



MODS206 - Data analysis in economics 2: Applied  
Econometrics

## **The Impact of Salary on Job Satisfaction**

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Palaiseau, April 2023

# Summary

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# 1. Introduction

The impact of wages on job satisfaction has become an increasingly relevant topic in the contemporary workforce, as it carries significant implications for employee retention, productivity, and overall company performance ([Bellet et al., 2019](#)). Thus, in the last decades, measures for workers' well-being, such as building recreational spaces in the company, flexibility to customize the work environment, and creating wellness policies, such as free food in the workplace, have become a trend in the tech industry to increase employee productivity and increase the attractiveness of companies. The best-known and probably most invested in these policies is Google ([The New York Times, 2013](#)), which is one of the top 5 most valuable companies in the world.

Consequently, understanding the relationship between wages and job satisfaction is crucial for organizations looking to optimize their workforce and enhance overall performance. In this study, we investigate the impact of wages on job satisfaction, and in addition, we also study the possible effect of other variables, such as the company status, thereby adding to the understanding of job welfare.

However, despite this recent trend, a world event occurred that changed the basis of contemporary work, which was the worldwide coronavirus pandemic. Remote jobs were already a trend in 2019, before the pandemic ([State of Remote Work, 2020](#)), however, with the isolation caused by the event, many companies were forced to adapt the model, and thus, there was an acceleration of the migration of jobs to the remote modality. Even with the gradual resumption of face-to-face work, the legacy of the work model instituted during COVID-19 cannot be ignored. By 2022, 78% of American workers stated a preference for remote jobs ([State of Remote Work, 2022](#)), which demonstrates this shift. Therefore, along with this, we seek to answer what digital-age workers are satisfied with, i.e. what companies can offer to make employees feel satisfied at work.

This research contributes to academic studies on job satisfaction in several ways. First, it explores the heterogeneity of employee responses to different wage levels, considering factors such as side benefits, company age, and how much this company is recommended by its employees to other people. Second, it is one of the first papers with this study theme done in the period in which one can estimate the effects of the pandemic and its consequences at work. This analysis allows for a deeper understanding of how wage variations may influence satisfaction among various employee groups. By considering the interplay between wage and non-wage factors, this research sheds light on the complexity of job satisfaction and offers valuable guidance for organizations seeking to improve employee well-being, which results in better productivity as well.

Starting in the 20th century, some studies began to be done to understand the factors that contributed to happiness at work. One of the prominent works of that time was the Motivation-Hygiene theory ([Herberg et al., 1959](#)), in which there was an attempt to list the factors that cause satisfaction and dissatisfaction in the work environment. In it, factors such as relationships with other employees, salary, working conditions (hygienic conditions), growth, responsibility, and recognition (motivational conditions) were concerns that companies should have in order to satisfy employees. This work served as a basis for those

that followed, and throughout the century, the subject was developed through various contributions, until we reached the most relevant contemporary theories in the field.

Among them, one of the most relevant was the study of the link between job satisfaction and firm value ([Edmans, 2012](#)), which brought a financial analysis with data from US companies. Although the factors are not explicitly cited, he used data from "100 Best Companies to Work For in America" list, published by Fortune magazine, as a proxy for employee job satisfaction. The list ranks companies based on various factors that contribute to a positive work environment, such as Compensation and benefits, work-life balance, opportunities for growth, recognition and rewards, and physical environment. In that article, the author investigates the relationship between job satisfaction and firm value, arguing that companies that invest in employee well-being can benefit from increased productivity, reduced turnover, and enhanced financial performance.

Edmans's work highlights the importance of job satisfaction in the broader context of corporate social responsibility, emphasizing that attending to employee satisfaction can lead to long-term value creation for businesses. Thus, the fact that job satisfaction directly affects productivity is widely accepted in industry and academia, and the factors that cause job satisfaction are well known. Therefore, we will use as a basis the factors mentioned in the articles to choose the variables other than salary that will have their influence studied on job satisfaction.

To conduct this analysis, we create a comprehensive dataset of employee wages in the IT area (which is an area where changes in work quality are made more quickly), job satisfaction levels, and various workplace attributes. This dataset spans a period during which significant changes in wage structures and labor market dynamics occurred, providing a rich source of information to analyze the relationship between wages and job satisfaction. Then we ran regressions to observe the relation between job satisfaction and other variables.

The results of this study offer several key insights. First, they show that wages are indeed a significant determinant of job satisfaction, with higher wages generally leading to greater satisfaction. However, the magnitude of this relationship varies across different employee groups and is influenced by non-wage factors. Second, the findings reveal that non-wage factors play a crucial role in shaping job satisfaction, with those often being more critical for employee satisfaction than wages alone. This underscores the importance of organizations adopting a holistic approach to employee well-being that considers both wage and non-wage factors.

Hence, we will test four hypotheses with the available data: 1) Salary exerts a significant impact on job satisfaction. 2) For jobs with the same salaries, the company with a better evaluation of non-salary factors is better evaluated. 3) The size of the company plays a big role in the evaluation of the company. 4) The company's business sectors have a great influence on guaranteeing job satisfaction regardless of others factors.

