How Much Does Your Boss Make?
The Effects of Salary Comparisons

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Abstract

We study how employees learn about the salaries of their peers and managers, and how those beliefs affect their behavior. We conducted a field experiment with a sample of 2,000 employees from a multi-billion-dollar corporation. We combine rich data from surveys and administrative records with an experiment that provided some employees with accurate information about the salaries of others. First, we document large misperceptions about salaries and identify some of the sources of these misperceptions. Second, we find significant behavioral elasticities with respect to the perceived salaries of other employees. These effects are different for horizontal and vertical comparisons: while higher perceived peer salary decreases effort, output and retention, higher perceived manager salary has a positive effect on those same outcomes. We discuss evidence on the underlying mechanisms, and implications for pay inequality and pay transparency.

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1 Introduction

Employees may care about the salaries of other employees inside the firm, such as the salaries of peers and managers. They may use this information to form expectations about their own future salary, or they may have fairness or inequity concerns. As a result, changing the salary of one employee can affect the behavior of other employees in the firm. These externalities can have important implications for the provision of incentives within the firm. In this paper, we address this question using a large-scale, high-stakes field experiment in collaboration with a multi-billion-dollar corporation.

We designed and conducted a field experiment involving a sample of 2,000 employees from a large commercial bank. The research design allows us to explore how employees learn about the salaries of their peers and managers, and how those beliefs affect their behavior. To do this, we combine three sources of data: a tailored survey, information-provision and information-acquisition experiments, and rich administrative data on the behavior of the employees such as real time data on the swipes in and out of the office, emails sent and received, sales performance, promotions, transfers and exits.

The first part of the research design addresses the formation of salary perceptions. According to survey data, employees report to be equally interested in learning about the salaries of their peers (i.e., employees in the same position and unit) and about the salaries of their superiors. Our survey elicited beliefs about the average salary among one’s peers and the average salary among one’s managers, using an incentivized method. This research design distinguishes between two forms of pay comparisons: horizontal comparisons (i.e., own salary relative to peer salary) and vertical comparisons (i.e., own salary relative to the manager salary).

By comparing the perceived salaries with the actual salaries from the firm’s administrative records, we can measure salary misperceptions. Moreover, to disentangle the sources of these misperceptions, we embedded an information-acquisition experiment: we elicited the willingness to pay for information about peer salary and manager salary, using an incentive-compatible method.

The second part of the research design addresses the behavioral effects of salary perceptions. We employ an information-provision experiment: for each employee, we flipped a coin to decide whether she would receive a piece of information about the average salary among peers; and we flipped another coin to decide if the employee would receive a piece of information about the average salary among managers.

Because employees react to the information provided to them, this experiment generated exogenous variation in the salary perceptions that the employees held at the completion of
the survey. We can use administrative records to see whether these exogenous shocks to salary beliefs translated into differences in behavior in the days or months after the survey was completed. We introduce a simple instrumental-variables model that exploits the experimental variation in beliefs to estimate the structural parameters of interest, the cross-salary elasticities: e.g., the percent change in effort for each percent increase in the perceived manager salary.

The first set of findings documents significant information frictions. Employees have large and systematic misperceptions about the salaries of their managers and their peers. These misperceptions are substantial at all levels of the firm, and for all demographic subgroups. We show that a substantial part of these misperceptions are due to lack of information instead of just lack of interest: on average, employees are willing to pay 14 days worth of salary for a signal about the average salary of their peers, and a similar amount for a signal about the average salary of their managers.

We show evidence that the information frictions arise from barriers to social learning. Even though each employees learns from the information provided to herself, that information does not travel to other employees in the network, not even to her closest peers. We show that employees who gossip more and employees who are more central in the network do not have more accurate beliefs about the average peer salary. Indeed, employees perceptions about average peer salary are not more accurate than what you would expect if they had access to information about their own salary only.

