The Role of Non-Base Compensation in the United States

Jason Sockin* Michael Sockin†

August 2019

Abstract

Using Glassdoor salary data on six U.S. industries, we show that non-base pay not only contributes more to income inequality than base pay, but also represents a sizable and stable fraction of employee compensation. Even within an industry, there is substantial heterogeneity in how firms pay bonuses and which employees receive cash, stock, profit-sharing, or sales commission. The size and incidence of bonuses is intimately related to job hierarchy and skill. More senior employees and occupations that require interpersonal (routine) skills receive higher (lower) bonuses, while employees with comparable roles (same job title) within a firm receive similar non-base compensation. Non-base pay also responds more to firm and, across the corporate hierarchy, industry shocks than base, and therefore represents an important mechanism through which changes in firm productivity are passed on to workers.

*University of Pennsylvania. Email: jsockin@sas.upenn.edu

†University of Texas at Austin. Email: michael.sockin@mccombs.utexas.edu.

PRELIMINARY: We thank Andres Donangelo, John Griffin, Sam Krueger, Andres Lieberman, Larry Schmidt, Kelly Shue, Per Stromberg, and Mindy Zhang for helpful comments and discussions, and seminar participants at UT Austin. We thank Xiang Kang for excellent research assistance.

1 Introduction

Non-base compensation has become an increasingly important part of employee compensation in the U.S. over the past few decades. The share of private-sector jobs that earn performance pay, for instance, increased from about one-third in the late 1970s to two-fifths in the late 1990s (Lemieux et al. (2009)), and averaged about 48 percent throughout the 2000s (Gittleman and Pierce (2015)). Despite its growing relevance, however, the prevalence and role of non-base pay in employee compensation are still not well understood. In this paper, we analyze non-base compensation for about [1.63] million salaries that employees voluntarily report on Glassdoor from January 2007 through February 2019 across six U.S. industries: Finance, Business Services, Information Technology (IT), Manufacturing, Healthcare (excluding Biotech and Pharmaceutical), and Retail.[1] Our investigation not only sheds light on the incidence of, and variation in, bonuses across these industries, but also establishes bonuses as a key channel for firms both to reward seniority and interpersonal skill sets, and to pass on shocks to firm performance.

Non-base pay represents an important and highly heterogeneous component of employee compensation. It is substantially more variable — in both the cross-section and time series — than base pay, and contributes more to income inequality both within and across firms. The top [20%] of employees in each industry, for instance, receive over [50%] of all bonuses paid compared with [35%] of all base pay. Bonuses also represent a stable fraction of total earnings among employees that receive bonuses, ranging from as low as [11%] for entry level employees in Healthcare to as high as [30%] for the most senior employees in Finance. Even within industries, the composition of bonuses differs noticeably across employees and employers. More junior employees are given a larger share of their bonus based on individual performance through sales commissions, while bonuses for more senior employees are increasingly concentrated in firm performance through cash, profit-sharing, and stock. Across

[1] Salary reports are assigned to industries, which are defined by Glassdoor, based on an employees firm. These six industries are chosen because they are the six most represented among Glassdoor salaries.

employers, firms pay the majority of workers cash as part of their bonuses, while [75%] of firms compensate less than [5%] (except in IT ([9%])) of employees with stock and less than [3.2%] (except in Manufacturing ([7.8%]) of employees with profit-sharing.

Our analysis reveals that firms pay similar bonuses to employees with the same job title, and higher bonuses to more senior employees and those with interpersonal skills. We assign corporate hierarchy by taking the median years of experience of all employees within a job title in an industry and ranking job title-industry pairs into five hierarchy groups: entry, low, medium, high, and senior.[2] We classify skills according to the skill and task requirements assigned to an occupation, according to O*NET, and job title. All else equal, the most senior employees earn between [147%] (IT) and [920%] (Retail) more in non-base pay than entry level employees. Regarding skill, employees in occupations that feature "non-routine interpersonal" skills or tasks, such as Communications and Social Media Managers, earn between [5.4%] (Finance) to [24.0%] (Business Services) more per standard deviation on the skill index, and are more likely to receive a bonus. In contrast, employees in occupations with "non-routine, cognitive analytic" skills, such as Marketing Coordinators or Product Specialists, earn between [9.5%] (Manufacturing) and [31.3%] (IT) less, and are less likely to receive a bonus. An employee's job title can also explain a substantial share of the variation in employee bonuses, suggesting that employees with similar skills and tasks receive comparable compensation.[3] Furthermore, jobs in occupations more intensive in "non-routine, cognitive" skills tend to have lower variance in non-base pay, while there is evidence that occupations more intensive in "non-routine, manual interpersonal" skills have higher variance.

We then examine whether non-base responds to shocks to firm productivity. Employers that, on average, pay higher base also, on average, pay higher non-base pay, with this positive

[2]We interpret years of experience as a measure of job-specific (Topel (1991)) or occupation-specific (Kambourov and Manovskii (2009)) human capital. When advertising a job vacancy, for instance, firms often include expected years of experience as a requirement for applying. As such, jobs higher up the corporate hierarchy, and that have a higher threshold of human capital accumulation, would have more years of experience, on average, than jobs lower in the hierarchy.

[3]A regression of only year, state, and job title fixed effects on log real non-base pay has an R^2 of [0.36] in Retail, [0.39] in Business Services, [0.44] in Manufacturing, [0.45] in IT, [0.49] in Finance, and [0.60] in Healthcare.

relation being strongest (elasticity statistically above 1) for Manufacturing, IT, Finance, and Retail. As such, persistent differences in employer productivities translate into larger differences across employers in non-base than in base pay. There is also evidence that firms that experience better transitory performance shocks in a given year, such as higher earnings before interest, taxes, depreciation, and amortization (EBITDA), average earnings per share, stock returns, or sales to assets ratios, increase bonuses more than they increase base pay. Finally, industry shocks, as measured by year fixed effects in industry-specific regressions of real non-base (base) pay, propagate to employee compensation primarily through bonuses, and the impact is shared across the corporate hierarchy.

Our results shed light on the role of non-base pay by providing evidence on the prevalence, composition, and determinants of bonuses for a wide cross-section of U.S. firms since 2007. A substantial share of an employees bonus, both in magnitude and composition, can be explained by her role within a firm (her job title), with more senior employees and those in roles that require more interpersonal skills receiving higher bonuses. In addition, firm and industry shocks pass through to bonuses, suggesting that firms do not fully insulate their workers from outcomes that are beyond their direct control. Although persistent differences in bonuses could reflect positive assortative matching between superstar firms and superstar employees (Song et al. (2018)), differences across employers cannot explain the job hierarchy premiums and that transient shocks, such as strong past stock performance and high sales relative to assets, impact bonuses.

These findings help inform our conceptual understanding of employee compensation. Similar employees receiving similar bonuses is consistent, for instance, with firms treating their employees as part of a team (Holmstrom (1982)), rather than a tournament (Lazear and Rosen (1981)), or firms paying for a job rather than a person (Baker (1992), Holmstrom and Milgrom (1991), Shimer (2005)). It is also consistent with compensation practices among comparable employees being motivated by concerns for equity (Bewley (1995)). In addition, the returns to ascending the corporate hierarchy suggest implicit incentives through career

concerns (Gibbs (1995)), or that firms learn about employee types over time and retain those with the highest match surplus (Holmstrom and Costa (1986)). Furthermore, the rewarding of more senior employees with more stock and profit-sharing, and junior employees with more sales commission, suggests that juniors, whose performance is easier to measure, are incentivized through "skin in the game" performance pay (MacLeod and Parent (1998)), while stock and profit-sharing may be used in retaining senior talent (Oyer (2004)).[4] That the composition of bonuses shifts from more self-performance (sales commissions) to more firm-performance (stock, profit-sharing) with seniority may also suggest that firms reward employees with improved risk-sharing. Since bonuses exhibit substantial variability and respond to firm and industry shocks, however, our results are difficult to rationalize with theories in which firms insulate employees from firm-specific risks (Harris and Holmstrom (1982), Baily (1974), Thomas and Worrall (1988)), which predict that wages should exhibit downward rigidity in the presence of informational frictions or limited commitment.

Our paper contributes to the literature on non-base compensation beyond base pay.[5] Most studies focus on executive compensation.[6] Lemieux et al. (2009) and Gittleman and Pierce (2015) find contrasting results on whether the rise of performance pay jobs since the 1970s contributed to wage inequality. Grigsby et al. (2019) uses administrative payroll data to examine the rigidity of wage adjustments in base and non-base pay.[7] We supplement these studies by linking the magnitude and incidence of an employee's bonus to her job title, hierarchical status, and occupational skills, and by demonstrating that non-base pay more than base acts as a transmission mechanism for firm and industry shocks. We also show that bonuses contribute significantly more to income inequality than base pay.

Our work also relates to the literature on job hierarchy and wages. To our knowledge, we

[4]The returns to hierarchy even after controlling for employer and employee observables could also reflect rent extraction by more senior employees (Bebchuk and Fried (2006), Bebchuk et al. (2011)).

[5]Our measure of non-base compensation does not include indirect pecuniary benefits (health insurance, retirement contributions, etc.) or non-pecuniary benefits (on-the-job training, working remotely, etc.).

[6]See, for instance, Murphy (2013) or Edmans and Gabaix (2016) for a survey of the literature.

[7]Grigsby et al. (2019) measure non-base pay indirectly as commission or bonuses by examining the frequency and magnitude of residual earnings (earnings in sufficient excess of base pay and overtime accrual).

are amongst the first to examine this relation for non-base pay. Caliendo et al. (2015) and Bayer and Kuhn (2018) link wages and hierarchy in Manufacturing based on occupational assignments and the tasks, requirements, and autonomy of a job, respectively, while Buhai et al. (2014) uncovers a positive relation between wages and an employee's tenure at a firm relative to that of her peers. Mueller et al. (2017), who also assign hierarchy based on an employee's job title, examines within-firm inequality in base pay between senior and junior employees in the U.K. In contrast to these studies, we explore how hierarchy impacts the magnitude and composition (cash, stock, profit-sharing, sales commissions) of non-base pay, and compare hierarchical status to an employee's occupational skills and her role in the firm.

Our work is also related to the literature on firm-level determinants of wages. Currie and McConnell (1992) demonstrates that firm-specific outcomes, such as the sales- and labor-to-capital ratios, are important determinants of real wages, while Michelacci and Quadrini (2009) and Petrosky-Nadeau (2014) focus on the role of firm size and Dore and Zarutskie (2018) on leverage. Guiso et al. (2005) shows that Italian employers insulate employees from idiosyncratic firm shocks, and Makridis and Gittleman (2017) finds that total earnings are more sensitive to the business cycle for performance-pay compared with fixed-pay jobs. In contrast to these papers, we show that firms transmit firm and industry shocks to performance through bonuses more than base pay.[8]

2 Data Description

Our data comes from the online job platform Glassdoor, on which users can search for jobs, review employers, and report their salaries. Our focus is on six major U.S. industries — Business Services, Finance, Healthcare, Information Technology, Manufacturing, and Retail — into which salary reports are mapped based on employer. Salaries are submitted volun-

[8]Consistent with our findings, Efing et al. (2019) documents that bonuses at European banks absorbed both division and bank-level shocks during the recent financial crisis.

tarily and anonymously.[9] Figure 1 displays the prompt screen for submitting a salary report. A respondent is first asked for their job title, and to which year the salary corresponds. After entering their base pay, they are asked whether they received "bonuses, tips, or sales commission". Within this additional category, a respondent can fill in the amounts corresponding to cash bonuses, stock bonuses, profit-sharing, sales commission, and tips/gratuities. We ignore this last field and refer to the combination of the first four as "non-base" pay. In addition, respondents are asked for the following demographic information: gender, years of work experience, job location, job title, employment status, and the name of their employer.[10] We assign job titles to standard occupation categories (SOC) used by the Bureau of Labor Statistics through textual analysis.[11]

Salaries in our dataset span from January 2007 through February 2019 and are more heavily concentrated in later years as online labor markets gained popularity as a platform for job search. Most salaries in our dataset, about [55%], are from 2016-2018, compared to only about [7%] for 2007-2010. We limit the scope of our analysis to workers who are full-time, which reduces the effect that hours worked may have on non-base compensation, and who are not self-employed or work in the public sector.[12] For all analyses that use the magnitude of bonuses, we exclude salary reports that report earning less than 200 in any of the bonus categories to avoid ambiguity in units. We also exclude the top 0.01% of base pay (an effective upper bound of [$475,000]) and the top 0.02% of bonuses (an effective upper bound of [$1 million]). This is to avoid our results being driven by extreme outliers or reporting errors. For all analyses that use the incidence of bonuses, however, we do not incorporate these filters. This leaves us with a total of [1,630,400] unique salary reports

[9] Visitors to the website are incentivized to leave a salary report through a "give to get" policy, through which a user obtains access to more information on the website by contributing to its content.

[10] Although Glassdoor collects educational attainment for purposes beyond salary reports, workers are not prompted to submit it. We lump together those for whom education is unavailable into a single group.

[11] Job titles are assigned to an occupation category by first using a language processing algorithm that produces a one-to-one mapping between job title and occupation. We keep only those mappings which can be made with at least an 85% degree of confidence.

[12] This restriction removes part-time, contractual, seasonal, interns, and self-employed workers, which limits the differential impact that time spent among coworkers and management may have on non-base pay.

covering [101,602] unique employers, with [190,164] in the Finance industry, [327,826] in Business Services, [214,294] in Healthcare, [412,892] in IT, [221,830] in Manufacturing, and [263,394] in Retail. We standardize salaries using the CPI so that all salaries are reported in 2018 U.S. dollars.