In conclusion, this study provides valuable insights into the relationship between wages and job satisfaction, offering a more nuanced understanding of the factors influencing employee well-being. By identifying the significance of both wage and non-wage factors, this research contributes to the ongoing conversation on optimizing workforce performance and enhancing overall organizational success.

## 2. State of Art: Previous Literature

In the existing literature, we looked for papers that were similar to what we intended to do. Thus, we will refer to these works to analyze our methodology and observe the results already obtained by past researchers who have worked on the same theme.

First, the theoretical reference that serves as a basis for the choice of the parameters to be investigated has been cited in the introduction. However, the synthesis of the work done over the years was well summarized by the work of [Aziri \(2011\)](#), one of the most relevant and cited works in the area today. In this work he reviews the theories of job satisfaction over time, pointing out the relevant factors from past literature that were still significant when he wrote his work. Although his work is oriented to the country in which he produces (Macedonia), the theoretical concepts are presented in a clear and understandable way. Thus, he made a compilation of the literature on the factors that are responsible for job satisfaction, and we used this work to guide us on which factors would be analyzed in our model and which would be discarded from the dataset obtained.

So, we analyzed a paper that also aimed to use job satisfaction as the main factor for an analysis based on Glassdoor data ([Luo et al., 2016](#)). Although the article in question researched productivity at work, the methodology used was analogous to the work we intend to do, so it was a valuable reference.

In this article, the authors mined the data of companies from different industries on the site and extracted the review texts from different users for each company. They then categorized the words in the texts to represent some aspect that pertains to different aspects that can affect job satisfaction. They referenced the work of [Guiso et al. \(2015\)](#), which proposes a framework of nine categories of corporate advertised value: (i) Integrity, (ii) Teamwork, (iii) Innovation, (iv) Respect, (v) Quality, (vi) Safety, (vii) Community, (viii) Communication, and (ix) Hard work. Thus, they chose words that fit within each category (for example, comments with the keywords Hard work + Reward + Fun + Energy would fall into the Reward category) and transformed the quantification of each category from this into a study variable. Then, as an indicator of productivity, they calculated each firm's Tobin's Q, which is used in their OLS regressions as their dependent variable. So they do a regression with all the previous 9 variables, plus overall satisfaction (value from 1 to 5 provided by Glassdoor) and firm size.

As a result of their studies, they conclude that the productivity of companies is directly affected by the job satisfaction of their employees, and emphasize the importance of looking at the aspects of human resource management that are important in creating and maintaining firm value and firm performance

Finally, the last work we were based on is the relationship between pay and job satisfaction: A Meta-analysis of the Literature ([Judge et al. 2010](#)), which is a comprehensive study examining the association between employee compensation and job satisfaction. The authors employed a meta-analytic approach to synthesize the findings from 120 independent samples encompassing a variety of industries, occupations, and geographical locations. The main objective of the study was to determine the magnitude of the relationship between pay and job satisfaction while considering potential moderating factors, such as the publication

year, sample characteristics, and the measurement of pay and job satisfaction. The authors conducted a series of meta-analytic procedures, including the calculation of correlation coefficients, the assessment of potential publication bias, and the evaluation of moderator effects. The findings of the meta-analysis revealed a positive but weak relationship between pay and job satisfaction. This indicates that higher levels of employee compensation are associated with increased job satisfaction, although the strength of this association is relatively small.

The authors also observed that the relationship between pay and job satisfaction was stronger in non-U.S. samples, for studies that used objective measures of pay, and for samples with higher percentages of women and younger employees. In their conclusions, Judge and his colleagues emphasized the importance of recognizing the role of pay in influencing job satisfaction, while also acknowledging the existence of other significant factors that contribute to employees' overall satisfaction with their jobs. They suggested that organizations should carefully consider their compensation policies in conjunction with other human resource management practices to optimize employee satisfaction and organizational performance. Incorporating the insights from this meta-analysis into our study will enable us to better understand the impact of pay on job satisfaction and inform our investigation into the relationship between these variables in the context of the current labor market. Although the method used by the authors is different from the one we are going to work with, it is interesting to see the results of previous works that investigated similar hypotheses to the one we are going to work with and observe if the same results can be observed more than 10 years later.