The second set of findings documents large behavioral implications for the salary perceptions. We find cross-salary elasticities that are statistically and economically significant. On the one hand, we find that a higher perceived peer salary has negative effects on effort, output and retention. For example, a 1% increase in perceived peer salary decreases the number of emails sent by 0.63%, implying a behavioral elasticity of -0.63. On the other hand, we find vertical comparisons to have the opposite effects as horizontal comparisons: higher perceived manager salary has positive effects on effort, output and retention. For instance, a 1% increase in perceived manager salary increases the number of emails sent by 0.18%, implying a behavioral elasticity of 0.18.

These behavioral effects are persistent over time, they are distributed homogeneously through different subsets of the employees, and they are robust across different specifications. We cannot reject the null hypothesis that the effects are symmetric (e.g., comparing upwards versus downwards revisions), although we cannot rule out moderate asymmetries either.

We provide some suggestive evidence about the mechanisms driving these cross-salary elasticities. To accomplish this, we measure the effects of perceptions on survey outcomes (e.g., future salary expectations), and we exploit heterogeneity analysis. Regarding horizontal
comparisons, we find evidence of two channels being at play. On the one hand, higher peer salary increases expected future salary, which motivates employees. However, there is a separate negative channel that trumps the first channel, which could be attributed to social concerns. Regarding vertical comparisons, we find again evidence of career concerns: higher manager salary increases expected future salary, which motivates employees. However, we do not find any evidence of social concerns being at play.

Since it increased pay transparency at the margin, our information-provision experiment allows for an impact-evaluation of pay transparency. We find that higher transparency has an insignificant average effect on most forms of behavior, except for retention, for which it has a positive and significant average effect. This evidence suggests that this firm may be better off by increasing pay transparency at the margin. Furthermore, it seems that employees would too benefit from higher transparency: the vast majority of employees report to be in favor of higher transparency, as long as it is anonymized. This is not surprising, given that higher transparency would result in information for which they revealed to be willing to pay significant amounts.

Our findings have a number of implications. First, these findings may explain why firms provide most of the financial incentives vertically (e.g., through promotions) instead of horizontally (e.g., through performance pay). Firms may be trying to negative effects of social concerns associated with horizontal comparisons. Similarly, this evidence may explain why the bulk of pay discrimination is vertical rather than horizontal (Barth, Kerr and Olivetti, 2017): for instance, in the firm where the experiment was conducted, 92% of the gender pay gap comes from vertical differences and only 8% through horizontal differences.

There is a widespread view that social comparisons put pressure on the firms to compress salaries within the firm (Frank, 1984; Hamermesh, 1975), and a similar morale-based argument is used to explain wage rigidities (e.g., Solow, 1979; Bewley, 1999). Our findings suggest that this view is only true in a narrow sense: while this channel may force firms to reduce horizontal inequality, firms are not restricted in their use of vertical inequality.

Our paper is related to several strands of literature. While there is a long standing theoretical literature on relative salary (e.g., Frank, 1984; Romer, 1984; Summers, 1988; Akerlof and Yellen, 1990), the empirical evidence has been lagging behind. In a seminal contribution, Card, Mas, Moretti and Saez (2012) conducted a field experiment to explore the effects of wage transparency in a university. They took a sample of university employees, and sent a random subsample of them an email with information about website that listed the salaries of every employee at that university. One week later, the researchers sent a follow-up survey to the entire subject pool. They found that, for workers with below-median salaries within their occupation, receiving the link to the website decreased job satisfaction
and increased the stated job search effort.

Since Card et al. (2012), others have studied the broader consequences of pay transparency (Cullen and Pakzad-Hurson, 2015; Perez-Truglia, 2015; Rege and Solli, 2015; Mas, 2017). Additionally, there is a long standing literature in psychology and economics that measures the effects of unequal piece-rates on task performance, both in the laboratory (Charness and Kuhn, 2007; Clark, Masclet and Villeval, 2010) and in the field (Pritchard, Dunnette & Jorgenson, 1972; Valenzi and Andrews, 1971; Schmitt and Marwell, 1972; Breza, Kaur, Shamdasan, 2017; Huet-Vaughn, 2017). Our study makes four key contributions to this existing literature.