We construct our measure of job hierarchy as follows. Using our metric for ranking job title-industry pairings, the median years of specific experience across workers with the same job title in the same industry, we group pairings into five disjoint bins: "entry" (median of 3 years or fewer), "low" (between 3 and 6 years), "medium" (between 6 and 9 years), "high" (between 9 and 12 years), and "senior" (more than 12 years). Across the six industries, [55–75%] of salaries correspond to jobs in the bottom two rungs along the corporate ladder, while between [0.2–5.8%] are correspond to the most senior bin. Roughly one-fifth of salaries within each industry are not assigned to a job hierarchy level.[13]

A key advantage of the Glassdoor salary data is that it decomposes compensation into base and non-base pay. Other surveys where workers detail their incomes often report only a single measure of total labor earnings and suffer from potential issues of under-reporting or top-coding. Since salary reports are submitted voluntarily and are not made public, individuals leaving a salary report have little incentive to misreport, and there is no censorship of the values that they enter.[14] Instead, issues of salience may be more relevant, as workers may not remember exactly how much, or in what form, they received a bonus, and there is no penalty for entering an incorrect value. Since such salience issues are not likely to be systematic, we see this bias as playing a limited role in influencing our results.

As with any self-reported information or survey dataset, there are also concerns of accuracy and precision. Salary estimates within our dataset are subject to rounding bias.

[13]When calculating the median years of experience across salaries within a job title-industry pairing, we exclude workers with no reported years of experience. We also leave unassigned job title-industry pairings with fewer than 20 salary reports containing positive years of work experience.

[14]While there is evidence that employers pressure employees to leave favorable reviews on Glassdoor, there is little reason to believe they pressure employees to distort salary reports. Persuading employees to overreport their salaries would disappoint new hires or dissatisfy current employees if new hires received inflated wages. Persuading employees to underreport could dissuade potential candidates from applying.

For base and non-base pay respectively, about [88%] and [70%] of salaries reported at the annual frequency are perfectly divisible by one thousand dollars. Given our emphasis on the incidence of non-base pay and its relative level across industries, job hierarchy levels and worker characteristics, the impact of this rounding bias should be systematic across all salary reports, and thus unlikely a major issue for our cross-section analysis.

Another potential issue with Glassdoor salary data is that it may not be representative of the six broader U.S. industries. Liu et al. (2017), for instance, shows that Glassdoor salary data match industry-specific first and second moments using the Quarterly Census of Employment and Wages (QCEW) and the Panel Study of Income Dynamics (PSID), but Glassdoor data oversample from those employed in Finance and other service industries. To address this concern, the top-panel for each industry of Figure 2 plots kernel density estimates of total pay from Glassdoor salary data alongside the Current Population Surveys (CPS) annual salaries in the Annual Social and Economic Supplement (ASEC) and the pre-tax wage and salary income from the American Community Survey (ACS). The bottom-panel for each industry of Figure 2 plots kernel density estimates of base pay from Glassdoor data against those constructed from the annualized weekly earnings of the CPS.

The distribution of Glassdoor salary data matches particularly well those of the three more common survey datasets. The Glassdoor data does appear, however, to oversample from the upper-middle ($75,000–$125,000) of the earnings distribution, and this oversampling appears to be particularly noticeable for Business Services and Manufacturing. Although a potential caveat for analysis, this oversampling helps alleviate concerns that survey respondents in our dataset are job seekers who, potentially because of selection bias, are either lower paid, lower quality, or have poor match quality. Taken together, Figure 2 provides reassurance that the inferences we draw from Glassdoor salary data are likely to be relevant for the six U.S. industries more broadly.

In addition to the salary data from Glassdoor, we collect firm characteristics on assets, liabilities, earnings, and stock returns from the COMPUSTAT annual dataset. To link firm

performance to individual salary reports, we assume that bonuses reported for a salary in year t are meant to capture performance and employment experience in year $t-1$. As such, each salary reported to 1-year lagged firm performance variables, e.g. an employee salary submitted for 2018 will be linked to her firms annual performance metrics from 2017. We exploit variation in firm performance to determine if employee bonuses respond to firm-specific shocks.

3 Non-Base Pay in Six U.S. Industries

In this section, we document three features of non-base pay in six U.S. industries. We first investigate the relative variability of non-base relative to base pay. We then explore the fraction of total compensation derived from bonuses across the corporate hierarchy. Finally, we study the cross-sectional distribution of bonuses within each of the six industries, both across employers and across employees.

Table 1 provides summary statistics about non-base compensation for employees in our sample. The share of employees that report receiving non-base pay varies across industries, ranging from [17.4%] and [30.5%] in Healthcare and Retail respectively, to [47.3%] and [55.1%] in IT and Finance, respectively. Conditional on receiving a bonus, the average non-base pay ranges from around [$12,000] in Healthcare and Retail, with standard deviations of [$21,700] and [$23,700], to averages of [$24,800] and [$30,500] in IT and Finance respectively, with standard deviations of about [$46,000]. The distributions of non-base pay are, consequently, highly right-skewed across the six industries. This is further evidenced by the means of the distributions being at least twice as large as the medians, and by the 90th percentile of workers earning substantially more than the 10th percentile. In levels, IT has the largest dispersion between the 90th and 10th percentiles at [$72,100] while Healthcare has the thinnest gap at [$27,700]. In ratios, however, Healthcare exhibits the largest dispersion with the top 10 percent of the distribution earning at least [56.4] times as much in

non-base pay as the bottom 10 percent.

Table 1 also displays analogous statistics on employee base pay for comparison. The average (standard deviation) of base pay varies from [$45,000 ($28,500)] in Retail and [$57,400 ($33,400)] in Healthcare, to [$70,100 ($36,600)] in Manufacturing and [$72,300 ($43,100)] in IT. Interestingly, while average base pay is much higher than average non-base, as one would expect, it has a comparable standard deviation, suggesting that bonuses are much more variable. Across industries, the average and standard deviation for both base and non-base pay are highest for Finance and IT and lowest for Healthcare and Retail.[15] Base pay also exhibits markedly less inequality than non-base pay, with the ratio of the 90th to the 10th percentile of the base-pay distribution falling between [3.8] and [4.4] across the six industries, an order of magnitude below those of non-base pay.

To further illustrate the inequality in bonuses, as compared to base pay, Figure 3 plots Lorenz curves for both base pay and non-base pay across the six industries. While base pay is closer to the 45-degree line (perfect equality) in all six plots, non-base pay is significantly more bowed, revealing that there is dramatically more inequality in non-base compensation.[16] For instance, the top 20% of employees receive over [60%] of total bonuses paid in Finance, IT and Manufacturing, and [50%] in Business Services, Healthcare, and Retail. In contrast, across the six industries, the top 20% of employees (as ranked according to base pay) earn only about [35%] of total base compensation. Interestingly, the Lorenz curves for base pay are almost identical whether we include all employees in an industry or restrict the sample to those that only earn base pay. This suggests that non-base does not substitute for base pay across employees, consistent with the findings of Grigsby et al. (2019). While Lemieux et al. (2009) emphasize the link between the incidence of performance-pay jobs and the rise

[15] A caveat for Healthcare is that we exclude self-employed workers. As such, our dataset does not contain physicians in private practices, who likely earn higher salaries.

[16] Our methodology for cleaning the data drops [97,848] salaries, and likely leads to an underestimation the degree of inequality in non-base pay. Excluding extreme outliers lessens the bow shape by dropping salaries that report extremely high bonuses. Excluding salary reports with non-annual bonuses and dropping observations reporting 200 or less likely excludes density from the middle of the non-base pay distribution (in particular, if the units for reporting 200 or less are in thousands).

in income inequality, our results suggest that it is specifically the bonuses these jobs pay that can explain this upward trend across the six industries we study.

To see that non-base pay is more variable, or less rigid, than base pay over time, Figure 4 reports the changes in nominal log base and log non-base pay for a subsample of employees who leave salary reports in two consecutive years for the same industry and geographic location.[17] This panel allows us to focus on wage rigidity by controlling for differences in unobserved employee, industry, and geographic characteristics. We further distinguish between employees who stay at the same and those who change employer but remain in the industry across the two years.

Figure 4 reveals that, on average, salaries increase across consecutive years in all industries, with the average (panel (a)) and standard deviation (panel (b)) of the increase being more pronounced for non-base than base compensation. While nominal base pay increases by an average of about [9 (12)] log points if an employee stays with (changes) employer, non-base pay increases by an average of about [21 (26)] log points across the six industries.[18] Across all six industries, the means and standard deviations of the log changes are substantially larger for non-base compared with base pay for employees that both stay with and switch employers. Perhaps surprisingly, conditional on the type of worker transition, a comparable share of employees across the six industries report no change across the two years in their non-base and base pay, exhibiting estimates that are consistent with the incidence rates seen in Fallick et al. (2016), although below the one-third for base pay found by Grigsby et al. (2019). For workers that remain with the same employer, [11–17%] ([10–14%]) report no change in their non-base (base) pay. This is somewhat above the rates of [7–13%] ([5–10%]) for workers that switch employers within the same relevant labor market (same industry and location).

[17] Although we report wage changes in nominal terms to be consistent with the literature, the patterns are qualitatively similar if instead we use real wages since annual inflation is low over our sample.

[18] Interestingly, the average growth in bonuses is largest when an employee switches employer within the Business Services and IT industries. This could reflect that these firms may use non-base pay in order to attract highly productive workers away from other employers.

Unlike base pay, non-base pay does not exhibit strong downward nominal rigidity (Figure 4, panel (d)).[19] Declines in nominal non-base pay across consecutive years are not uncommon for employees that switch firms [(27–45%)], or even for employees that remain at the same firm [(25–32%)]. In contrast, the respective shares for base pay are [(12–29%)] and [(6–10%)], respectively, as compared to 38% and 3.6% for salaried workers in Grigsby et al. (2019). While downward nominal rigidity in base pay would be consistent, for instance, with models of learning (Baily (1974), Harris and Holmstrom (1982)), limited commitment (Thomas and Worrall (1988)), or firm monopsony power in wage bargaining (Krugman (2018)), changes in non-base pay are more flexible and suggest a responsiveness to skill, luck, firm conditions, or industry shifts. Taken together, non-base is much more variable than base pay in the cross-section and time-series and exhibits significantly more inequality across employees.

We next explore the fraction of total employee compensation attributable to bonuses. Figure 5, Panel (a) plots the share of total compensation attributable to non-base pay for all six industries across the five job hierarchy ranks. Across all job hierarchy ranks, employees in Finance, followed by IT, rely the most on bonuses. As employees ascend the job ladder, a larger share of their compensation tends to stem from non-base pay, with a steeper gradient across hierarchy for Finance than the other five industries. Entry-level employees earn about [2–13%] of their total compensation from bonuses, depending on their industry. This share remains roughly flat until the employee reaches a more managerial role (high or senior), at which point [(7–18%) 14–27%] of total compensation for (high-) senior-level employees is paid out in the form of non-base pay.

Figure 5, Panel (b) plots the average share of total compensation from non-base pay conditional on receiving a bonus. Interestingly, once we condition on an employee receiving a bonus, the average share of non-base compensation from bonuses flattens across the corporate hierarchy, becoming relatively stable across the four lowest hierarchy groups. For entry level employees, the average conditional share can range from as low as [11%] in Manufacturing

[19]Grigsby et al. (2019) also find that bonuses fluctuate more than base pay using administrative payroll data. Since bonuses are given to only a fraction of workers in their sample, they also contribute to inequality.

to [25%] in IT. For the most senior employees, the average conditional share can range from [22%] in Healthcare to just over [30%] in Finance. This suggests that more senior employees are increasingly likely to receive a bonus, but, conditional on receiving a bonus, the magnitude of the bonus they receive relative to their base pay is comparable to that across the corporate hierarchy. Although this evidence of a higher incidence of bonuses is suggestive of large returns to ascending the corporate hierarchy, these patterns could reflect selection in that more productive employees are those that are also promoted and sort themselves into highly productive firms. In the next section, we return to this question when we investigate the returns to hierarchy after controlling for employee and employer characteristics.

In the last part of this section, we document differences in both the composition and incidence of bonuses that firms pay their workers. Table 1, for instance, provides summary statistics about what type(s) of bonuses an employee receives. These types are not exclusive, as an employee could, for instance, receive both cash and sales commission or stock. The most prevalent form of bonus across all industries is cash, with over [70%] of all employees reporting a bonus receiving cash. Within all industries excluding Manufacturing and IT, sales commission is the second most prevalent bonus ([12.1%] in Manufacturing to [27.4%] in Business Services), while for Manufacturing it is profit-sharing ([15.8%]) and for IT stock ([25.4%]). Stock bonuses and profit-sharing are, however, much less prevalent across the other four industries, with less than [10%] of employees receiving stock or profit-sharing as part of their bonuses.