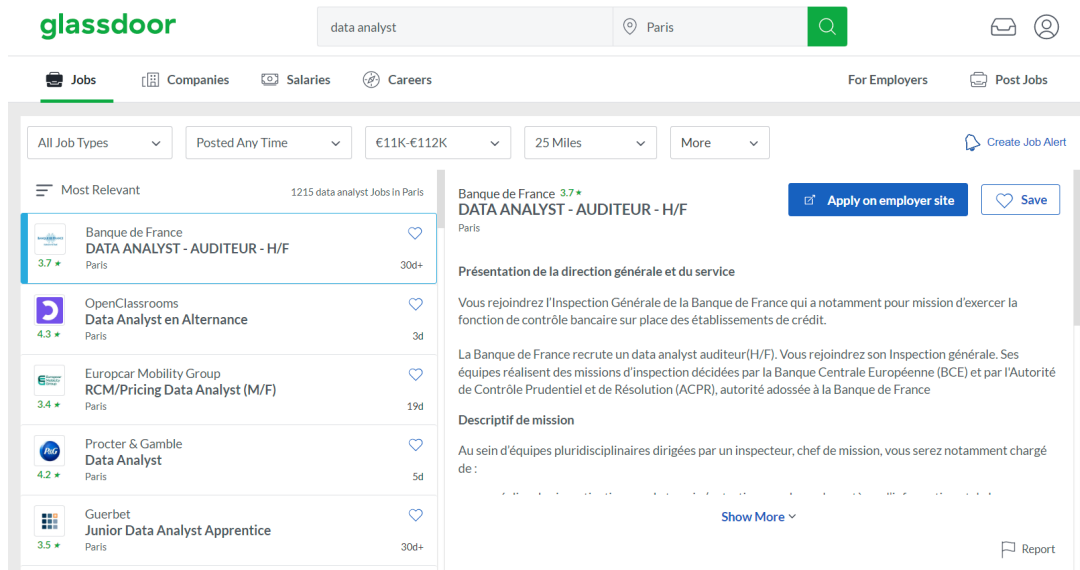
## **3. Data Description**

### **3.1. Our data**

Fitting the purpose of our study, the data we are using are data-related job listings on the online platform Glassdoor. Glassdoor is an online platform that connects job seekers, employees, and companies in a common online space to promote transparency and communications. Employees can share their reviews and ratings on their current or former workplace anonymously, providing insights into salary ranges, company culture, and management practices. Job seekers can search Glassdoor for job openings and potential employers, and gain insights into the hiring process and companies' conditions. Nevertheless, companies also benefit from Glassdoor by using it to improve their reputation and attract talent at the same time that they receive valuable insights into the needs and expectations of their employees and potential hires.

Glassdoor has also had a significant impact on the job market by increasing transparency and holding companies accountable for their actions. The anonymous reviews are a stage for the workers to show their dissatisfaction with their work conditions and unethical or discriminatory practices that they may feel abstained to share otherwise. Additionally, Glassdoor insights on salary ranges have played a pivotal role in diminishing

wage disparities between companies and encouraging employers to offer more competitive compensation. Overall, the platform has empowered workers with information creating a more fair and competitive market for all involved.



**Figure 1:** Job listings on Glassdoor.

The platform provides information about jobs, companies, salaries, and career paths, as you search for a specific job title, company, or keyword, filtering by location, and the result listings show the most relevant information on the region. For our project, we are more interested in the job listings, in Figure 1. The data available to collect from these listings are mostly the range of remuneration predicted for the job opening and company-related information. Other job-specific pieces of information are added in the description in an unstructured way, describing functions, prerequisites, and sometimes some benefits, the presence of this data is not reliable and hard to extract.

Our data set used in this project contains over 165K job listings for data jobs collected from the platform on 10th December 2019 for every country. The list of terms used in the search is the following: data scientist, software engineer, data analyst, research scientist, business analyst, product manager, project manager, data engineer, statistician, dba, database engineer, and machine learning engineer.

Variable	Obs	Mean	Std. Dev.	Min	Max
salary	8143	47873.813	22297.85	13019.04	225119
starRating	8143	3.723	.416	2.1	5
ceoRating	8143	.819	.136	0	1
recommendRating	8143	.723	.13	.17	1
benefitRating	8143	3.729	.577	1	5
compAge	8143	59.767	51.625	5	377

**Table 1:** Summary statistics of the data set.

The original data set contained over 200 features related to the companies distributed over different files, so there was a need to preprocess and clean the data before our analysis,

resulting in a small selection of the relevant features. The remaining features after cleaning the dataset are job-related variables such as job title and median salary, the country of location of the job, the ratings of the company CEO approval, star rating, benefit rating and recommend to friend ratings, and company characteristics, such as company age, size, revenue, and business sector. While some of the features are categorical, the continuous variables are summarized with some relevant statistics in Table 1.

### **3.2. Limitations**

Our data suffered a lot from the limitations of the data set, regarding missing values and too general ratings. One of the first problems we faced with this data was the incompleteness of each sample, most of the job listings collected were lacking some important data among our variables of interest. It was especially troublesome regarding one of our main variables salaries, the great majority of our samples did not contain the salary range. In the end, after all the cleaning and preprocessing, the result data set was reduced from 165 thousand to around 8 thousand samples.

