

Employee Satisfaction and Firm Performance: Evidence from a Company Review Website

Ke Ma

University of California, Santa Cruz, California, US
kma41@ucsc.edu

ABSTRACT

Prior research shows that employee satisfaction is positively related with firm performance. This study exploits employees' reviews from Glassdoor.com as a measure of employee satisfaction and built a novel dataset which combines Glassdoor reviews with financial data from Bloomberg. The preliminary results from both OLS and IV models are consistent with prior research. More analysis needs to be done to validate the results.

KEYWORDS

Firm performance; Market to book ratio; Return on assets; Employee satisfaction

1. INTRODUCTION

Employee satisfaction, which represents a combination of positive or negative feelings that workers have towards their work, has been widely believed to be positively related with customer satisfaction, human resources and future firm performance. Many studies found that companies with higher employee satisfaction or emphasis more on human resources tend to perform better.

In this paper, I'm going to scrape employee's reviews for companies from Glassdoor.com and build a novel dataset that combines reviews with financial data from Bloomberg to examine the relationship between employee satisfaction and public firm performance. In doing so, my study first contributes to the literature that heavily relies on survey data by using the unique social media data as a measurement of employee satisfaction and extend this traditional topic to the most recent years. Glassdoor.com contains millions of employees' reviews for over 460,000 firms since 2008, which provide a comprehensive exploration of variation in employee satisfaction. Second, I'm focused on the effect of employee perception of companies management and other characteristics, not information provided by companies.

Guiso et al. (2015) argues when employees perceive top managers as trustworthy and ethical, a firm's performance is stronger, while proclaimed values appear irrelevant. If employee perception can predict or affect future firm performance, then those "insider" information can help most people to know more about real quality of companies. Hopefully, more studies about employee can be inspired by this.

Chi & Gursoy (2009) focus on hotel industry and collect survey data from employees, customers and managers of three and four star hotels located in five cities. They find that that customer satisfaction has positive significant impact on financial performance, and there is an indirect relationship between employee satisfaction and financial performance, which is mediated by customer satisfaction. Yee, Yeung & Cheng (2010) also focus on service industry and conduct a

survey of 210 high-contact service shops in Hong Kong. Using structural equation modeling (SEM), they observed that employee loyalty is significantly related to service quality, which in turn impacts customer satisfaction and customer loyalty, ultimately leading to firm profitability.

Employee is not only a valuable asset for companies in service industry, but also important for all kinds of companies. Using the survey data from “100 Best Companies to Work for in America” (1984 to 2009) a measurement of employee satisfaction, Edmans (2011) assessed the performance of a stock portfolio for firms included in the list and found significant positive abnormal returns over a twenty-five-year period. Based on this finding, he argued that employee satisfaction positively impacts firm value. Guiso et al. (2014) use the Great Place to Work Institute (GPTWI) survey data and find that one standard deviation increase in integrity is associated with a 0.19 standard deviation increase in Tobin’s Q, which is a widely-used measurement of public firm performance.

Apparently, most of prior research relies heavily on survey data, which means they may suffer from some limitations, such as selection bias and small sample. With the penetration of social media and online review websites, some researchers start to use Internet as data source. Moniz (2015) is the first study to use textual analysis on reviews from Glassdoor.com to. The author extracted keywords with the meaning of “goal-setting” from reviews and found that firms realise greater value by aligning employee goals to strategic objectives rather than the pursuit of employee satisfaction alone. Luo et al. (2016) extend textual analysis on employee’s reviews from Glassdoor.com to various dimension of corporate value. They find that “Innovation” is the most important category for technology industry to drive the correlation between employee satisfaction and company performance, “Quality” category drives retailing and financial industry. Huang et al. (2015) also use Glassdoor.com to capture how employees perceive their company’s culture. They find that employees who work for firms with active founders rate their companies higher than employees in nonfamily firms, especially if the founder runs the company.

In the next section, I will introduce the datasets (Glassdoor and Bloomberg) and sample used in this paper. In section 3, I will introduce the baseline model and identification strategies followed up with some preliminary results. Then in the last section, some robustness check and future research will be discussed.

2. DATA AND SAMPLE

In this section, I will introduce the two datasets that are used to build the novel dataset and summary statistics of the sample. Employer reviews are scraped from Glassdoor.com, financial data for public firms are from Bloomberg database.