While our incidence rates for the four types of bonuses are at the industry level, the composition of bonus packages likely varies across firms, especially for stock options and profit-sharing which are inherently tied to firm performance and growth. To investigate this issue, we calculate the share of workers within each firm that receive cash, stock, profit-sharing or sales commissions for firms in our dataset with at least 50 salaries. Taking a distribution across firms for each bonus type-industry pair, Table 2 displays the 1st, 50th,

75th, and 99th quantiles of these distributions.[20]

Consistent with our summary statistics, Table 2 reveals that cash is the most prevalent form of bonus across all quantiles of firms and all six industries. For instance, 75% of firms in Finance pay at most [62.7%] of their employees a cash bonus. Although that share reaches as low as [16.7%] for firms in Healthcare, the 75% percentile for the other three bonus types is markedly shallower at [1.4%] and below. Regarding stock, profit-sharing, and sales commission, there is noticeable skewness in the distribution of bonuses. While 75% of firms pay less than [5%] of their employees stock bonusesexcept for IT at [9.0%]the remaining 25% of firms pay up to [6.4%] (Healthcare) to [48.3%] (IT) of their employees stock. Similarly, while 75% of firms pay less than [3.2%] of their employees profit-sharing except for Manufacturing at [7.8%] the remaining 25% pay up to 9.5% (Healthcare) to 52.1% (Manufacturing). Similarly, except for Healthcare and Manufacturing, up to [14.5%] (Business Services) to [20.0%] (IT) of employees receive sales commissions at 75% of firms, whereas at most [29.7%] (Healthcare) to [57.2%] (Retail) receive sales commissions for the remaining 25% of firms. As such, even within industries, we observe substantial heterogeneity in the composition of bonuses, with a few firms in each industry offering bonuses other than cash to a considerably larger fraction of their employees.

To help understand what might explain the differences we observe in the composition of employee bonuses, Table 3 provides summary statistics and a breakdown of base and non-base pay, both incidence and amount, for a subset of job titles in each industry. Analyst, for instance, is an entry level position in Finance that has a [56%] incidence of bonuses, and employees with this tile receive, on average, [17%] of their total compensation in the form of non-base pay. Analysts earn, on average, [$34,000] in what is most likely a cash bonus and [$73,000] in base pay. Sales associate is an entry level position in Retail with a [16%] incidence of bonuses that earns, on average, [$27,000] in what is likely cash and sales

[20]Since our data only capture a subset of salaries at each firm, they likely under-sample the peak of the corporate hierarchy, i.e. c-suite positions. Thus, while many firms in our dataset exhibit zero incidence rates for some bonus types, these percentages are likely not exactly zero given the lack of complete firm coverage.

commissions and [$27,000] in base pay. In contrast, Senior Director is a senior level position that has at least a [69%] incidence of bonuses, which are most likely in cash and stock, and earns, on average, [$35,000 ($162,000)] in non-base (base) pay in Business Services, [$45,000 ($170,000)] in Healthcare, [$64,000 ($191,000)] in Retail, and [$68,000 ($192,000)] in IT.

Table 3 suggests that more client-oriented roles, such as Account Executives, Sales Associates, and Store Managers earn sales commissions, while more cognitive junior roles, such as Analysts and Patient Service Representatives appear to receive cash bonuses. Mortgage Loan Officers in Finance, for instance, receive [48%] of their total compensation in performance pay, almost entirely in the form of sales commission. Compensation also appears to shift from only cash to also including stock as an employee becomes more senior in the corporate hierarchy. Such a pattern is consistent with firms using stock to provide high-power incentives for high-skilled workers, or to aid in the retention of middle management talent, as in Oyer (2004) and Oyer and Schaefer (2005). While stock bonuses give an employee a vested interest in their employer, and thus incentivize retention, cash bonuses and sales commissions likely add to the portability of an employee when switching firms.

Table 3 also demonstrates that our methodology can capture clear career ladders within industries and assign the rungs of these ladders to different ranks. In Finance, for example, Assistant Vice President, Vice President and Senior Vice President are assigned to the medium, high and senior levels, respectively. Similarly, in Manufacturing, Engineer, Senior Engineer and Principal Engineer are assigned to low, medium and high levels, while, in Business Services, the titles of Account Director, Director and Senior Director are assigned to medium, high and senior levels, respectively. Our methodology of using job titles also enables us to capture subtleties in an employees relative seniority to that of her peers that other measures of skill or human capital, such as occupation or schooling, may miss. For instance, while Project Manager in IT, General Manager in Retail, and Nurse Manager in Healthcare would all be classified as managerial occupations, our methodology separates the first into the low and the latter two into the medium hierarchy ranking. In addition, the

high- and senior-level job titles in Table 3 have the highest concentrations of advanced-degree holders, while entry- and low-level job titles tend to have a non-trivial share of workers with post-bachelors degrees.[21]

Figure 6, which plots the average fraction of total employee compensation by type of bonus across job hierarchy levels, provides additional support for our hypothesis. As an employee becomes more senior, a larger (smaller) fraction of her bonus, on average, is in cash, stock, and profit-sharing (sales commissions). For instance, the fraction of compensation paid in bonuses in sales commission declines from [11–14%] for entry to [0.4–3.5%] for senior employees in Business Services, IT and Retail, while stock bonuses increase from [0.2% to 2.6%] for Business Services, [0.4% to 8.3%] for Retail, and [4.5% to 9.1%] for IT. Similarly, cash increases from [4.9%] for entry to [15.1%] for senior employees in Healthcare, while it increases from [6.1%] to [14.5%] in Manufacturing.

The five panels of Table 4 expand on non-base pay, and its four components, along two salient dimensions: hierarchy and gender. Although the most likely form of bonus compensation across all levels is cash, more junior employees are increasingly likely to receive sales commissions[13%] (Manufacturing) to [46%] (Retail) for entry level compared with 1% (Retail) to 10% (IT) for seniorwhile more senior employees are more likely to receive stock [2%] (Healthcare) to [19%] (IT) for entry level compared with [21%] (Healthcare) to [46%] (Retail) for senior. The bottom half of Panel A reveals that a senior employee receives, on average, from [$44,900] (Healthcare) to [$74,300] (Finance) in total bonuses, while an entry level employee receives, on average, from [$6,600] (Healthcare) to [$24,800] (IT). The gap between entry and senior within an industry ranges from as small as [$33,100] (or [57.1%] less) in IT to as large as [$56,300] (or [75.7%] less) in Finance. Across all four sub-components of non-base pay, compensation increases monotonically along the job hierarchy ladder, with senior employees earning 4-to-5 times as much as entry level ones, differences

[21]Our ranking by job titles is, however, not perfect. While Process Engineer and Engineer in Manufacturing, for instance, earn similar base and non-base pay, and have similar demographic and bonus type decompositions, the former is assigned to the entry and the latter to the low hierarchy rankings, respectively.

that are statistically significant at the 1% level.

Regarding gender, the top half of Table 4, Panel (a) shows that a larger fraction of men than women in our sample received bonuses, with gaps ranging from as low as [6] percentage points in IT to [12] percentage points in Finance.[22] In addition, average overall non-base pay is lower for women, ranging from [$3,500] less than men in Manufacturing to [$10,600] less in Finance. The differences in both incidence and magnitude are statistically significant at the 1% confidence level. Although the incidence of receiving cash or sales commission is comparable across genders, men are [2–8] percentage points more likely to receive stock across industries, and [2–4] percentage points more likely to receive profit-sharing across industries. Women tend to receive a smaller bonus in all four categorieswith the largest gaps in average cash ($2,100 in Manufacturing to $8,000 in Finance) and sales commissions ($5,700 in Business Services to $13,400 in Finance). These differences could reflect, in part, selection into the types of occupations men and women choose to pursue as well as compositional differences in worker observables such as age, education, and human capital, an issue we address in the next section when we implement regressions on non-base pay controlling for an employees observable characteristics.

Our summary analysis identifies several features of employee compensation across the six U.S. industries we study. First, there is significantly more cross-sectional and time-series variation in non-base than base pay, both within and across industries, and non-base pay contributes substantially more to income inequality. Second, as an employee becomes more senior, she is more likely to receive a bonus, but, conditional on receiving a bonus, a relatively stable but sizeable fraction of her total compensation is in non-base pay. Third, there are significant differences in the composition and magnitude of bonus an employee receives. Across industries, cash is more prevalent in Finance, Healthcare, and Manufacturing, stock bonuses in IT, profit-sharing in Business Services and Manufacturing, and sales commissions

[22]While the gender pay gap in overall wages has received significant attention in the literature, for instance in Altonji and Blank (1999) and (Bertrand et al. (2010)), the intensive and extensive margins of non-base pay have yet to be fully explored.

in Business Services, IT, and Retail. Within industries, there is a pronounced hierarchy gap between entry-level and senior employees, with more junior employees receiving smaller bonuses in cash and sales commission, and more senior employees receiving large bonuses in both cash and stock. There is also a gender gap in non-base compensation, both in magnitude and composition, with women receiving smaller bonuses than men that are less concentrated in stock options and profit-sharing.

These three patterns illustrate the importance of non-base compensation in these six U.S. industries, and how it is different from base pay. In addition, it provides some evidence on the role of bonuses. For instance, the extensive margins of cash, stock, and sales commission bonuses are consistent with firms providing incentives for workers to outperform, such as in the presence of moral hazard. Junior level employees (e.g. mortgage loan officers in Finance), who have more client-oriented sales roles and little personal impact on their firm's operations, are incentivized through "skin-in-the-game" incentives in the form of sales commissions. Senior employees (e.g. senior directors), in contrast, who perform in managerial and material decision-making roles, are incentivized to align their interests with their employers' through equity stakes in their firm.

4 Skills, Hierarchy and Non-Base Compensation

In this section, we examine the extent to which an individual's skills and position along the corporate hierarchy can explain the cross-sectional dispersion in non-base pay within the six U.S. industries we study. To explore the role of hierarchy, we regress an employee's total log non-base compensation on a dummy variable for the hierarchical standing of her job title, as well as dummies for educational attainment, gender, and a quadratic in years of specific experience. We include a rich set of controls (year, state, occupation, and employer fixed effects), and cluster standard errors by employer. Since an occupation determines an employee's role and skill requirements, by controlling for occupation, our empirical estimates

for the returns to ascending the corporate hierarchy reflect non-wage premiums beyond the function of an employee's position. Our regression specification, implemented separately for each industry, is:

$$nbp_{ijkst} = \alpha + \beta_i X_i + \lambda_k + \lambda_{g(j)} + \lambda_t + \beta_H \mathbb{1}\{h(j,s) = H\} + \epsilon_{ijkst} \quad (1)$$

where nbp_{ijkst} is the inflation-adjusted log non-base pay of employee i with job title j at firm k in industry s in year t, X_i the set of worker observables, $g(j)$ the occupation associated with job title j, $h(j,s)$ the hierarchy ranking associated with job title j in industry s, and ϵ_{ijkst} an error term.

Consistent with the summary statistics in Table 1, Table 5 reveals that senior employees receive a meteoric non-wage premium relative to entry-level employees and the rest of the corporate hierarchy. After controlling for a worker's occupation and differences across firms, which can explain between 43% (Retail) and 65% (Healthcare) of the total variation in non-base pay, Table 6 demonstrates a pronounced, statistically significant upward sloping profile in non-base pay across hierarchy in all six industries. Retail and Healthcare, all else equal, pay senior employees the most relative to their entry level counterparts ([920] and [415] percentage points, respectively). In Manufacturing, the gap between entry and senior employees is [288] percentage points, while for Finance it is [240], Business Services [224], and IT, a more modest gap of [147]. Importantly, these hierarchy gaps survive even after controlling for an employee's years of specific work experience, educational attainment, occupational skill requirements, and differences in firm productivity.

As for other worker characteristics, there is a pronounced gender gap in overall non-base pay of [18.7–27.6] percentage points across the six industries, even after controlling for differences in education, experience, location, occupation and employer. Interestingly, this gap is significantly larger than that found from running analogous regressions for base pay (results not reported), which ranges from [4.8–6.5] percentage points less. There is

also an education premium since workers with less (more) than a bachelor's degree earning a significantly negative (positive) premium in non-base pay. The wedges across levels of educational attainment likely reflect differences in unobserved skill and match quality. In addition, non-base pay has a steep, yet concave (negative quadratic term not shown) relation in years of specific experience, illustrating that there are indeed marked, albeit decreasing returns to on-the-job skills and knowledge in performance pay.

One may be concerned that an employee's hierarchy predicts bonuses only because it a noisy proxy for her tenure at the firm, which has been shown to be a significant predictor of wages (Buhai et al. (2014), Lemieux et al. (2009)). To address this concern, we focus on a subsample of employees in our dataset for which their years employed at their firm are available.[23] Table 6 re-estimates our hierarchy-based regression specification but now includes dummy variables for an employee's tenure (3–5, 6–10, and 10+ years), with 0–2 years as the baseline.[24] Interestingly, while there is no statistically significant relation between bonuses and tenure in Manufacturing, bonuses are increasing in tenure for Finance, Business Services, and Retail, but surprisingly decreasing for Healthcare and IT. Importantly, our hierarchy fixed effects maintain similar magnitudes and statistical significance to our baseline regressions in Table 5, suggesting that job hierarchy is a distinct characteristic in an employee's profile from her tenure.

To motivate the role of skills in determining bonuses, we first match each employee's self-reported job title to an O*NET-SOC occupation classification. We then incorporate the skill requirement metrics used in Acemoglu and Autor (2011), which capture the tasks for which an occupation is responsible. These task requirements are decomposed into five classification indices following their definitions: "routine, cognitive", "routine manual", "non-routine,

[23]Information regarding an employee's tenure is not included in a salary report. Instead, a worker is asked to submit her years of employment at her firm when submitting an employer review on Glassdoor. Our sample for exploiting the returns to tenure is therefore limited to workers whom submit both a salary report and an employer review for the same firm in the same year.