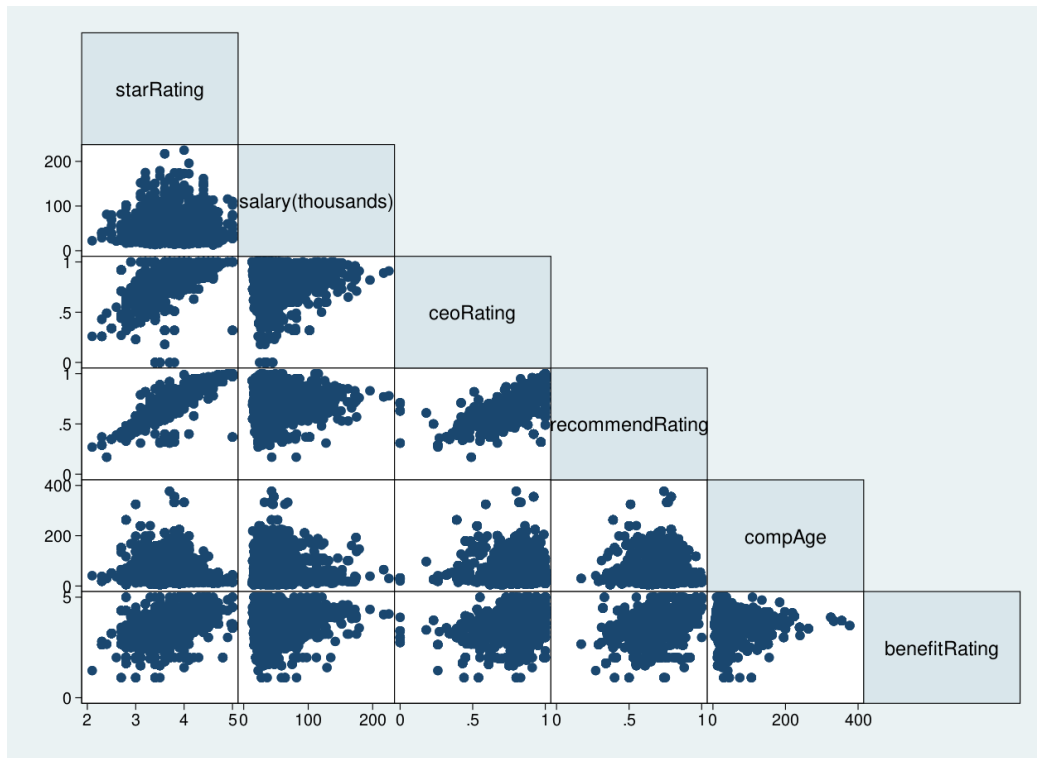
Trying to recover from this, we also attempted to collect new samples, to increase our data and possibly compare our analysis on time using data from different years, but the evolution of the website made the process more complex and time-consuming therefore inviable for our current circumstances on the project.

Another limitation of our data set is the different levels of our variables of interest, which may affect the magnitude of our analysis. While the website collects reviews from workers specifying their job titles, the rating evaluation is stored as a measure on the company level, and therefore the star rating is a composed rating from reviews of employees in all jobs at the same company. That way, in our further analysis, as we explore the influence of the salary on the job level on the star rating on the company level, for each sample, this impact is not excluded from other impacts from different salaries at the same company. Despite that we still can measure this effect, the scale of the effects of a change in salary on satisfaction measured in our analysis may be smaller than the real effects.

## **4. Descriptive Data Analysis**

To start our analysis, we investigated the relation between our variable of interest “star rating” representing job satisfaction, and our other variables.





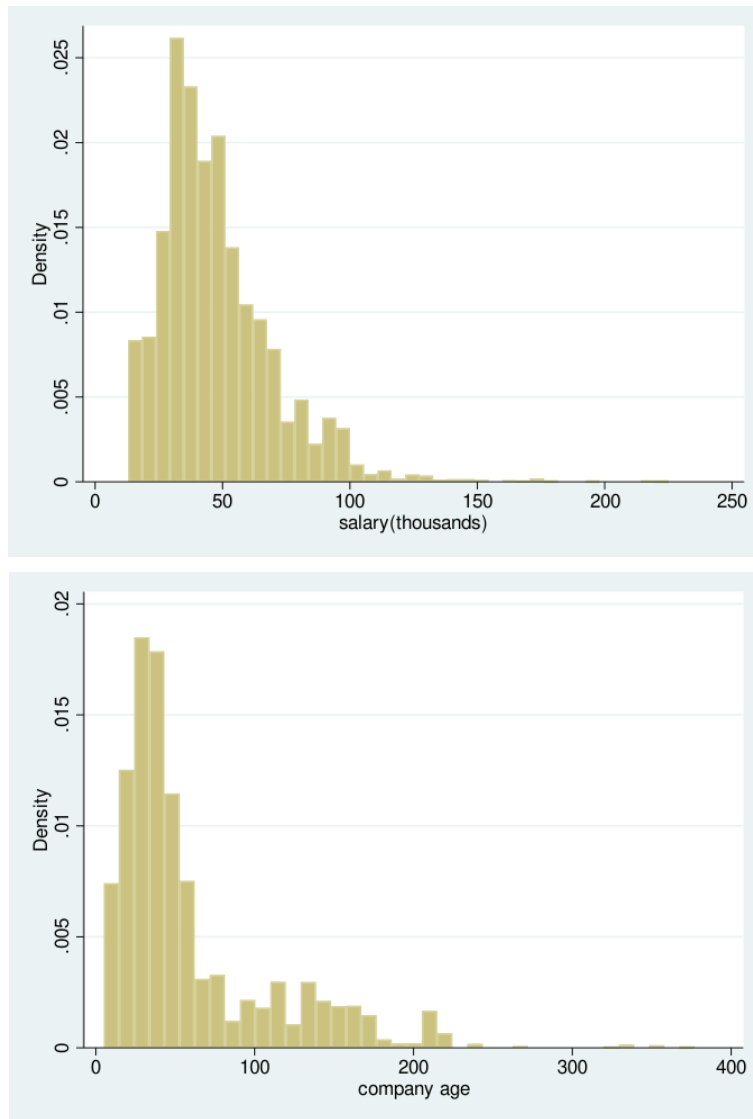
**Figure 2:** Scatter plots over data set variables.