2.1. Glassdoor Dataset

Glassdoor.com, launched in June 2008, is a website where current and former employees anonymously review over 400,000 companies and their management. The website also verifies that each review of a company comes from real employees “through technological checks of e-mail addresses and through screenings by a content management team,” according to Glassdoor spokesman Scott Dobroski.

Figure 1 shows the company review page for company X on Glassdoor. The first rating we can see is overall rating 4.1, which is calculated by Glassdoor using a proprietary ratings algorithm. Company ratings are based on a 5-point scale. 0.00-1.50 means employees are “Very Dissatisfied” and 4.01-5.00 means employees are “Very Satisfied”.

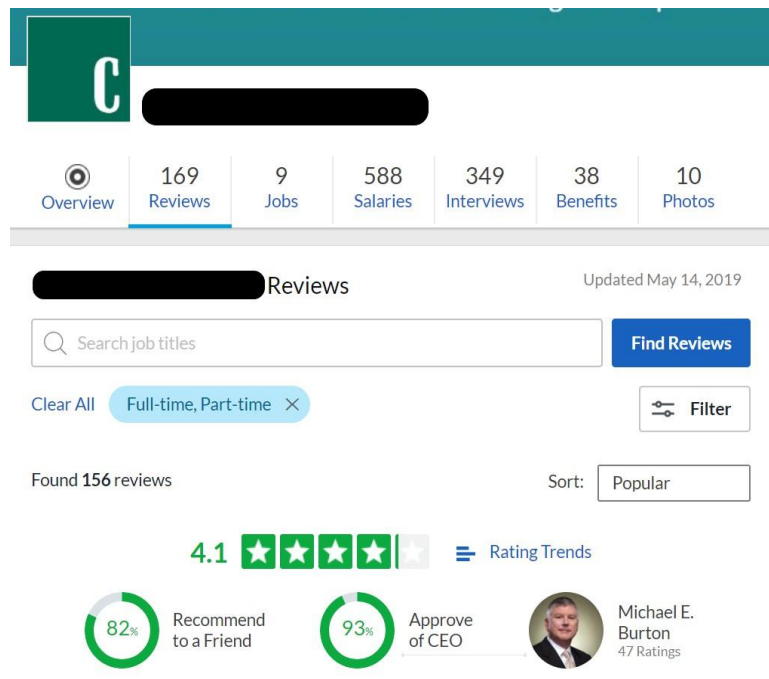


Figure 1. Company X review page on Glassdoor

Figure 2 shows an individual review for Company X. First, a reviewer can provide an overall rating with 1-5 scale. Then, he is required to write text-based reviews to share his own experience in this company, including how long he has worked in this company and pros and cons of this company. Glassdoor will verify whether this reviewer is a real employee through checks of email address. Each individual review will contain information about whether he is a former or current employee, position, location and submitted date. For some reviews, we can also see the number of people who think this review is helpful.

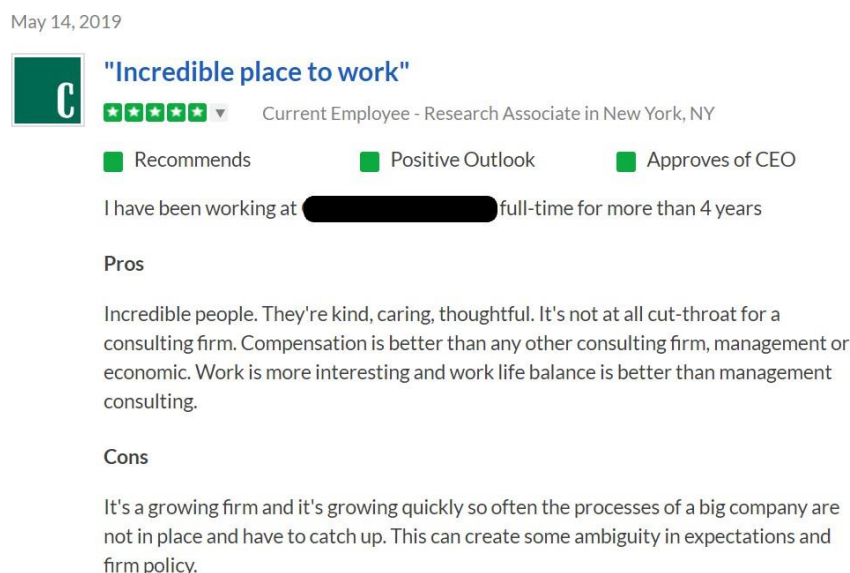


Figure 2. An individual review for Company X

Figure 3 is the Glassdoor review survey questions for reviewers. As an anonymous reviewer, he has to clarify the company name, the overall rating, whether he is a current or former employee, how long he has worked in this company and pros/cons of this company. It's optional to write advice to management, provide ratings for some subcategories (e.g. Career opportunities / Compensation / Work and life balance / Senior management / Culture and value) and show whether the reviewer recommends this company. Also, the reviewer can choose to show his job title, length of employment and location.