[24]We do not include employer fixed effects because of the relatively thin sample sizes. Instead, we include employer type (public, private, non-profit, hospital or subsidiary) as a proxy for employer fixed effects but continue to cluster standard errors by employer.

cognitive analytic", "non-routine, cognitive interpersonal", and "non-routine, manual interpersonal." Routine tasks correspond to tasks that can be completed by following explicit rules, while non-routine tasks relate to problem-solving and complex communication activities. Manual tasks are physical tasks with concrete requirements, while cognitive tasks are abstract and require, in the language of Acemoglu and Autor (2011), "problem-solving, intuition, persuasion, and creativity."

To test the importance of skill requirements for bonus compensation, we regress these skill metrics on log base and non-base pay for each of the six industries, incorporating state, year, educational attainment cross gender, and employer fixed effects, as well as a quadratic in years of specific experience cross gender. Table 7 reports the results from implementing these regressions:

$$(n)bp_{igkt} = \alpha + \beta_i X_i + \lambda_k + \lambda_t + \beta_\sigma z_\sigma(m_\sigma(g)) + \epsilon_{igkt} \tag{2}$$

where $(n)bp_igkt$ is the inflation-adjusted log (non-)base pay of employee i with occupation g at firm k in year t, X_i the set of worker observables, $m_\sigma(g)$ is the skill intensity of skill-type σ for occupation g, $z_\sigma(\cdot)$ is the standardized z-score for the distribution of skill intensities for skill-type σ across occupations, and ϵ is an error term.

Interestingly, occupations intense in non-routine interpersonal skills garner the highest reward for non-base pay across all six industries. Employees in occupations with non-routine, manual interpersonal skills have the highest skill premium, earning from [16.0] percentage points more in real bonuses per standard deviation on the skill index in IT to [24.0] more in Business Services.[25] Examples of such jobs include Communications Managers in Business Services and Finance, Mental Health Professionals in Healthcare, and Social Media Managers in Retail. This is followed by non-routine, cognitive interpersonal skills, which instead earn a premium from [5.4] percentage points (Finance) to [20.7] percentage points (Healthcare) in bonuses per standard deviation on the skill index. Examples of such jobs include Hu-

[25]We omit from the discussion regression coefficients that are statistically insignificant below the 5% level.

man Resources Managers / Generalists in Finance, Healthcare, Manufacturing, and Retail and Learning Consultants in IT. In contrast, occupations that are increasingly intensive in non-routine, cognitive analytic skills, such as Marketing Coordinators in Business Services, Finance and Healthcare or Product Specialists in Manufacturing and Retail, receive, on average, smaller bonuses, earning a discount ranging from [–8.7] (Manufacturing) to [–23.8] percentage points (IT) per standard deviation on the skill index. Similarly, occupations that are more intensive in routine skills receive smaller bonuses. Routine, cognitive skills correspond to [–6.2] (Manufacturing) to [–23.3] (Healthcare) percentage points and routine, manual skills to [–6.7] (Business Services) to [–21.3] (Manufacturing) percentage points less in bonuses per standard deviation on the skill index. These correlations between skills and bonuses appear consistent across all six industries.

While bonuses reward occupations that are more intense in interpersonal skills and discount those that are more routine or cognitive non-routine, base pay does not demonstrate a similar pattern, nor is its relation to skills consistent across industries.[26] Occupations that are characterized by both non-routine, cognitive interpersonal skills and non-routine, cognitive analytic tasks earn higher base pay, while it is less clear that "non-routine, manual interpersonal" does as well. A "non-routine, cognitive interpersonal" occupation, for instance, earns between [5.6] (Retail) to [10.0] (IT) percentage points more in base pay per standard deviation on the skill metric, while occupations that more skill-intensive in non-routine, cognitive analytic tasks earn a premium ranging from [3.4] (Finance) to [8.9] (Manufacturing) percentage points in base pay per standard deviation of the skill index. In contrast to bonuses, non-routine, manual interpersonal occupations tend to earn a premium in base pay in Business Services, Healthcare and Manufacturing, but a discount in Finance and IT. In addition, routine, manual skills earn a positive return in base pay across all industries except Manufacturing, earning [3.3] (Retail) to [9.4] (Finance) percentage points more per standard deviation.

[26]Two exceptions are occupations with "cognitive" tasks and "routine, manual" (outside of Manufacturing), which earn higher base pay across all six industries.

The bottom panel of Table 7 relates occupational skill requirements to the incidence of non-base pay from a linear probability model.[27] Similar to the magnitude of non-base pay, occupations intensive in non-routine, interpersonal skills tend to have a higher likelihood of receiving non-base pay across the six industries. A one standard deviation increase in the non-routine, cognitive interpersonal skill index raises the probability of receiving a bonus by [1.2] (Manufacturing) to [4.1] (Healthcare) percentage points, while for the non-routine, cognitive manual skill index, a one standard deviation increase raises the likelihood from [1.5] (Finance) to [5.2] (IT) percentage points.[28] In contrast, occupations that require more "routine" or "non-routine, cognitive analytic" (except in Retail) skills are less likely to receive bonuses. A one standard deviation rise in the routineness of a job reduces the probability of earning non-base pay by as much as [2.3] percentage points (Business Services) for the "routine, cognitive" index and [5.4] percentage points (IT) for the "routine, manual" index. That routine jobs are significantly less likely to receive non-base compensation than non-routine might reflect that there is less uncertainty in, or in measuring, their output, and therefore it less necessary to reward their performance. Since such jobs are also increasingly automatable, it could also reflect that the opportunity cost of a routine employee is a machine that has a fixed marginal product.

Taken together, our analysis suggests that occupations that require interpersonal skills, which tend to be more managerial roles, are more likely to receive bonuses and earn both higher base and non-base pay. In contrast, routine and even non-routine analytical occupations instead earn higher base pay but both lower a bonus and a lower likelihood of receiving a bonus. This could reflect, for instance, that managerial roles are more senior or have a higher marginal product for a firm, and/or that they require more variable pay incentives to exert effort to outperform in their roles. Importantly, since occupations map directly to skills, that our hierarchy dummy variables are statistically significant with occupation fixed

[27]Lemieux et al. (2009) also examine the relation between occupation and the incidence of performance pay using dummies for the 1-digit occupation codes from the PSID.

[28]These ranges exclude IT for non-routine, cognitive interpersonal for which there is no effect and Healthcare for non-routine, manual interpersonal for which we see a small negative effect of [1.1] percentage points.

effects reveals that the returns to hierarchy are distinct from the returns to skill.

While an employee's occupation serves as a coarse categorization of her skills and the tasks she performs, the Glassdoor dataset provides us with a more granular measure: an employee's job title. To demonstrate the importance of individual (and traditionally unobserved to the econometrician) productivity for non-base compensation, we regress inflation-adjusted non-base pay on our control variables from our hierarchy regressions (5), but incorporate job title fixed effects instead of occupation fixed effects, and add an additional skill measure, specifically an employee's base pay relative to the average within her job title-year.[29] While controlling for an employee's job title captures differences in roles and ability across different titles, incorporating an employee's base pay relative to her job title-year's average should reflect unobserved differences within her title since employees paid more in base pay relative to their peers are likely to be more productive. The empirical specification, for which the results across industries are shown in 8, is thus:

$$nbp_{ijkt} = \alpha + \beta_i X_i + \lambda_k + \lambda_j + \lambda_t + \gamma(bp_{ijkt} - \overline{bp_{jt}}) + \epsilon_{ijkt} \tag{3}$$

where $(n)bp_{ijkt}$ is the inflation-adjusted log (non-)base pay of employee i with job title j at firm k in year t and $\overline{bp_{jt}}$ is the average base pay for job title j in year t.

Table 8 reveals that, compared with the hierarchy regressions in Table 5, accounting for these two additional measures of skill adds considerable explanatory power in explaining non-base compensation, raising the R^2 of the regressions by about 10 percentage points across all industries. Also, our measure of skill within a job title is both economically and statistically significant, suggesting that, consistent with Grigsby et al. (2019), base and non-base pay are complementary in rewarding higher skilled employees. Specifically, a 1% increase in an employee's base pay relative to her job title-year average corresponds to an average premium on non-base pay between [0.83%] (Business Services) and [1.19%] (IT). Also striking is that including job title fixed effects and relative base pay also attenuates

[29]Since job titles map into occupations, incorporating occupation fixed effects as well would be redundant.

the role for our control variables. Noticeably, there is now an insignificant discount for having less than a college degree, although there is still a premium in bonuses for holding an advanced degree. The slope in years of experience attenuates between [52–76%] across the six industries, suggesting that work experience, in part, proxies for an employee's position in her firm, with jobs associated with more work experience requiring more human capital and ability. In addition, the gender gap is lessened by [29–44%] but remains economically and statistically significant at a level above [11] percentage points in all six industries, compared to about 4 percentage points in analogous regressions for base pay (results not reported). This suggests that differences in skills and tasks between men and women can help explain some of the gap in non-base pay, however, even within identical roles in the same firms, there still exists a considerable gender gap.

We next examine the variation in non-base and base compensation within job titles. To do this, we construct three indices of an employee's inflation-adjusted compensation, which we label "within", "across", and "between" employee pay indices. The first "within" measure for an employee is the average (non-)base compensation among all other employees with the same job title at the same firm. The "across" measure for an employee is the average (non-)base compensation of all employees with the same job title excluding that employee's firm. The "between" measure for an employee is the average (non-)base compensation of all employees within the employee's firm excluding employees at the firm with that job title. We standardize these three metrics as well as employee (non-)base pay to z-scores assuming a normal distribution (zero-mean and unit variance).

If an employee's individual performance determines her non-base compensation, as one might expect given that non-base pay is used synonymously with performance pay, her bonuses would be either unrelated or negatively related to those of other employees in similar roles. A negative relation for the "within" or "across" measures would be evidence of rank-tournament incentives, such as in Lazear and Rosen (1981), in which relative performance within the firm matters. A lack of a relation would be consistent with optimal contracting, in

which a worker is paid for outcomes within her control and insured against job title-specific risk.[30] A positive relation would instead suggest, for instance, that employee (non-)base compensation is: (i) benchmarked or determined by the job rather than the employee (Baker (1992), Holmstrom and Milgrom (1991)), (ii) insured at the job or firm-level (Baily (1974)), and/or (iii) is determined based on team or business unit performance (Holmstrom (1982)).

In 9, we regress base pay, non-base pay, and the incidence of non-base pay according to a linear probability model, on the "within", "between" and "across" measures. We include controls for gender, educational attainment, years of specific human capital, time and location, and cluster standard errors by employer. Our empirical specification is:

$$z(x_{ijkst}) = \alpha\ (+\beta_i X_i + \lambda_k + \lambda_j + \lambda_t) + \beta_w z(\overline{x_{sjk}}) + \beta_a z(\overline{x_{sj-k}}) + \beta_b z(\overline{x_{s-jk}}) + \epsilon_{ijkst} \qquad (4)$$

where x_{ijkst} is inflation-adjusted (non-)base pay, $z(\cdot)$ is the z-score function for a normal distribution, β_w captures the value of the "within" measure in predicting compensation, β_a the "across" measure and β_b the "between" measure.[31]

All three measures are statistically significant—except for the "between" measure for non-base in several industries—and often economically meaningful. A striking observation from the first column of each panel is that not only are base pay, non-base pay, and the incidence of non-base pay highly correlated among employees that have the same job title at the same firm, but this "within" measure alone can explain a significant amount of the variation in these three variables, consistent with worker equity within a firm determining their compensation ((Bewley (1995)). Knowing only the average base pay among an employee's peers (same job title and firm) can explain between [82%] (Manufacturing) and [89%] (Business Services and Healthcare) of the variation in base pay, predicting that a 1

[30]Since a positive relation could arise because of a correlation within a job title or firm in unobservable worker characteristics (e.g. individual motivation), we later add employer and job title fixed effects for robustness.

[31]For the incidence of non-base pay, the dependent variable is an indicator for earning non-base pay and the "across, between, and within" measures are the share of workers within the respective categories rather than z-scores.

standard deviation increase in base pay among an employee's peers augments her base pay by [0.85] (Manufacturing) to [1.0] (Business Services) standard deviation.[32] Notably, and perhaps surprisingly, a similar story arises for non-base pay. The average bonuses among an employee's peers (same job title and firm) can explain between [54%] (Manufacturing) and [65%] (Healthcare) of the variation in non-base pay, predicting that a 1 standard deviation increase in bonuses among an employee's peers raises her own bonuses by [0.62] (Manufacturing) to [0.73] (Finance) standard deviation.

With respect to the extensive margin, the first column of the middle panel of Table 9 highlights that receiving performance pay depends significantly on an employee's job title and firm. Under a simple linear probability model, knowing the share of workers within the same job title-firm that earn a bonus can explain between [19%] (Manufacturing) and [36%] (Business Services) of the variation in receiving performance pay. The "within" metric suggests that a 1 percentage point increase in the share of an employee's peers (same job title and firm) that earns a bonus raises the probability that she herself earns a bonus by [0.76] (Manufacturing) to [0.90] (Business Services) percentage point. These results suggest that across all six industries, benchmarking exists not only in base compensation, but in the incidence and magnitude of employee bonuses as well.