As we analyze the scatter plots, in Figure 2, we can observe that our metric for job satisfaction does not have a strong linear relationship with salary and company age but with the other ratings. The relations of the other variables among themselves are also not well represented by a line except for the ratings. While analyzing the correlation matrix, Table 2, we can confirm our analysis as “starRating” has larger correlation values with the other ratings and small correlation with other variables, in particular, “recommendRating” has a significantly strong relation with our interest variable that should be paid attention in further analysis.

	(1)					
	starRating	sal	ceoRating	recommendRating	compAge	benefitRating
starRating	1					
sal	0.192***	1				
ceoRating	0.730***	0.169***	1			
recommendRating	0.903***	0.169***	0.791***	1		
compAge	-0.0856***	-0.0732***	-0.0314**	-0.0309**	1	
benefitRating	0.573***	0.199***	0.428***	0.517***	-0.0702***	1

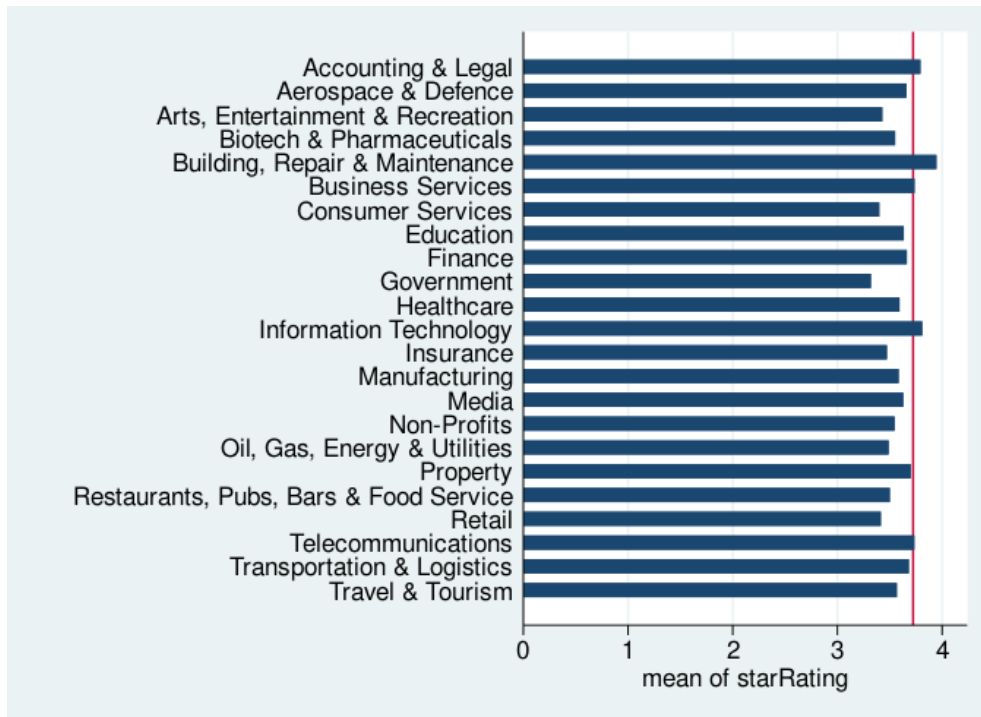
**Table 2:** Correlation Matrix.

These relations were already expected from the general behavior of the workers filling a review in the platform, as the rating one gives a company is the overall trend among the others, and a strong positive or negative experience among one criterium can overstep on the judgment influencing all the others.