For each company in the final sample, I'm going to scrape all individual reviews on Glassdoor. This reviews dataset would contain: 1) ratings and text-based reviews from each reviewer; 2) total number of reviews; 3) posted date of each review; 4) employment status, job title and location of each reviewer; 5) the number of people who think this review is helpful.

Rate a Company
It only takes a minute! And your anonymous review will help other job seekers.

Company
Employer name

Overall Rating
★ ★ ★ ★ ★

Are you a current or former employee?
 Current Employee
 Former Employee

Last Year at Employer
2015

Employment Status
Select

Review Title
[Text Box]

Pros 20 word minimum
[Text Box]

Cons 20 word minimum
[Text Box]

Advice to Management 20 word minimum
[Text Box]

Ratings (Optional)

Career Opportunities
★ ★ ★ ★ ★

Compensation & Benefits
★ ★ ★ ★ ★

Work/Life Balance
★ ★ ★ ★ ★

Senior Management
★ ★ ★ ★ ★

Culture & Values
★ ★ ★ ★ ★

Rate CEO
[Thumbs Up/Down/Helpful Icons]

Recommend to a friend?
[Thumbs Up/Down Icons]

6 Month Business Outlook?
[Thumbs Up/Down/Helpful Icons]

ABOUT YOU (Optional)

Job Title
[Text Box]

Length of Employment
Length of Employment

Location
[Text Box]

Cancel **Submit Review**

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Figure 3. Glassdoor company review survey questions

2.2. Summary Statistics of Sample

My original sample contains 546,232 employee reviews for 304 large public firms between 2008 and August 2019. After merging with financial data from Bloomberg database and dropping firms which have less than 100 reviews, my final sample contains 511,476 reviews for 272 public firms between 2012 and August 2019. All of the 272 firms are included in the latest S&P 500 company list. I randomly choose these firms from S&P 500 list because large public firms tend to have more reviews online and S&P 500 contains the most representative large companies in the stock market. It's a pity that I don't have enough time to scrape reviews for all S&P 500 companies. I will continue to enlarge the Glassdoor dataset and update the results in the future. The reason I excluded all reviews between 2008 and 2011 is Glassdoor.com was launched in 2008 and most firms didn't receive large number of reviews until 2012 or even later. So, all reviews from 2008 to the end of 2011 were dropped to avoid any selection bias and inaccuracy of outdated reviews.

Table 1 shows summary statistics of the final sample in Glassdoor dataset by GICS sectors. Firms are divided into 11 GICS sectors. More than half of the 272 firms belong to Consumer Discretionary; Financials, Health Care, Industrials and Information Technology industries and the industry of Information Technology has highest average rating during the sample period.

Table 1. Glassdoor Dataset Summary Statistics by GICS Sector

GICS Sector	Number of Firms	Number of Reviews	Avg. Rating	S.D.	25th Percentile	75th Percentile
Communication Service	11	29,139	3.361	1.314	2	4
Consumer Discretionary	33	81,389	3.430	1.254	3	4
Consumer Staples	21	39,219	3.430	1.248	3	4
Energy	13	10,968	3.660	1.136	3	5
Financials	34	89,861	3.376	1.499	3	4
Health Care	39	63,364	3.474	1.220	3	4
Industrials	39	77,571	3.514	1.418	3	4
Information Technology	37	90,351	3.673	1.447	3	5
Materials	18	13,182	3.574	1.458	3	5
Real Estate	12	10,298	3.579	1.744	3	5
Utilities	15	6,132	3.674	1.422	3	5
Total	272	511,474	3.492	1.515	3	4

Table 2 provides summary statistics of firm variables in the final sample. I got the financial data by fiscal quarter from 2012 to 2019 for each firm from the Bloomberg database. Among these financial variables, Return on assets and Market to book ratio are widely used to measure the performance of public firms. Others will be used as controls for firm characteristics in the models. Most of firm variables don't have large standard deviation. However, the standard deviations of Total assets and Num. of employees are extremely high. In the robustness check section, I'm going to trim firms with financial variables at the top 1% and bottom 1% percentiles to reduce the influence of extreme values.