First, while the existing evidence focuses on horizontal comparisons, we are the first to incorporate vertical comparisons as well. This is important because vertical inequality comprises the vast majority of the within-firm inequality. In the firm where our experiment was conducted, 95% of the pay inequality is vertical and the remaining 5% is horizontal — this decomposition is in the same order of magnitude for other firms.

Since individuals react with opposite signs to horizontal and vertical comparisons, the distinction between the two ends up being critical.

Second, we contribute from a methodological perspective. Rather than estimating the reduced-form effects of inequality or transparency, our novel research design identifies the structural parameters of interest, the cross-salary elasticities, by combining an information provision experiment, survey data and behavioral data.

Third, this study is unique in terms of the scope of the field experiment. This is a high-stakes environment for our subjects, with thousands of careers and billions in revenues at stake. This firm provides an environment that is quite representative of large firms around the world in key aspects such as pay transparency, salary inequality and norms about pay secrecy. Moreover, the close collaboration with the firm allowed us to measure novel aspects of the employee’s life, such as their behavior, perceptions, willingness to pay for information and diffusion of information in the network, among others.

Fourth, our information-provision experiment provides arguably the first impact-evaluation analysis of higher pay transparency. Most companies in the world, including the firm where this experiment was implemented, actively choose not to be transparent about pay even though they do not have evidence that such policy is in the firm’s best interest. Even though we cannot generalize the findings to all firms, our evidence at least suggests that more firms should experiment with higher transparency.

Our study also contributes to a growing literature showing that individuals have substantial misperceptions of their relative income (e.g., Cruces, Perez-Truglia, and Tetaz 2013; 1

1Details about the inequality decomposition reported in Appendix ??.
Karadja, Mollerstrom, and Seim 2017). While this literature shows that correcting these misperceptions has significant effects on stated preferences for redistribution, there is little evidence on whether these misperceptions affect behavior (Bottan and Perez-Truglia, 2017). We show that misperceptions about relative salary can have substantial consequences for behavior.

The rest of the paper proceeds as follows. Sections 2 and 4 describes the research design and the survey design, respectively. Section 4 presents the implementation details and the administrative data. Section 5 presents the results about the formation of salary perceptions. Section 6 presents the results on behavioral elasticities. Section 8 discusses evidence about the causal mechanisms at play. Section 7 presents the impact-evaluation of transparency. The last section concludes.

2 Research Design

In this section, we introduce the econometric model used to identify the behavioral elasticities.

2.1 Conceptual Framework

Let $Y_i$ be a form of employee $i$’s behavior, such as the effort or sales performance. Let $Own_i$ be $i$’s own salary. Let $P_i$ be $i$’s perceptions about the average salary among $i$’s peers. Let $M_i$ be $i$’s perceptions about the average salary among $i$’s managers. Consider the following regression model:

$$\log (Y_i) = \eta_0 + \eta_{own} \cdot \log (Own_i) + \eta_{peer} \cdot \log (P_i) + \eta_{mgr} \cdot \log (M_i) + e_i$$

We denote $\eta_{own}$ as the own-salary elasticity. When the dependent variable is the labor supply, then this parameter $\eta_{own}$ would correspond to usual labor supply elasticity. In addition to the own-salary elasticity, equation (1) allows employees to react to their perceptions of the salaries of other employees, through $\eta_{peer}$ and $\eta_{mgr}$. We denote these two parameters as the cross-salary elasticities.

Equation (1), of course, makes a number of simplifications. For example, this framework does not allow employees to care about the average salary in other groups (e.g., their subordinates), or to care about other moments of the distribution of salaries (e.g., the maximum salary among peers). In principle, we could allow for a fully saturated model where the right hand side of equation (1) includes one term for the salary of each employee in the bank. Estimating this saturated model would be impossible due to limitations in time, money and attention, so we have to focus on this simplified model instead. We choose this specific sim-