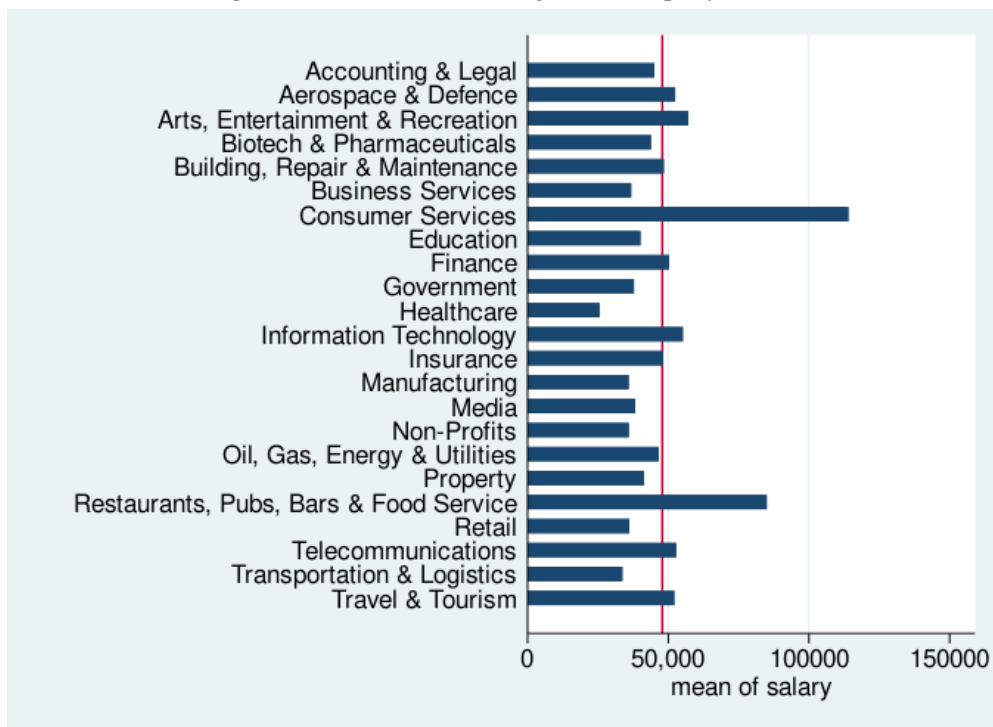


**Figures 3 and 4:** Distributions of salary and company age.

Another remarkable aspect that we notice from the scatter plots is the non-uniform variance among most graphs. This heteroskedastic behavior is especially present for variables with a large difference among the sizes of the observations, as observed for salary and company age, Figures 3 and 4. We can interpret that as we increase the average annual salary of an employee, the number of samples diminishes together with the variation in job conditions and therefore ratings in the reviews. In the same way, the older a company fewer the amount of samples and more similar behavior while treating their workers, resulting in similar results in the reviews.



**Figure 5:** Mean of star rating over company sector.



**Figure 6:** Mean of salary over company sector.

Nevertheless, another analysis of interest we observe is how the company sector influences the other job features. From the previous images, Figures 5 and 6, we can particularly notice that social-related companies despite possessing some of the lower averages of remuneration, their job satisfaction is close to the others, such as healthcare, education and non-profits. The healthcare sector has especially low salaries compared to the other sectors while not distancing itself far from the overall mean of “starRating”. We abstain

from that there is a “humanitarian” or “passion” factor that affects the satisfaction of an IT/data employee, supposedly jobs somewhat similar, to compensate for worst job conditions such as salary remuneration.

## **5. Empirical Strategy**

### **5.1. Our Method**

We are interested in verifying whether salary has any causal effect on job satisfaction. As we think of possible causes of omitted variable bias, we came to some possibilities that are both correlated with the regressor, salary, and a determinant of job satisfaction: the benefits of the job (advantages of the job other than the salary that also influences their employees' satisfaction, such as a reward system, healthcare insurance, bonus, annual leave, etc), the working environment (how healthy are the relations in the company, how stressful or heavy the job is, the attitude of superiors towards employees), the job position (being at a higher hierarchy and possibilities of growth inside the company), location (the standards of a specific country can influence different satisfactions given the same work conditions), the company's business sector (some business sector can affect job satisfaction regardless other job conditions, such as healthcare, education, NPO's, etc), and other company's characteristics (how big or renowned the company is, the pride on working there).

Taking these factors into account, we can add the following variables to the base model of star rating, our measure of job satisfaction, over salary: benefit satisfaction, CEO approval as a representative of the working environment, the country where the job is situated, company sector, company revenue, size, and age as factors of company renown on the market.

We are using the linear regression of the dependent variable of job satisfaction on the salary alone as the regressor as the base model in our analysis. Next, we analyze how the coefficient change as we include the groups of control variables in the regression, explaining the bias effects on the salary coefficient. For organization purposes, the variables are divided into the following groups: benefit, environment, company sector, company influence, and country; and we add variables of the groups together to test omitted bias by each of these categories.

The job title will not be used in our analysis, because there are over 1000 titles, and most of them are not standardized, using different wordings, thus including job position in the analysis will not be effective. The recommendation rating will be omitted from the regression model as well, since there is a big correlation between job satisfaction and the variable, over 0.9 as we stated above. Besides the continuous variable (salary, benefit rating, CEO rating, company age), company sector, company revenue, and company size are all categorical variables. These variables will be converted into binary variables using a one-hot encoder.

However, all the models we have run above assume that the relationships between the dependent variable and all independent regressors are linear. This may not be true. Moreover, the previous plan does also not account for the interaction between variables, which means

that the effect of salary on job satisfaction may vary depending on the value of other variables, so non-linear between the two independent variables. So apart from the linear model, we also run the regression with non-linear assumptions, polynomial or logarithmic model, and look for interactions between salary and the control variables.

## 5.2. Hypotheses

Modeling our project we came to some hypotheses based on our topic of the job market and work satisfaction, which we expect to verify throughout this work. All the hypotheses were based on the literature presented previously, especially in the work of [Aziri \(2011\)](#), which was a guide for the choice of study factors, because these had already been theorized before as influencing satisfaction:

- **H1:** Remuneration exerts a significant impact on job satisfaction.

Wages are the most obvious quantitative means of rewarding employees for their work, so we want to test the influence that such a factor has on the happiness of the workforce.

- **H2:** For jobs with the same salaries, the company that has a better evaluation of non-salary factors is better evaluated.

We want to quantify the influence of factors that can be offered to employees in addition to salary, as we believe these factors can be as influential as pay.

- **H3:** The size of the company plays a big role in the evaluation of the company.

We believe that companies with more renown bring better ratings with them, given their influence and often prestige, given that professional fulfillment can be greater when working in a known place.

- **H4:** The company's business sectors can guarantee job satisfaction regardless of other factors.

We also want to test whether different sectors of industry cause different satisfaction in their workers given the same pay and benefits conditions. This is because we believe that certain areas can bring different feelings of achievement, as already indicated by ([Luo et alOur2016](#)), which brings, as an example, that in the technology sector, the presence of innovation in the company brings higher satisfaction than in other industries.

