	Average return	4-Factor alpha	Average return	4-Factor alpha
Low △Rating	0.83	−0.24	0.59	−0.38**
	(1.28)	(−1.15)	(1.03)	(−2.02)
Middle group	1.06*	0.01	0.89*	0.02
	(1.77)	(0.07)	(1.83)	(0.21)
High △Rating	1.66**	0.65***	1.33***	0.40*
	(2.50)	(2.62)	(2.62)	(1.81)
High − Low	0.84***	0.88***	0.74***	0.77***
	(2.67)	(2.70)	(3.03)	(3.26)

Panel B: Average portfolio characteristics

	△Rating	β^{MKT}	Size (log)	BM	MOM
Low △Rating	−0.50	1.24	22.91	0.63	7.63
Middle group	0.00	1.21	23.52	0.66	11.08
High △Rating	0.53	1.25	22.98	0.62	10.28

Empirical Results: Main Results

- Whether △rating signal fundamental information?

$$R_{i,t+1} = \lambda_{0,t} + \lambda_{1,t} \Delta Rating_{i,t} + \lambda_{i,t} \mathbf{X}_{i,t} + \varepsilon_{i,t}$$

	Returns$_{t+1}$			Returns$_{t+2}$	Returns$_{t+3}$	Returns$_{t+4}$
	(1)	(2)	(3)	(4)	(5)	(6)
△Rating	0.273***	0.236**	0.254**	0.099	0.096	0.029
	(2.52)	(2.48)	(2.50)	(1.29)	(0.28)	(0.09)
Top 100		0.125	0.118	0.104	0.084	0.035
		(1.07)	(0.39)	(0.56)	(0.40)	(0.16)
Size		−0.099	−0.267	−0.073	0.169	−0.105
		(−1.01)	(−1.43)	(−0.74)	(0.44)	(−0.85)
Book-to-market		−0.206	0.213	−0.218	0.697	0.338
		(−0.94)	(0.33)	(−1.13)	(0.57)	(0.62)
Return$_{t-12:t-2}$		−0.007	0.004	−0.010	0.010	−0.004
		(−0.57)	(0.46)	(−0.77)	(0.39)	(−0.71)

➢ Results remains. The performance differential is concentrated in the calendar quarter following the change in employer ratings.

Empirical Results: Other Results

- Whether certain rating dimensions are more informative?

	Equal-weighted portfolios		Value-weighted
	Average return	4-Factor alpha	Average return
Panel A: Changes in Career Opportunities			
High – Low ΔRating	0.56**	0.65**	0.45**
	(2.10)	(2.18)	(2.09)
Panel B: Changes in Compensation & Benefits			
High – Low ΔRating	0.22	0.20	0.44*
	(0.82)	(0.71)	(1.92)
Panel C: Changes in Work/Life Balance			
High – Low ΔRating	0.11	0.09	0.12
	(0.35)	(0.32)	(0.32)
Panel D: Changes in Culture & Values			
High – Low ΔRating	0.08	0.09	0.56**
	(0.45)	(0.39)	(2.05)
Panel E: Changes in Senior Management			
High – Low ΔRating	0.71***	0.71***	0.56*
	(2.86)	(2.95)	(1.82)
Panel F: Changes in Business Outlook			
High – Low ΔRating	0.27*	0.29**	0.34**
	(1.99)	(2.44)	(2.14)

➢ Shifts in firm fundamentals affect employees' views along certain firm dimensions more than others.

Empirical Results: Other Results

- Varies with employee, review, firm characteristics?

	Equal-weighted portfolios High – Low ΔRating	
	Avg. return	4-Factor alpha
Panel A: Employee characteristics		
Employment status: Current	0.81***	0.88***
	(2.86)	(2.91)
Employment status: Former	0.13	0.28
	(0.38)	(0.62)
Location: Headquarters state	0.96***	0.92***
	(2.90)	(2.75)
Location: Not HQ state	0.75*	0.85*
	(1.79)	(1.82)

➢ The employee status and location findings are consistent with the notion that more timely and central access to information about firms' fundamentals plays a role in the observed return predictability.