Table 2. Summary Statistics of Firm Variables

Firm Variables	Obs	Mean	S.D.	Min	Max
Cash/total assets	7,746	8.450	8.725	0	61.79
Dividend indicated yield	6,092	2.327	1.313	0.0192	14.26
Return on assets	7,693	6.752	6.554	-45.10	44.52
Sales growth	7,722	7.971	30.10	-92.58	1,008
Total debt/total assets	7,746	28.92	18.10	0	103.0
Total assets	7,746	55,664.94	152645.3	169.999	1988226
Num. of employees	6,776	40,238.21	55,890.46	467	453000
Market to book ratio	7,592	12.727	81.9	0.359	1719.171
Ln (Total assets)	7,746	9.838	1.371	5.136	14.50
Ln (CEO age)	7,683	4.038	0.112	3.296	4.394
Ln (CEO tenure)	7,666	1.500	1.110	-2.526	3.543
Ln (Market to book ratio)	7,592	1.322	1.005	-1.025	7.450
Ln (Num. of employees)	6,776	9.883	1.236	6.146	13.02

3. RESEARCH DESIGN

My baseline model to examine the effect of company rating on firm performance is a basic OLS specification:

$$Performance_{it} = \beta_0 + \beta_1 Avg.rating_{it-1} + \beta_2^l X_{it-1} + sector_j + year_t + c_{it} \quad (1)$$

Where the outcome variable $Performance_{it}$ denotes the financial performance of a firm i in quarter t during the sample period. $Avg.rating_{it-1}$ is the average Glassdoor rating by employees of firm i in quarter $t - 1$, X_{it-1} is the characteristic vector for firm i . $sector_j$ and $year_t$ denote GICS sector and fiscal year fixed effects, respectively.

In this paper, I'm going to use two financial performance measures that are widely used for public firms: Market to book ratio and Return on assets. Market to book ratio is defined as:

$$\text{Market to book ratio} = \frac{\text{Market capitalization}}{\text{Total book value}}$$

The market value is the current stock price of all outstanding shares (i.e. the price that the market believes the company is worth). The book value is the amount that would be left if the company liquidated all of its assets and repaid all of its liabilities. Overall, this ratio is used to compare a business's net assets that are available in relation to the sales price of its stock.

Return on assets is defined as:

$$ROA = \frac{\text{Net income}}{\text{Avg.total assets}}$$

Return on assets is a profitability ratio that provides how much profit a company is able to generate from its assets. In other words, this ratio measures how efficient a company's management is in generating earnings from their economic resources or assets on their balance sheet.

The baseline model may raise several endogeneity problems. First, although firm characteristics have been added in the model, there might some other confounding factors and unobservable variables which will affect company ratings and firm performance at the same time. Second, reverse causality is mentioned in many studies about employee satisfaction and firm performance. Higher

employee satisfaction might increase subsequent firm performance, while higher firm performance can also increase subsequent employee satisfaction.

$$\text{Avg. rating}_{it} = \alpha_0 + \alpha_1 \text{Current ratio}_{it} + \alpha_2^l X_{it} + \text{sector}_j + \text{year}_t + c_{it} \quad (2)$$

Where $\text{Current ratio}_{it}$ denotes the ratio of reviewers who claimed themselves as current employees of firm i in quarter t . As all reviewers are required to clarify whether they are current employees or former employees, the current employee ratio can be calculated directly from Glassdoor dataset. If there is no manipulation of reviewers, then the current employee ratio should be a valid instrument. In the robustness check section, I will also use average rating in each industry as an instrument for company rating.

Table 3 provides the first stage results for the IV regression in equation (2). Column (1) shows results for first stage regression without sector fixed effect and year fixed effect, column

(2) shows results for first stage with sector fixed effect only and column (3) shows results with both sector fixed effect and year fixed effect. All of the estimates for coefficients of current employee ratio are significant at 1% level. Results from this IV model are reported in table 4 and table 5. But to make sure of the validity of this instrument, more test will be done in the following days.