While there are other factors such as remuneration or possibilities of growth, "passion" or personal fulfillment is also one of the main discriminating factors in choosing a career or a job. Taking that into account, the company's business sector can say a lot about the possible degree of realization someone has while doing their job, in our case the jobs fitting a similar category. Therefore, we expect a low variation in job satisfaction given variations in the other job factors for companies in business sectors such as healthcare or education.

We came to a realization for this fourth hypothesis in the data analysis, as we compared the mean of the salary and star rating for each company sector. We could observe

that while the mean salary for the Healthcare, Non-Profits, and Education sectors are amongst the lowest, their star rating which is our measure of job satisfaction remains close to the average. Therefore we accept this hypothesis (hypothesis 4) for some business sectors, especially sectors encouraged by social welfare and humanitarianism.

## 6. Results

### 6.1. Linear Model

	(1) starRating	(2) starRating	(3) starRating	(4) starRating	(5) starRating	(6) starRating	(7) starRating
sal	0.00359*** (16.64)	0.00152*** (8.35)	0.000560*** (3.83)	0.00311*** (13.96)	0.00335*** (15.06)	0.00379*** (15.67)	0.00114*** (6.89)
benefitRating		0.402*** (48.11)	0.227*** (31.51)				0.208*** (28.31)
ceoRating			1.804*** (40.57)				1.749*** (39.39)
compAge					0.0000566 (0.58)		0.000125* (2.05)
_cons	3.551*** (305.98)	2.151*** (70.29)	1.371*** (44.74)	3.653*** (325.02)	3.745*** (33.20)	3.563*** (107.96)	1.095*** (9.30)
adj R-sq	0.0370	0.335	0.616	0.0892	0.191	0.135	0.678
benefit	No	Yes	Yes	No	No	No	Yes
environment	No	No	Yes	No	No	No	Yes
company sector	No	No	No	Yes	Yes	Yes	Yes
company influence	No	No	No	No	Yes	No	Yes
country	No	No	No	No	No	Yes	Yes

t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**Table 3:** Regression Table for Linear Models.

The regression represented in the first column of the regression table represents our base model, with salary as the only independent variable. Later, by adding each group of control variables into the regression model, we can see how those control variables affect the coefficient of salary and the model's ability to predict job satisfaction.

From Table 3 we can see that, our H1 hypothesis is correct: salary, benefit rating, and CEO approval have a t-value greater than 1.96, thus we can reject the null hypothesis that the coefficient is equal to 0 at level 5%. They all have a significant impact on the prediction of job satisfaction, on the other hand, the company age does not. However, the R square value of the first model is very small, which means we cannot predict the target value based on salary alone. Adding other groups such as benefit and environment variables highly improves the model's performance.

Based on the coefficient of salary with a positive correlation to these variables, it's clear that benefit, environment, and company sector variables have an upward bias effect toward the salary variable, since the coefficient of salary decrease in magnitude when including the mentioned control variables. On the other hand, the company influence variable

group and country variables have a downward bias effect towards salary, because the coefficient of salary increases in magnitude in those situations.

Overall, when we include all control variables, the coefficient of sal (salary in thousand units) is 0.00114, which means that salary does have a positive effect on employees' job satisfaction, but the effect is not large, when salary increases by 1000, job satisfaction only increase by 0.001. The magnitude of these effects can also be influenced by the limitations on data regarding the different levels of salary and star rating, as described in the previous section regarding limitations.

Another aspect we want to find out is whether the company's reputation affects the satisfaction of employees (hypothesis H3). Since Stata automatically omits one value of the variables for categorical variables like company revenue and company size, the hypothesis is similar to saying that the coefficients of these variables are significant. Due to the test results in Figure 7, we can reject the null hypothesis, which means our H3 hypothesis is true.

( 1)	2.compRevenue_en = 0	( 1)	2.compSize_en = 0
( 2)	3.compRevenue_en = 0	( 2)	3.compSize_en = 0
( 3)	4.compRevenue_en = 0	( 3)	4.compSize_en = 0
( 4)	5.compRevenue_en = 0	( 4)	5.compSize_en = 0
( 5)	6.compRevenue_en = 0	( 5)	6.compSize_en = 0
( 6)	7.compRevenue_en = 0	( 6)	7.compSize_en = 0
( 7)	8.compRevenue_en = 0		
( 8)	9.compRevenue_en = 0		
( 9)	10.compRevenue_en = 0		
(10)	11.compRevenue_en = 0		
(11)	12.compRevenue_en = 0		
	F( 11, 7993) = 15.07		F( 6, 7993) = 16.63
	Prob > F = 0.0000		Prob > F = 0.0000

**Figure 7:** Hypothesis testing

## 6.2. Logarithmic model

Number of obs = 8,143  
F(134, 7993) = .  
Prob > F = .  
R-squared = 0.6772  
Root MSE = .06552

log_star	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
log_salary	.0089329	.0020906	4.27	0.000	.0048349	.013031
ceoRating	.4967015	.012614	39.38	0.000	.4719747	.5214283
benefitRating	.056407	.002031	27.77	0.000	.0524258	.0603883
compAge	.0000605	.0000174	3.49	0.000	.0000265	.0000945

**Table 4:** Regression Results for Logarithmic Model.

In Table 4 we have the logarithmic model's result when we convert job satisfaction and salary to the log scale. The t-value shows us that all variables' coefficients are significant and helpful to predict job satisfaction, especially CEO approval and the benefit that employees receive since they have a much higher t-value compared to other dependent variables. The company age variable continues to have the lowest t-value, indicating its lowest effect.