Since the strong, positive relations we find may simply be proxying for persistent differences in compensation practices across job titles, which we know are present based on our hierarchy and skills results (Tables 5 and 7), and/or employers, we include job title and employer fixed effects, as well as worker observables, for robustness in Column 2 of each panel. Column 2 demonstrates that most of our results are statistically robust to the inclusion of these additional controls, except for the incidence (magnitude) of non-base pay for Manufacturing (Healthcare). Although the additional controls do attenuate the correlations of base pay, non-base pay and the incidence of non-base pay with the "within" measure, they add only marginal explanatory power and most correlations remain economically significant. For

[32]Since both the independent and dependent variables are z-scores, the linear regression coefficient is the correlation between the two variables.

instance, the correlations with the "within" measure remain strongly positive for base pay (ranging from [0.51] (Manufacturing) to [0.74] (Business Services) increase per standard deviation for base pay, [0.11] (Healthcare) to [0.54] (Retail) percentage point for the incidence of non-base pay (excluding Manufacturing), and [0.22] (Manufacturing) to [0.53] (Retail) increase per standard deviation for the magnitude of non-base pay (excluding Healthcare). As such, even with the additional controls, our results still reveal a robust relation between employees' compensation within a firm and job title.

While Column 2 of each panel of Table 9 provides evidence that the "within" measure is important for explaining variation in individual (non-)base compensation, the fixed effects approach limits our ability to draw inferences about how these two characteristics, job title and employer, influence base and non-base pay. To examine the role of these two characteristics, Column 3 in each panel replaces the job title and employer fixed effects with the "across" and "between" indices. The "across" measure is meant to reflect industry-wide pressure on bonuses within a job title, while the "between" measure should capture pressure that is firm-specific across job titles. Replacing the fixed effects from Column 2 with these two measures has little effect on the R^2 of the regressions.

The "between" and "across" measures have the most significant correlation with the incidence of non-base pay, ranging from [.153] and [.164] in Retail to [.346] and [.357] in Manufacturing, respectively, suggesting that there are norms both within firms and within industries for offering employees bonuses. As for the magnitudes of base and non-base pay, the "across" measure is economically and statistically significant across all industries, suggesting that job titles have a similar significance across firms within an industry. For non-base pay, specifically, a one standard deviation increase in the average non-base pay for all employees with the same job title outside an employee's firm raises her own bonus by [.014] (Business Services) to [.087] (Healthcare) standard deviation. The "between" measure for non-base pay on the other hand, while statistically significant for some industries, is quantitatively smaller, ranging from [.003] to [0.010]. The relative unimportance of the

"between" index suggests that an employee's job title is more indicative of one's bonus than her employer or her observable characteristics.

Finally, we examine the total variance of non-base compensation across job titles within an industry. To do this, we first calculate the variance of total bonuses for all employees that report earning a bonus within a job title-industry-year triple. For each industry, we then regress these job title-industryyear specific variances onto the five O*NET skills from Table **??** and a linear time trend, according to the following specification:

$$Var(nbp_{jst}) = \alpha \ (+\lambda_j) + \beta_t t + z_\sigma(m_\sigma(g)) + \epsilon_{jst} \tag{5}$$

The upper (lower) panel of Table 10 reports the results from the regressions on total variance in bonuses excluding (including) job title fixed effects. Job titles with relatively more non-routine, cognitive tasks appear to have lower bonus variances. Non-routine, cognitive analytic jobs in Business Services, Manufacturing and Retail have statistically significant lower bonus variances, although such jobs in IT have a higher variance. Similarly, jobs that are more intensive in non-routine, cognitive interpersonal responsibilities have statistically significant lower bonus variances in Finance, IT and Manufacturing. There is also evidence, in Finance and Manufacturing, that non-routine, manual interpersonal jobs instead have higher variances in their bonuses. Taken together, the upper panel of Table 10 suggests that non-routine jobs that involve abstract thinking, such as engineers and marketers, have lower variance in their bonuses, while non-routine jobs that are more managerial have a higher variance.

Our results reveal that there are returns in non-base pay to both hierarchy and skill, as measured by O*NET skill indices, job titles and relative base pay compared with one's peers. Such a steep incline in bonuses as an employee ascends the corporate hierarchy is, for instance, consistent with the role of career concerns (Gibbs (1995)), or with employer uncertainty about an employee's type resolving as an employee is awarded for positive per-

formance through promotions (as in Holmstrom and Costa (1986)). That certain skills also earn higher bonuses, as proxied for by both O*NET skills requirements and job title, reveals that employers pay workers with similar skills and task assignments comparable base and non-base compensation.

In addition, the cross-sectional variability of bonuses within a job title is also related to the skills and tasks of that position. Our results suggest that compensation for a position strongly tracks firm and industry standards. That employee characteristics beyond job title have only incremental explanatory power for base and non-base pay, as well as its incidence, could also be consistent with firms caring about equity across similar employees (Bewley (1995)), or with firms paying based on the job rather than the employee (Baker (1992), Holmstrom and Milgrom (1991), Shimer (2005)). That a significant fraction of non-base pay and its incidence across the six industries is still driven by non-observables, however, suggests some scope for bonuses to reflect individual performance or luck.

5 Firm Performance and Non-Base Compensation

In this section, we explore whether employee bonuses respond to firm- and industry-level shocks. Our hypothesis is that, since non-base pay is more variable in the cross-section and flexible across years than base pay, it could respond more readily to both persistent differences and unexpected changes in firm productivity. We begin with persistent differences in firm productivity.

Persistent differences in firm productivity should produce greater match surpluses between a firm and its employees, which if passed on to the employees, should lead to level differences in the average labor compensation paid out across firms. In a regression framework, including a fixed effect for each employer would capture these productivity gaps. In Figure 7, we plot the employer fixed effects $\hat{\lambda}_j$ from (separate) regressions for log base and

non-base pay according to:

$$(n)bp_{ijkt} = \alpha + \beta_i X_i + \lambda_t + \lambda_j + \epsilon_{igkt}, \tag{6}$$

where X_i controls for worker observables including education, gender, state, and a quadratic in years of specific experience. Figure 7 demonstrates a clear, positive relation: Employers that pay offer greater base pay on average tend to pay higher non-base pay on average, with the relation being strongest (elasticity statistically greater than 1) in Manufacturing, IT, Finance and Retail. As such, bonuses and base pay are complements at the firm level in employee compensation, which may point to positive assortative matching between firms and workers, as stipulated in Song et al. (2018). Importantly, the steep slopes for these four industriesranging from [1.4] (Retail) to [1.8] (Manufacturing) percentage points on non-base pay per percentage point on base payreveals that persistent differences in employer productivities can translate into larger differences in bonuses than in base pay.

To assess whether (non-)base compensation responds to more transient shocks in firm performance, such as in Holmstrom (1982) for teams, we examine how bonuses respond to several measures of firm performance at an annual frequency: sales to lagged assets ratio, as studied in Currie and McConnell (1992), earnings before income, taxes, depreciation and amortization (EBITDA), average earnings per share (EPS), and annual stock returns. Since these performance metrics are measured at the end of the fiscal year, we link salary reports for year t to firm performance in year $t-1$. To account for the role of financial frictions in limiting firm risk-sharing capacity, we also include a firm's log assets, as featured in Michelacci and Quadrini (2009) and Petrosky-Nadeau (2014), and the log leverage ratio (log debt-to-assets), as investigated in Dore and Zarutskie (2018).

We match employees with public employers in COMPUSTAT using the employer names in Glassdoor salary data and linking those names to COMPUSTAT names using a textual matching algorithm. This provides each (matched) employer in our dataset with an unique

GVKEY identifier with which we can pull annual firm performance data from COMPUSTAT. Among the total sample of salary reports that report earning bonuses within each industry, our matched sample covers roughly [10%] of Business Services, [14%] Healthcare, [29%] Manufacturing, [33%] Retail and IT, and [63%] Finance. We normalize the performance metrics into z-scores for each year within each industry. We include gender x a quadratic in years of specific experience as a control, as well as education x gender, year, state and job title fixed effects, and cluster standard errors by employer. Given our focus on firm characteristics and our short sample period, we do not include employer fixed effects. Instead, we include the log total employment at each firm, which is collected by Glassdoor, and a vector of the firm fixed effects from our regression specifications used in producing Figure 7. For the non-base pay regressions, we include the base pay fixed effects, and vice-versa.[33] To the extent that employer fixed effects are intended to capture non-transitory differences in firm productivities, using the estimated fixed effects for the other form of compensation allows us to account for firm productivity differences that go beyond annual performance without removing excessive variation in employee pay.

Table 11 reports our regression results of real base and non-base pay on employer performance using our four performance metrics. We restrict our sample for base pay to only workers who earn a bonus. Of those we consider, an employer's annual stock return and sales to assets ratio have an economically and statistically significant positive impact on bonuses in IT, Manufacturing, and Retail, while there are attenuated, mostly insignificant responses in base pay. A one standard deviation increase in a firm's past stock return (sales to asset ratio) increases bonuses by [3.3 (15.1)], [4.8 (18.8)], and [3.5 (18.3)] percentage points in IT, Manufacturing and Retail, respectively. In contrast to these three industries, a higher sales-to-asset ratio actually lowers bonuses in Business Services by [8.2] percentage points.

[33]From Figure 7, there is a clear positive and significant correlation between the employer fixed effects that we estimate separately for base and non-base pay. Admittedly, the employer fixed effects for base (non-base) pay proxy better for the employer fixed effects of non-base (base) pay for Retail, Finance, Manufacturing and IT — with R^2 between [0.14] and [0.22]— than for Business Services and Healthcarewith R^2 of [0.03] and [0.04], respectively.

EBITDA has an economically and statistically significant positive impact on bonuses in Finance and Healthcare, [11.2] and [14.5] percentage points per standard deviation, respectively, while a higher average EPS appears to increase bonuses only within Finance, adding [5.1] percentage points per standard deviation.

In addition to the annual performance metrics, the firm characteristic controls also help explain bonuses more than base pay. A one standard deviation increase in a firm's log assets is associated with an economically and statistically significant boost to bonuses in IT, Manufacturing and Retail, while the impact on base is more muted. Interestingly, while employers with more assets pays higher bonuses, consistent with Michelacci and Quadrini (2009), employers with larger workforces pay lower bonuses in all industries except Healthcare, which may reflect a lower marginal product of labor for the average worker in larger firms.

Finally, to see how non-base compensation reacts to industry shocks, we plot in Figure 8 the industry-specific year fixed effects from 2007 to 2019 (relative to 2008) recovered from regressing real non-base and base pay on gender x quadratic in years of specific experience, as well as gender x education, O*NET-SOC major occupation code, state, job hierarchy rank, and employer fixed effects.[34] While Business Services, Healthcare, and Retail did not experience any noticeable industry shock to employee compensation since the Global Financial Crisis, Finance, IT, and Manufacturing did. Both base pay and bonuses declined in Finance after the financial crisis but, while base pay recovered in real terms, bonuses remain depressed ([–16] percentage points as of 2018). In contrast, while base fell and recovered in Manufacturing, bonuses have grown since the financial crisis by about [20] percentage points as of 2018. Similarly, while IT has seen a modest increase in base pay since 2008, bonuses have grown dramatically ([38] percentage points as of 2018).

From Figure 8, it appears that while Finance suffered a negative industry shock, IT and Manufacturing experienced positive shocks. To understand further how these shocks

[34]Major occupations codes (of which there are 23) are used instead of the six-digit occupation codes (of which there are 474) because of relatively thin sample sizes in the earlier years of our sample. These specifications still explain between [40%] (Retail) and [59%] (Healthcare) of the total variation in bonuses.

impacted non-base compensation, we aggregate employees into two disjoint hierarchy groupings: (i) entry, low, and medium ranked job titles, and (ii) high and senior ranked job titles. Figure 9 plots the year fixed effects for the two groupings from implementing identical regressions to those used to produce Figure 8 but replacing the year fixed effects with year x aggregated hierarchy grouping fixed effects. Interestingly, it appears that employees across all hierarchy levels in Finance experienced the negative shock to bonuses as Dodd-Frank and more intense regulation limited both the profitability of the industry and its ability to pay bonuses.[35] Similarly, the booms in bonuses in IT and Manufacturing in the mid-2010s raised bonuses for both the less and more senior employees. Consequently, both negative (Finance) and positive (IT, Manufacturing) industry shocks pass through to bonuses across the corporate hierarchy. These industry shocks to bonuses could, for instance, reflect changes in the composition of the workforce or an erosion/entrenchment of industry rents.

Taken together, our results suggest that employers pass through persistent, temporary, and industry-wide productivity shocks to employees through non-base compensation. Our employer fixed effects analysis reveals that firms with higher persistent productivity pay both higher base and non-base compensation, with a higher differential in non-base for four of the six industries. The positive relation between bonuses and sales-to-assets and stock performance in three industries, EBITDA in two industries, and average EPS in Finance, suggests that firms do reward employees for more transitory, idiosyncratic positive performance. That non-base pay moves positively with performance suggests that it act as a hedge for firms, while more rigid base pay acts as leverage, which is consistent, for instance, with employees contracting under limited commitment and human capital accumulation (Zhang (2014)). Finally, our analysis of the industry year fixed effects reveals that not only do industry shocks pass through into bonuses, but they so so across the corporate hierarchy. Since the analogous relations for base pay are economically smaller and often statistically

[35]Since our sample is from 2007–2019, our results are not driven by the immediate aftermath of the Financial Crisis, in which bonuses were dragged down by the regulatory burden imposed by TARP and the cash reserves banks accumulated to pay for fines associated with mortgage lending before the crisis.

insignificant, our results provide evidence that bonuses are a more important transmission mechanism for firm shocks to employee compensation.