Table 3. First stage regression

Variables	Company rating		
	OLS	OLS	OLS
Ratio of current employees	0.470*** (0.0850)	0.469*** (0.0787)	0.518*** (0.0778)
Ln (Total assets)	0.0457*** (0.0166)	0.0824*** (0.0200)	0.0760*** (0.0203)
Ln (Num. of employees)	0.00564 (0.0172)	-0.00338 (0.0225)	-0.00185 (0.0221)
Dividend indicated yield	0.0133 (0.0175)	-0.00190 (0.0159)	-0.00280 (0.0159)
Ln (CEO age)	0.0681 (0.220)	0.0813 (0.202)	0.0443 (0.199)
Ln (CEO tenure)	0.0236 (0.0159)	0.0390*** (0.0145)	0.0419*** (0.0143)
Sales growth	-1.07e-05 (0.000332)	0.000115 (0.000305)	-0.000117 (0.000303)
Total debt/total assets	0.00177 (0.00108)	-0.000344 (0.00114)	-0.00116 (0.00119)
Cash/total assets	0.00744*** (0.00213)	0.00877*** (0.00211)	0.00909*** (0.00209)
Constant	2.231** (0.868)	1.955** (0.832)	1.988** (0.824)
Observations	5,275	5,275	5,275
R-squared	0.057	0.106	0.139
Sector FE		Yes	Yes
Year FE			Yes

Robust standard errors clustered by firm in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Another concern is that my final sample include all reviews from former employees, while most of prior studies about employee satisfaction would exclude former employees from the sample to avoid

outdated opinion and inaccuracy. Former employees who have left the firm for a long time might provide inaccurate reviews. So, I will exclude all former employees or exclude former employees who have left the firm for more than two years to do robustness check.

4. RESULTS

Table 4 reports the results from the baseline model and IV model when using Market to book ratio as the measurement of firm performance. Column (1) through column (3) show estimates from baseline model without fixed effects, with sector fixed effect only and with both sector fixed effect and year fixed effect, respectively. All of the coefficients on company rating in the first three columns are positive and significant at 1% level, which implies one unit increase in average rating is associated with around 26% increase in Market to book ratio. Column (4) shows results when controlling for Market to book ratio during quarter $t - 1$. Although the coefficient on average rating is much smaller, it's still significant at 10% level. Column (5) reports estimate from the IV model. The coefficient on average company rating is still significant at 10% level and bigger than estimates from baseline models, which implies the basic OLS regression suffer from attenuation bias.

Table 4. The effect of company rating on ln (Market to book ratio)

	(1)	(2)	(3)	(4)	(5)
Variables	OLS	OLS	OLS	OLS	IV
Company rating	0.277*** (0.0506)	0.277*** (0.0506)	0.255*** (0.0513)	0.0104* (0.00596)	0.459* (0.270)
Ln (Total assets)	-0.315*** (0.0600)	-0.315*** (0.0600)	-0.318*** (0.0594)	-0.0110 (0.00715)	-0.370*** (0.0389)
Ln (Num. of employees)	0.0903* (0.0460)	0.0903* (0.0460)	0.0933** (0.0460)	0.00576 (0.00394)	0.196*** (0.0415)
Dividend indicated yield	-0.0290 (0.0392)	-0.0290 (0.0392)	-0.0279 (0.0397)	0.00155 (0.00322)	-0.0724** (0.0345)
Ln (CEO age)	0.862 (0.639)	0.862 (0.639)	0.849 (0.641)	0.0197 (0.0372)	0.876 (0.673)
Ln (CEO tenure)	0.0238 (0.0267)	0.0238 (0.0267)	0.0271 (0.0267)	0.00293 (0.00264)	0.0208 (0.0320)
Sales growth	0.000193 (0.000564)	0.000193 (0.000564)	0.000170 (0.000565)	-0.000118 (0.000114)	-6.66e-06 (0.000655)
Total debt/total assets	0.0241*** (0.00452)	0.0241*** (0.00452)	0.0236*** (0.00453)	0.000221 (0.000521)	0.0225*** (0.00369)
Cash/total assets	0.0139** (0.00554)	0.0139** (0.00554)	0.0143** (0.00559)	0.000807 (0.000592)	0.0162** (0.00637)
Ln (Market to book ratio) _{t-1}				0.967*** (0.0141)	
Constant	-1.831 (2.608)	-1.831 (2.608)	-2.040 (2.638)	-0.0683 (0.129)	-2.729 (2.677)
Observations	5,012	5,012	5,012	5,008	5,012
R-squared	0.478	0.478	0.483	0.951	0.398
Sector FE		Yes	Yes	Yes	
Year FE			Yes	Yes	