The coefficient of log salary is 0.009, which means when salary increases by 1%, job satisfaction increases by 0.009%. Once again, the impact of salary on job satisfaction is significant but not much expressive. Overall, we reached similar conclusions from the model with linear assumption.

### 6.3. Polynomial model

In Table 5 we present the result of our regression model running with polynomial variables, together with interactions between the polynomials of salary and company age, benefits, and CEO approval. Only the models whose result coefficients are significant are included.

The first two columns are regressions when only the polynomials of the salary variable are included. The following four are regressions including linear interaction between the polynomials of salary and the stated control variables. Finally, The last one contains the interaction variables of all control variables with the first order of salary.

From the third to the seventh column, the t-values indicate that there is a non-linear effect between salary and the control variables. However, based on the range of value of the variables, and the coefficients of interaction terms, we can say the difference when including the polynomials of salary, and interaction variables are very small, keep adding the polynomials and interaction terms will only make the model become overfitted.

After running linear regression for both linear and non-linear assumptions, the CEO approval, benefit rating, and company age (which is a part of the company influence group of variables) always have a positive coefficient, which means they all have positive effects on



job satisfaction. We can confirm our H2 hypothesis: If two jobs in different companies have the same salary, the company that has better non-salary conditions is better evaluated.

	(1) starRating	(2) starRating	(3) starRating	(4) starRating	(5) starRating	(6) starRating	(7) starRating
sal	0.00114*** (6.89)	-0.00867*** (-7.42)	-0.00814*** (-6.83)	-0.0266*** (-7.09)	-0.0450*** (-4.94)	-0.0390** (-3.28)	-0.00743*** (-3.48)
ceoRating	1.749*** (39.39)	1.740*** (39.44)	1.738*** (39.41)	1.741*** (39.52)	1.740*** (39.52)	1.171*** (4.52)	2.001*** (18.28)
compAge	0.000125* (2.05)	0.000127* (2.10)	0.000412*** (3.29)	0.000128* (2.11)	0.000127* (2.09)	0.0000952 (1.59)	0.000426** (2.92)
benefitRating	0.208*** (28.31)	0.205*** (28.22)	0.204*** (28.12)	0.0718** (2.82)	-0.00650 (-0.15)	0.205*** (28.19)	0.153*** (8.68)
sal2		0.000135*** (7.86)	0.000133*** (7.87)	0.000252*** (7.45)	0.000549*** (3.95)	0.000626*** (3.31)	0.000131*** (7.66)
sal3		-0.00000497*** (-6.89)	-0.00000488*** (-6.96)	-0.00000436*** (-5.76)	-0.00000177** (-2.94)	-0.00000255** (-3.05)	-0.00000482*** (-6.85)
sal_age			-0.00000619** (-2.68)				-0.00000648* (-2.24)
sal_ben				0.00486*** (5.18)	0.00942*** (4.10)		0.00112** (3.05)
sal2_ben				-0.0000338*** (-4.39)	-0.000107** (-3.07)		
sal3_ben					0.000000330* (2.18)		
sal_ceo						0.0350* (2.55)	-0.00571* (-2.51)
sal2_ceo						-0.000566** (-2.62)	
sal3_ceo						0.00000236* (2.47)	
company sector	Yes	Yes	Yes	Yes	Yes	Yes	Yes
company influence	Yes	Yes	Yes	Yes	Yes	Yes	Yes
country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8143	8143	8143	8143	8143	8143	8143
adj R-sq	0.678	0.683	0.683	0.685	0.685	0.684	0.685

t statistics in parentheses  
\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**Table 5:** Regression Table of Polynomial Models.

## 7. Conclusion

Initially, through statistical methods, the project was meant as a way for us to measure the effect of salary on job satisfaction. The answer is that it does have a statistically significant, positive effect, though the effect is not as big as we all have expected. Continue working on the project, we also answer other questions: what other factors also affect job satisfaction, and how do salary and these factors interact together? Our final results align with previous studies, that there are indeed non-salary factors that affect the satisfaction of employees. We

also succeed in shedding light on other problems, related to company influence, or the industry sector that the company is working in.

Although our project has achieved a certain level of results, providing insights for the long debating questions over what affects the satisfaction of a worker, due to time and knowledge limitations, we could not completely measure the effect of our variable of interest on job satisfaction. There is still a lot of space for us to improve our work. First of all, after cleaning, our data has only around 8000 samples, which is a small number, considering the number of job offerings on the market, working conditions, and industry sectors. Secondly, our data was collected a few years ago so the effect of salary on job satisfaction may not be up to date, collecting more recent data can even enable another direction to measure the change of effect of salary over time. So if we have more time to gather more data and knowledge, future work can be built up based on what we have achieved.

After all the analysis, we reinforced our knowledge of econometrics and how to apply regression techniques in a new fashion, applying them in the context of the job market and achieving a better understanding of the quantitative influence of wages on job satisfaction.

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