6 Conclusion

Using Glassdoor data on worker salaries, we show that non-base pay is significantly more variable than base pay, contributes more to income inequality, and represents a sizable, stable fraction of total compensation for those that receive it. In addition, there is significant heterogeneity in what types of bonuses firms pay both across and within industries, and which employees receive which types of bonus. While more junior employees receive more sales commission, more senior employees receive more cash, stock, and profit-sharing. We then show how non-base compensation varies across hierarchy and skill. All else equal, more senior employees and employees in occupations with more interpersonal skills or tasks earn higher bonuses. In addition, most of the cross-sectional variation in bonuses can be explained by that of her peers (same job title and employer). Finally, we demonstrate that firms pass on persistent, transitory, and industry productivity shocks to employees primarily through bonuses rather than base compensation.

Our analysis has several broader implications. First, while the rigidity of base pay limits the ability of firms to adjust wage bills in economic downturns without laying off workers, the flexibility of non-base pay allows firms to respond to changes in productivity. This suggests a role for non-base pay to act as a shock absorber to mitigate job losses (Shimer (2004)). Second, firms display heterogeneity in how they pay bonuses, even within industries, with larger bonuses given to more senior employees and to jobs that require interpersonal skills, such as managerial roles. As an employee becomes more senior, at least part of her bonus also shifts from being driven by her own performance (sales commissions) to her firm's performance (stock and profit-sharing), suggesting firms engage in better risk-sharing with more senior employees. Consequently, understanding how and to whom bonuses are paid can

inform our theory of the firm. Finally, that employers pay larger bonuses to jobs requiring interpersonal rather than analytical skills has implications for the returns to human capital and different career paths. Such occupations, for instance, may be integral to firms by providing organizational capital (Lustig et al. (2011)) and aiding in the hiring of new talent.

References

Daron Acemoglu and David Autor. Skills, tasks and technologies: Implications for employment and earnings. In *Handbook of Labor Economics, Volume 4. Amsterdam: Elsevier-North*, pages 1043–1171, 2011.

Joseph G. Altonji and Rebecca M. Blank. Chapter 48 race and gender in the labor market. volume 3 of *Handbook of Labor Economics*, pages 3143 – 3259. Elsevier, 1999.

Martin Neil Baily. Wages and employment under uncertain demand. *The Review of Economic Studies*, 41(1):37–50, 1974.

George P. Baker. Incentive contracts and performance measurement. *Journal of Political Economy*, 100(3):598–614, 1992.

Christian Bayer and Moritz Kuhn. Which Ladder to Climb? Decomposing Life Cycle Wage Dynamics. CESifo Working Paper Series 7236, CESifo Group Munich, 2018.

Lucian A. Bebchuk and Jesse M. Fried. Pay without performance: Overview of the issues. *Academy of Management Perspectives*, 20(1):5–24, 2006.

Lucian A. Bebchuk, K.J. Martijn Cremers, and Urs C. Peyer. The ceo pay slice. *Journal of Financial Economics*, 102(1):199 – 221, 2011.

Marianne Bertrand, Claudia Goldin, and Lawrence F. Katz. Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors. *American Economic Journal: Applied Economics*, 2(3):228–255, July 2010.

Truman F. Bewley. A depressed labor market as explained by participants. *The American Economic Review*, 85(2):250–254, 1995.

I. Sebastian Buhai, Miguel A. Portela, Coen N. Teulings, and Aico van Vuuren. Returns to Tenure or Seniority? *Econometrica*, 82(2):705–730, March 2014.

Lorenzo Caliendo, Ferdinando Monte, and Esteban Rossi-Hansberg. The Anatomy of French Production Hierarchies. *Journal of Political Economy*, 123(4):809–852, 2015.

Janet Currie and Sheena McConnell. Firm-Specific Determinants of the Real Wage. *The Review of Economics and Statistics*, 74(2):297–304, May 1992.

Timothy E. Dore and Rebecca Zarutskie. Firm Leverage, Labor Market Size, and Employee Pay. Working Papers 18-36, Center for Economic Studies, U.S. Census Bureau, August 2018.

Alex Edmans and Xavier Gabaix. Executive Compensation: A Modern Primer. *Journal of Economic Literature*, 54(4):1232–1287, December 2016.

Matthias Efing, Harald Hau, Patrick Kampktter, and Jean-Charles Rochet. Bank Bonus Pay as a Risk Sharing Contract. CESifo Working Paper Series 7495, CESifo Group Munich, 2019.

Bruce C. Fallick, Michael Lettau, and William L. Wascher. Downward Nominal Wage Rigidity in the United States During and After the Great Recession. Finance and Economics Discussion Series 2016-1, Board of Governors of the Federal Reserve System (US), 2016.

Michael Gibbs. Incentive compensation in a corporate hierarchy. *Journal of Accounting and Economics*, 19(2):247 – 277, 1995.

Maury Gittleman and Brooks Pierce. Pay for performance and compensation inequality: Evidence from the ecec. *ILR Review*, 68(1):28–52, 2015.

John Grigsby, Erik Hurst, and Ahu Yildirmaz. Aggregate Nominal Wage Adjustments: New Evidence from Administrative Payroll Data. NBER Working Papers 25628, National Bureau of Economic Research, Inc, March 2019.

Luigi Guiso, Luigi Pistaferri, and Fabiano Schivardi. Insurance within the firm. *Journal of Political Economy*, 113(5):1054–1087, 2005.

Milton Harris and Bengt Holmstrom. A theory of wage dynamics. *The Review of Economic Studies*, 49(3):315–333, 1982.

Bengt Holmstrom. Moral hazard in teams. *The Bell Journal of Economics*, 13(2):324–340, 1982.

Bengt Holmstrom and Joan Ricart I Costa. Managerial incentives and capital management. *The Quarterly Journal of Economics*, 101(4):835–860, 1986.

Bengt Holmstrom and Paul Milgrom. Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design. *Journal of Law, Economics, & Organization*, 7: 24–52, 1991.

Gueorgui Kambourov and Iourii Manovskii. Occupational Mobility and Wage Inequality. *The Review of Economic Studies*, 76(2):731–759, 04 2009.

Paul Krugman. Monopsony, rigidity, and the wage puzzle. May 2018. URL `https://www.nytimes.com/2018/05/20/opinion/monopsony-rigidity-and-the-wage-puzzle-wonk`

Edward P Lazear and Sherwin Rosen. Rank-Order Tournaments as Optimum Labor Contracts. *Journal of Political Economy*, 89(5):841–864, October 1981.

Thomas Lemieux, W. Bentley Macleod, and Daniel Parent. Performance pay and wage inequality. *The Quarterly Journal of Economics*, 124(1):1–49, 2009.

Tim K T Liu, Christos Makridis, Paige Parker Ouimet, and Elena Simintzi. Is cash still king: Why firms offer non-wage compensation and the implications for shareholder value. 2017.

Hanno Lustig, Chad Syverson, and Stijn Van Nieuwerburgh. Technological change and the growing inequality in managerial compensation. *Journal of Financial Economics*, 99(3): 601–627, 2011.

W. Bentley MacLeod and Daniel Parent. Job Characteristics and the Form of Compensation. CIRANO Working Papers 98s-08, CIRANO, March 1998.

Christos Makridis and Maury Gittleman. Does performance pay pay ? wage flexibility over the great recession. 2017.

Claudio Michelacci and Vincenzo Quadrini. Financial markets and wages. *The Review of Economic Studies*, 76(2):795–827, 2009.

Holger M. Mueller, Paige P. Ouimet, and Elena Simintzi. Within-Firm Pay Inequality. *The Review of Financial Studies*, 30(10):3605–3635, 05 2017.

Kevin J. Murphy. *Executive Compensation: Where We Are, and How We Got There*, volume 2 of *Handbook of the Economics of Finance*, chapter 0, pages 211–356. Elsevier, 2013.

Paul Oyer. Why do firms use incentives that have no incentive effects? *The Journal of Finance*, 59(4):1619–1650, 2004.

Paul Oyer and Scott Schaefer. Why do some firms give stock options to all employees?: An empirical examination of alternative theories. *Journal of Financial Economics*, 76(1):99 – 133, 2005.

Nicolas Petrosky-Nadeau. Credit, vacancies and unemployment fluctuations. *Review of Economic Dynamics*, 17(2):191 – 205, 2014.

Robert Shimer. The consequences of rigid wages in search models. *Journal of the European Economic Association*, 2(2-3):469–479, 2004.

Robert Shimer. The assignment of workers to jobs in an economy with coordination frictions. *Journal of Political Economy*, 113(5):996–1025, 2005.

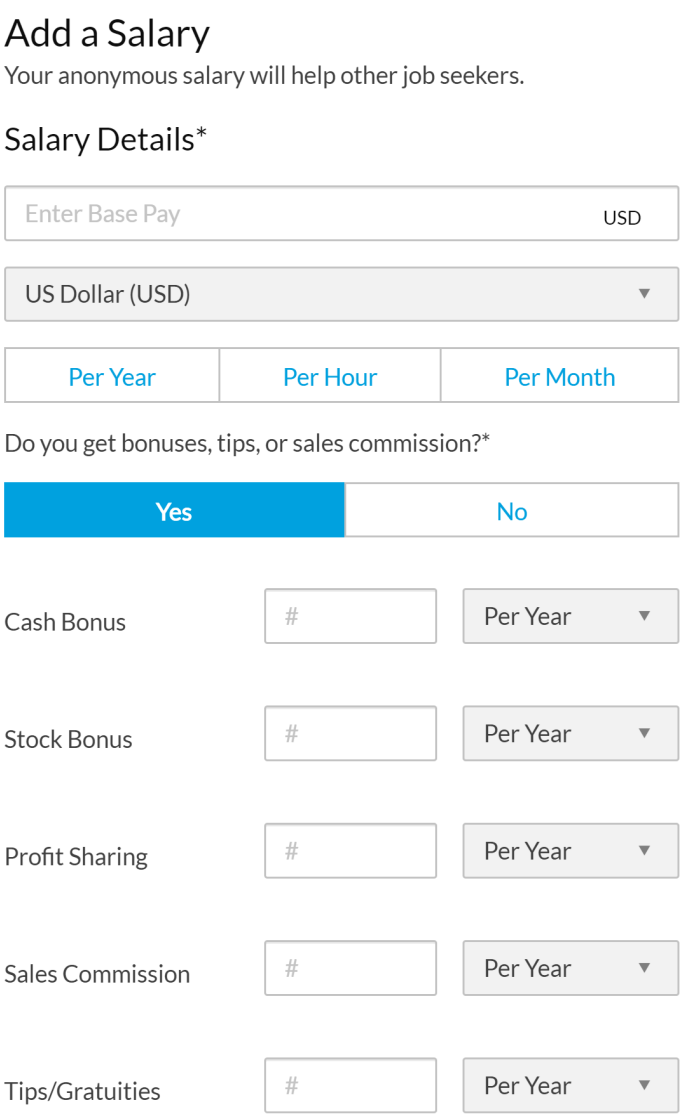
Jae Song, David J Price, Fatih Guvenen, Nicholas Bloom, and Till von Wachter. Firming Up Inequality. *The Quarterly Journal of Economics*, 134(1):1–50, 10 2018.

Jonathan Thomas and Tim Worrall. Self-enforcing wage contracts. *The Review of Economic Studies*, 55(4):541–553, 1988.

Robert Topel. Specific capital, mobility, and wages: Wages rise with job seniority. *Journal of Political Economy*, 99(1):145–176, 1991.

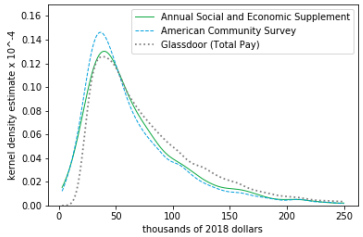
Xiaolan Zhang. Who Bears Firm-Level Risk? Implications for Cash Flow Volatility. 2014 Meeting Papers 184, Society for Economic Dynamics, 2014.

Figure 1: Leaving a Salary Report

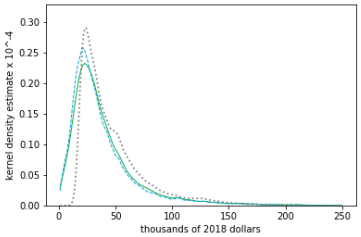


Notes: This figure is a screenshot of the salary report submission form on Glasssdoors website. Options for cash bonus, stock bonus, profit sharing, sales commission, and tips/gratuities are available after selecting "Yes" to the relevant question.