Robust standard errors clustered by firm in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5. The effect of company rating on ROA (return on assets)

	(1)	(2)	(3)	(4)	(5)
Variables	OLS	OLS 1	OLS 2	OLS 3	IV
Company rating	1.169***	1.231***	1.254***	0.129**	6.297***
	(0.409)	(0.333)	(0.346)	(0.0548)	(2.366)
Ln (Total assets)	-2.179***	-1.273***	-1.273***	-0.145***	-2.423***
	(0.254)	(0.360)	(0.361)	(0.0380)	(0.301)
Ln (Num. of employees)	1.161***	0.143	0.140	0.0378	1.113***
	(0.246)	(0.330)	(0.329)	(0.0381)	(0.268)
Dividend indicated yield	-0.150	-0.000995	-0.0104	-0.0717**	-0.235
	(0.183)	(0.185)	(0.185)	(0.0281)	(0.186)
Ln (CEO age)	0.470	1.385	1.351	0.150	0.349
	(2.779)	(2.523)	(2.534)	(0.359)	(3.145)
Ln (CEO tenure)	0.0773	0.0824	0.0821	-0.00843	-0.0487
	(0.203)	(0.176)	(0.176)	(0.0277)	(0.240)
Sales growth	0.0163	0.0123	0.0113	0.00659**	0.0152
	(0.0114)	(0.00973)	(0.00931)	(0.00272)	(0.0117)
Total debt/total assets	-0.0184	-0.0303*	-0.0289*	-0.000709	-0.0268
	(0.0147)	(0.0169)	(0.0168)	(0.00180)	(0.0164)
Cash/total assets	0.151***	0.116***	0.116***	0.0122**	0.112***
	(0.0360)	(0.0301)	(0.0304)	(0.00520)	(0.0390)
ROA _{t-1}				0.908***	
				(0.00782)	
Constant	10.31	7.421	8.101	0.608	-3.064
	(11.14)	(10.74)	(10.93)	(1.489)	(13.58)
Observations	5,032	5,032	5,032	5,031	5,032
R-squared	0.270	0.351	0.354	0.889	0.117
Sector FE		Yes	Yes	Yes	
Year FE			Yes	Yes	

Robust standard errors clustered by firm in parentheses *** p<0.01, ** p<0.05, * p<0.1

In Table 5, I repeat the regression in Table 4 to examine the effect on return on assets (ROA). As before, I start with baseline models in the first three columns. Similar with results in Table 4, coefficients on average company rating in the first three columns are positive and significant at 1% level, which implies if average company rating increases by one, the return on assets will increase by 1.2 percentage point. The coefficient in column (4) when controlling for lagged return on assets is smaller but still significant at 5%. In column (5), the coefficient from IV model is much bigger and significant at 1% level, which means OLS models suffer from severe attenuation bias.

Taken together, the results in Table 4 and Table 5 suggest that average company rating is positively and significantly related with firm performance which is measured by market to book ratio and return on assets, no matter whether I use a basic OLS model, OLS model with lagged outcome variables or IV model.

5. CONCLUSION

In this paper, I build a novel dataset which combines company review on Glassdoor.com with firm financial data from Bloomberg database together to examine the effect of online company rating on public firm performance. The preliminary results are consistent with prior studies, and suggest that

online company rating, which can work as a measurement of employee satisfaction, is positively associated with subsequent firm performance. However, a lot more need to be done to validate the results.

First, I need to validate the instrument variable used in the IV model and prove it's not weak. Second, for robustness check, all former employees should be excluded to avoid inaccuracy. Also, firms with extreme financial variables and firms with highest number of reviews should be dropped to make sure the results are not because of some specific firms. Third, it's a pity that the Glassdoor dataset is not large enough due to time limit. I will scrape more reviews in the following days. Hopefully the sample can contain not only large firms, but also mid-size firms.

As for the future research directions, I plan to do textual analysis to see what kind of words would affect firm performance the most. Also, I would study each sector individually to achieve more accurate results since sectors might differ a lot.

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