Empirical Results: Other Results

- Varies with employee, review, firm characteristics?

Panel B: Review characteristics		
Review length: Short	0.23	0.19
	(0.67)	(0.60)
Review length: Long	0.81**	1.03***
	(2.34)	(2.74)
Review age: Early	0.95**	1.05***
	(2.24)	(2.62)
Review age: Late	0.76**	0.64*
	(2.50)	(2.00)

➢ The association between changes in employer ratings and future returns is stronger when constructed from earlier and lengthier reviews.

Empirical Results: Other Results

- Varies with employee, review, firm characteristics?

Panel C: Firm characteristics		
Firm size: Small	1.27***	1.18**
	(2.62)	(2.31)
Firm size: Large	0.58**	0.65***
	(2.29)	(2.65)
Idiosyncratic volatility: Low	0.32	0.23
	(1.15)	(0.88)
Idiosyncratic volatility: High	1.06***	1.11***
	(2.76)	(2.81)
Institutional ownership: Low	1.19***	1.02**
	(2.63)	(2.46)
Institutional ownership: High	0.68	0.51
	(0.70)	(0.56)
Analyst coverage: Low	0.95**	1.02**
	(2.56)	(2.64)
Analyst coverage: High	0.68**	0.69*
	(2.07)	(1.85)

➢ Changes in employee reviews are more likely to reveal information unknown to the market among firms that are less informationally efficient

Empirical Results: Other Results

- Whether the predictive relation between △rating and stock returns is because employee morale affects firm performance? If so, we would expect a stronger relation among firms in which labor plays a particularly important role.

➢ We find no evidence that the association between employer ratings changes and stock returns stronger among firms with greater labor intensity.

Empirical Results: Other Results

- Reflect operating performance, earnings surprises?

	ΔReturn-on-assets		Sales growth		Analyst forecast errors		Announcement returns	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔRating	0.088**	0.087*	0.301***	0.308***	0.021**	0.017**	0.165**	0.146*
	(2.44)	(2.02)	(3.07)	(3.29)	(2.42)	(2.33)	(2.11)	(1.97)
Size	−0.031	−0.951***	−0.188	0.829	0.031**	−0.062	−0.013	−1.363*
	(−0.65)	(−3.46)	(−0.91)	(1.43)	(2.27)	(−0.97)	(−0.12)	(−1.92)
Book-to-Market	−0.062	−0.345*	−2.156***	−1.176***	0.003	0.204**	−0.103	−0.128
	(−1.61)	(−1.85)	(−16.58)	(−5.27)	(0.11)	(2.29)	(−1.27)	(−0.49)
Return$_{t-12:t-2}$	0.397***	0.282***	2.263***	1.585***	0.039***	0.004	−0.153	−0.672***
	(4.22)	(2.84)	(7.25)	(7.39)	(2.95)	(0.23)	(−1.16)	(−3.94)
Illiquidity	0.020*	0.009	0.118	0.006	0.031	−1.005*	0.123***	0.008
	(2.03)	(0.57)	(1.70)	(0.09)	(0.12)	(−1.96)	(2.99)	(0.08)

➢ Changes in employee satisfaction are influenced by fundamental changes at the firm that markets are slow to incorporate.

Conclusion

- We find quarterly changes in employer ratings predicting one-quarter-ahead stock returns.

- The return effect is concentrated among reviews from current employees and when the employee works in the headquarters state, and it is stronger among early firm reviews, longer reviews, and among in less informationally efficient films.

- Shifts in firm fundamentals affect employees' views along *Career Opportunities and views of senior management* more than others.

- Changing employer reviews also predict contemporaneous changes in sales growth and profitability and help forecast one-quarter-ahead earnings surprises.