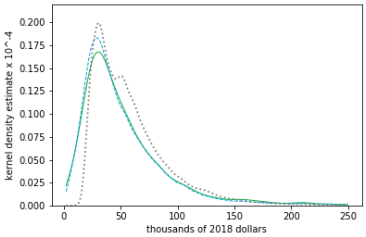
Figure 2: Comparison of Glassdoor Data to Other Surveys



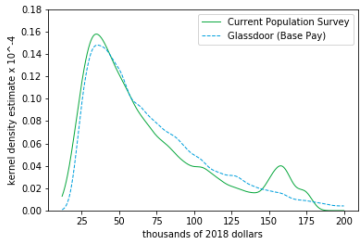
(a) ASEC, ACS: Finance



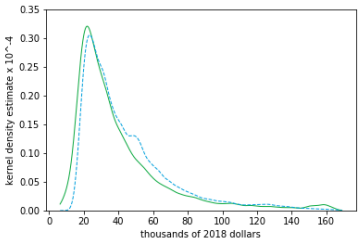
(b) ASEC, ACS: Retail



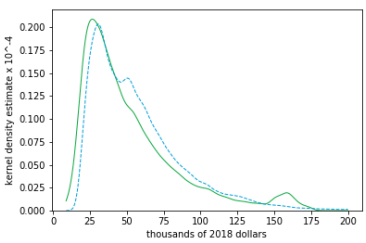
(c) ASEC, ACS: Healthcare



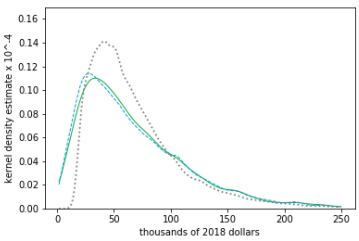
(d) CPS: Finance



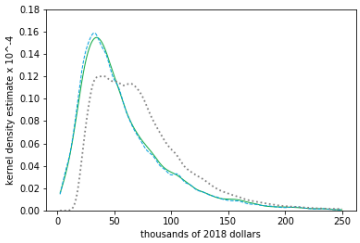
(e) CPS: Retail



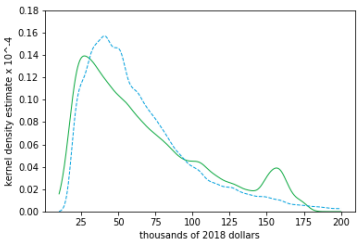
(f) CPS: Healthcare



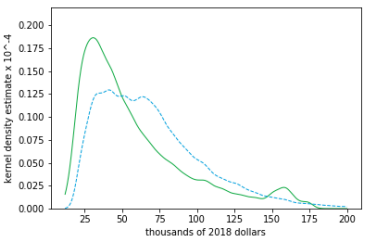
(g) ASEC, ACS: Bus. Serv.



(h) ASEC, ACS: Manufacturing



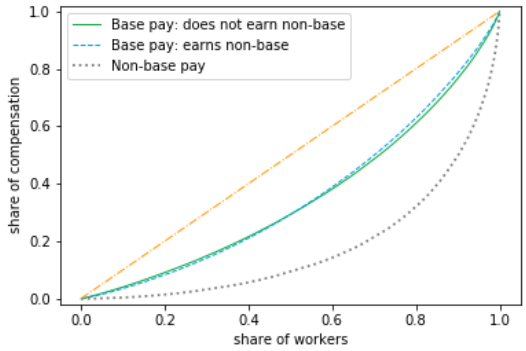
(i) CPS: Bus. Serv.



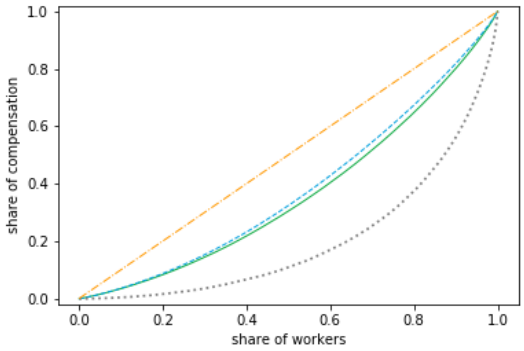
(j) CPS: Manufacturing

Notes: Figures display kernel density estimates constructed using Gaussian approach (that is weighted for CPS and ASEC) with bandwidth chosen using Scotts method. For monthly CPS, weekly earnings (which are top-coded at \$150k) are used. For ASEC, pre-tax salary income for the previous year is used. Each plot excludes the top and bottom 0.5%-tails. IT is excluded because there is not a clean mapping from industries in the other surveys to IT.

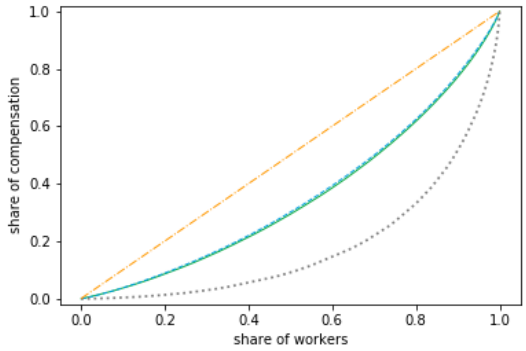
Figure 3: Lorenz Curves for Base and Non-Base Pay Across Industries



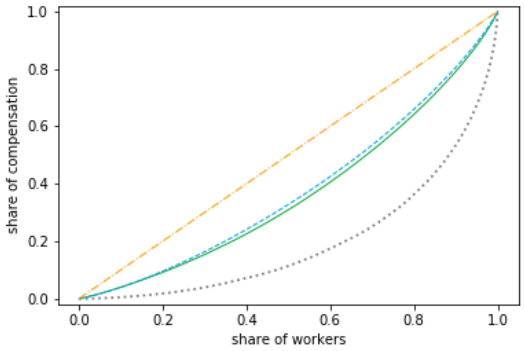
(a) Finance



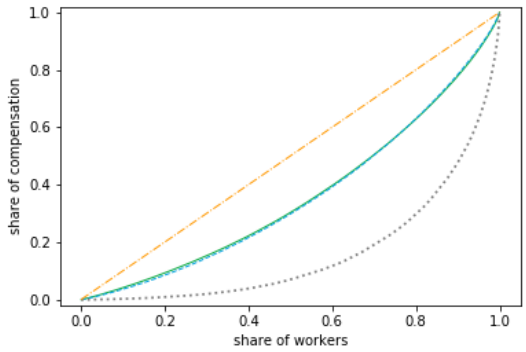
(b) Information Technology



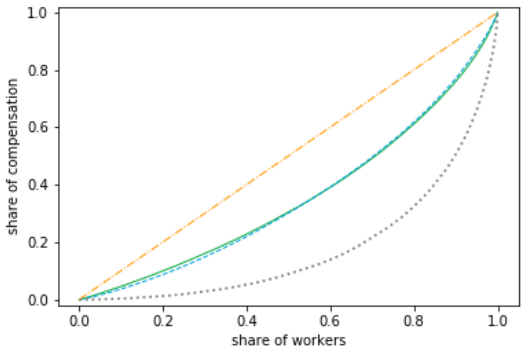
(c) Business Services



(d) Manufacturing



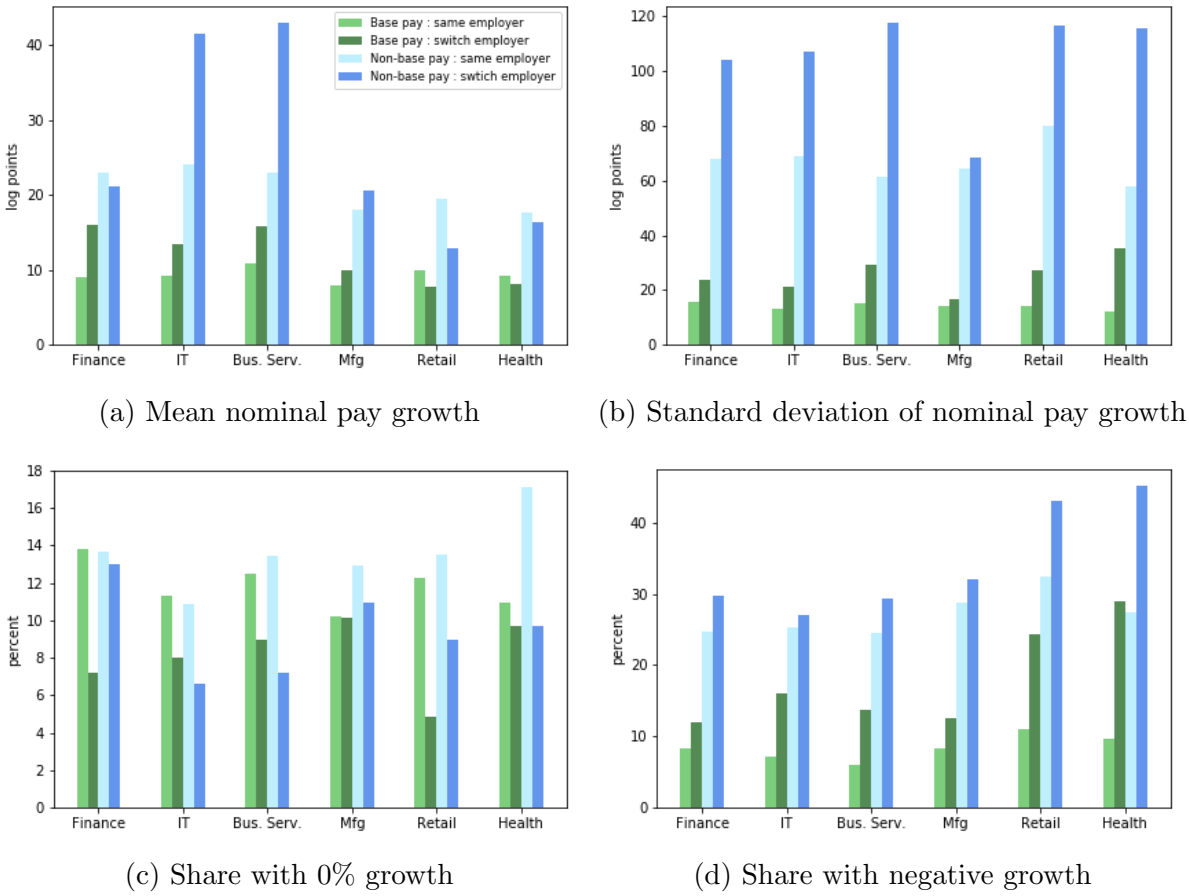
(e) Healthcare



(f) Retail

Notes: The x-axis represents the share of workers in an industry after sorting in increasing order. The y-axis indicates the share of cumulative base (non-base) compensation paid to all workers in that industry, split according to whether the worker reports earning non-base pay.

Figure 4: Nominal Pay Rigidity for Job Transitions



(a) Mean nominal pay growth

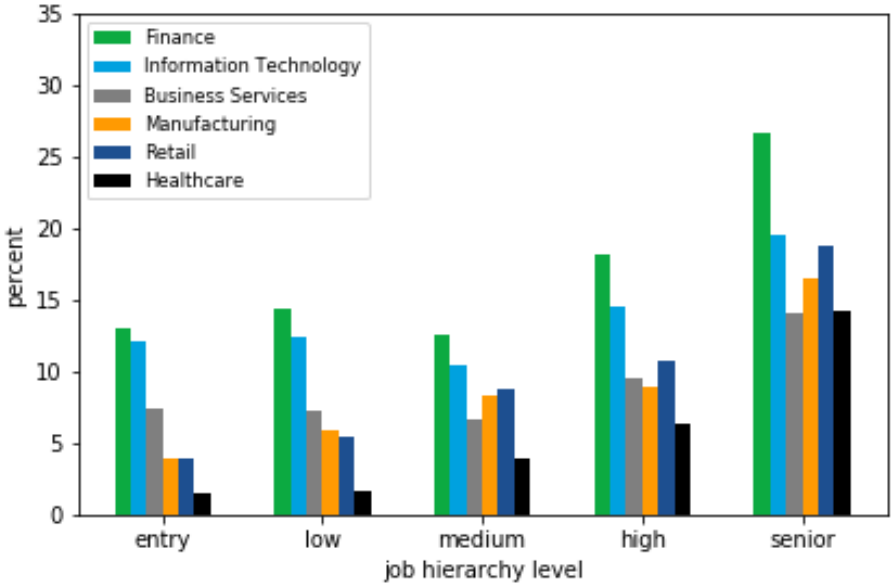
(b) Standard deviation of nominal pay growth

(c) Share with 0% growth

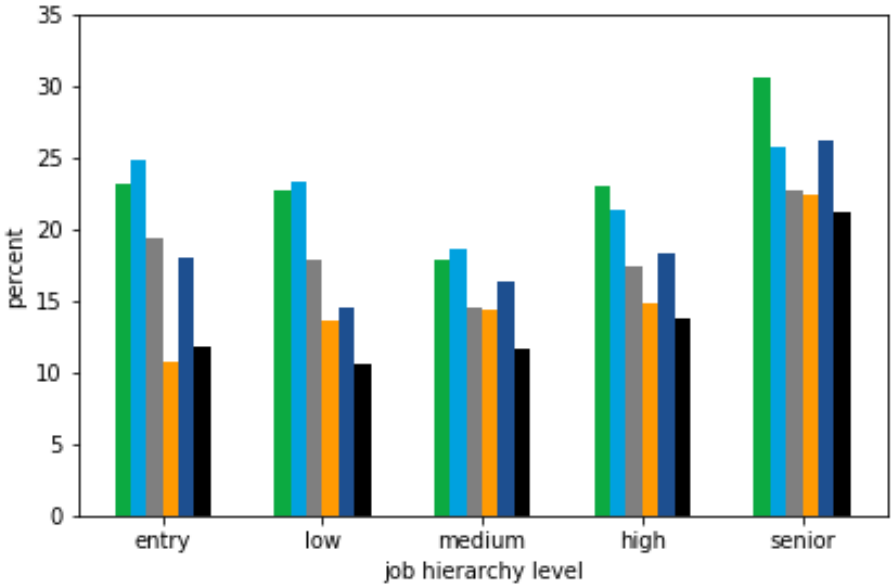
(d) Share with negative growth

Notes: The figure reports statistics on changes in base and non-base pay for a panel of employees over the sample period of January 2007 – February 2019. Sample is restricted to workers who leave a salary report for two consecutive years and report earning non-base pay in both salary reports. Same employer sample restricted to employees remaining in the same metropolitan area. Switch employer sample restricted to employees who switch to an employer within the same industry in the same metropolitan area. Employees included in same (switch) employer samples for each industry are: [690 (307)] Finance, [1430 (677)] IT, [594 (167)] Business Services, [410 (128)] Manufacturing, [237 (123)] Retail, and [146 (31)] Health.

Figure 5: Share of Total Compensation from Non-Base Pay



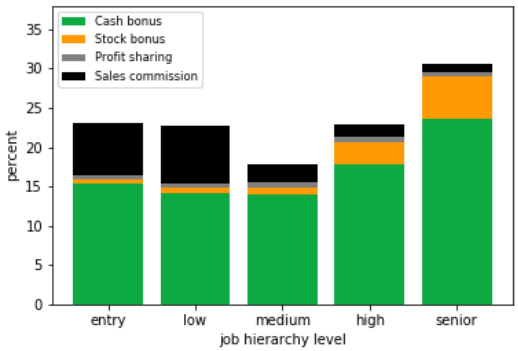
(a) Not conditional on receiving non-base pay



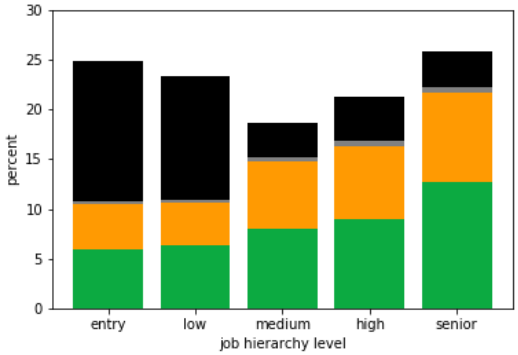
(b) Conditional on receiving non-base pay

Notes: These two figures plot the average fraction of non-base pay in total compensation for all six industries across employee job hierarchy levels. Non-base pay includes cash bonuses, stock bonuses, profit sharing, and sales commissions, but excludes tips/gratuities. For job hierarchy level definitions, see main text.

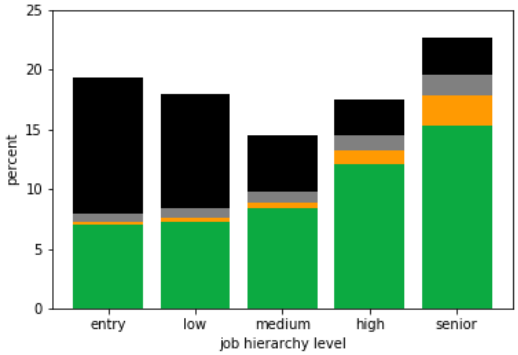
Figure 6: Breakdown of Non-Base Pay Compensation as a Share of Total Pay



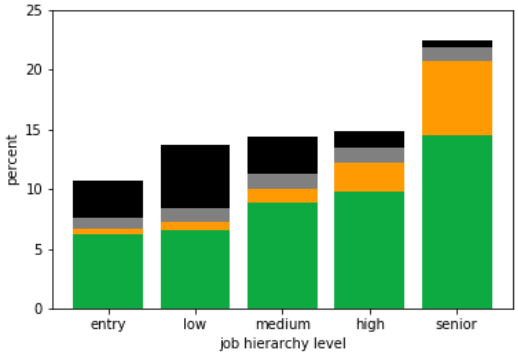
(a) Finance



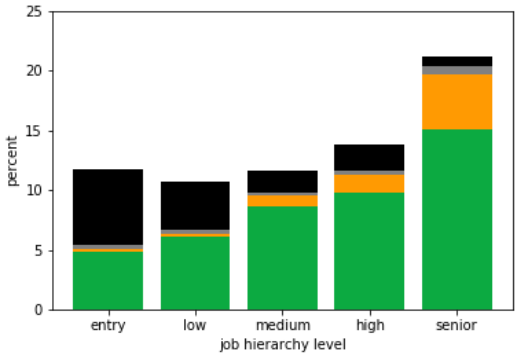
(b) Information Technology



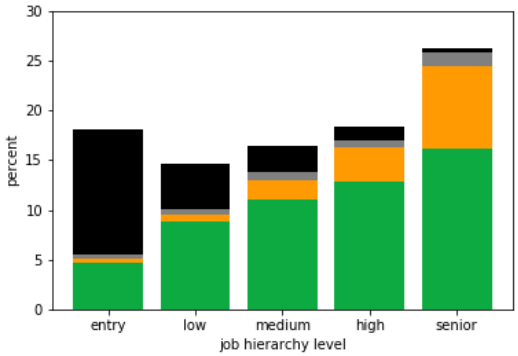
(c) Business Services



(d) Manufacturing



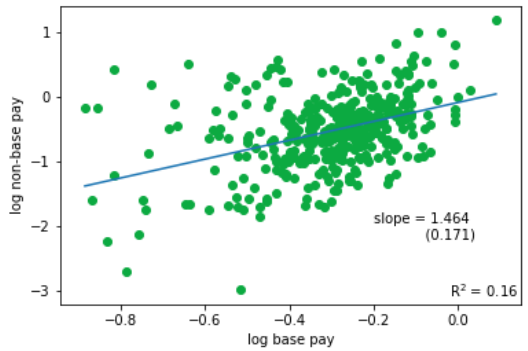
(e) Healthcare



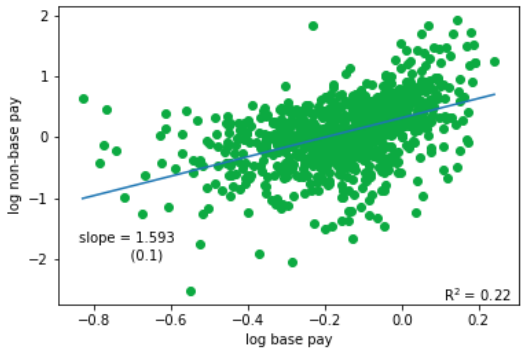
(f) Retail

Notes: This figure plots the average fraction of non-base pay in total compensation conditional on receiving a bonus, excluding tips/gratuities, for all six industries across employee hierarchy. The vertical bars are disaggregated into the fractions from cash, stock, profit-sharing, and sales commissions. For job hierarchy level definitions, see main text.

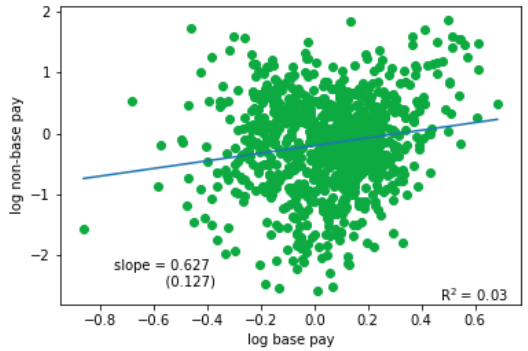
Figure 7: Residual Base and Non-Base Pay Across Employers



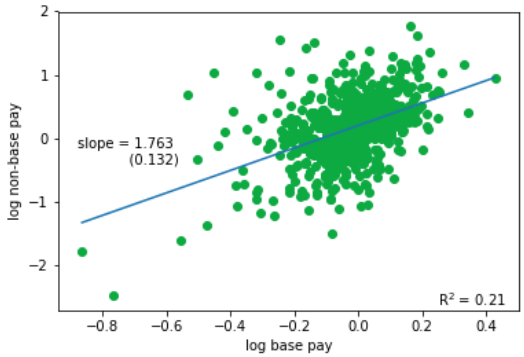
(a) Finance



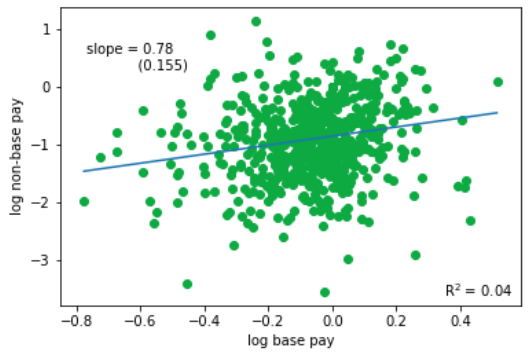
(b) Information Technology



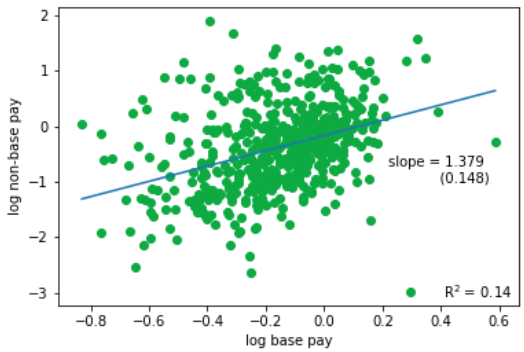
(c) Business Services



(d) Manufacturing



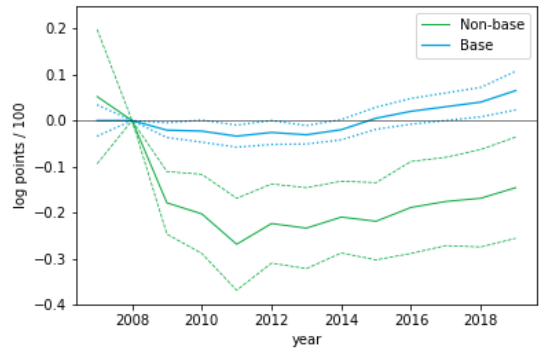
(e) Healthcare



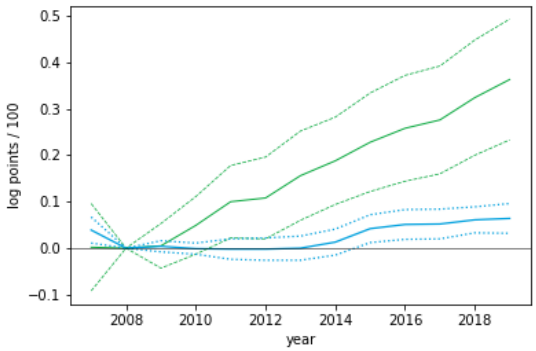
(f) Retail

Notes: This figure plots the estimated employer fixed effects from regressions of non-base ($\hat{\lambda}_j^{nbp}$) and base pay ($\hat{\lambda}_j^{bp}$) according to equation (6). The x-axis (y-axis) represents an employer-specific premium for base (non-base) pay. Each dot represents an employer with at least 30 salary reports. Sample for each industry is the same for base and non-base pay. Blue line indicates the predicted values from estimating $\hat{\lambda}_j^{nbp} = \alpha + \beta\hat{\lambda}_j^{bp} + \epsilon_j$.

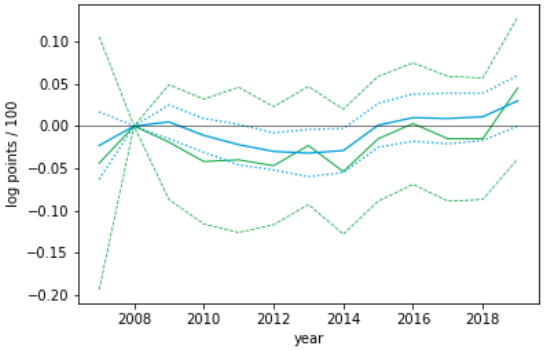
Figure 8: Industry-Specific Aggregate Trend in Pay Since 2007



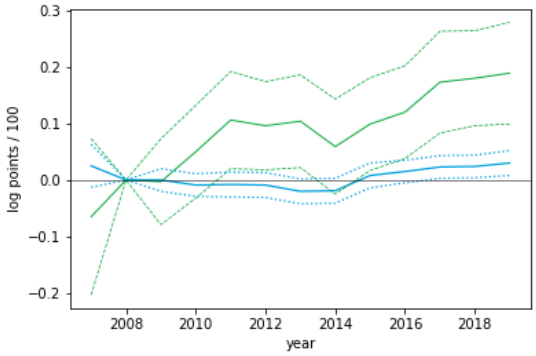
(a) Finance



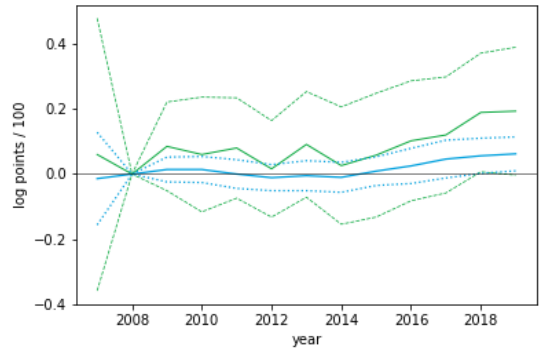
(b) Information Technology



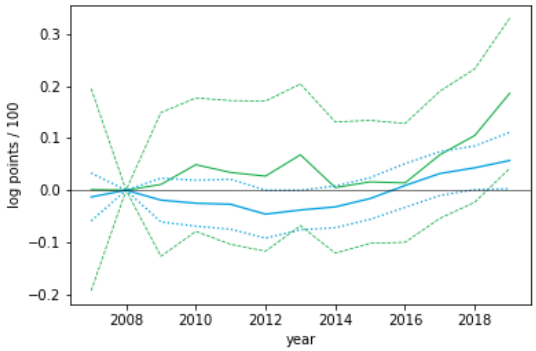
(c) Business Services



(d) Manufacturing



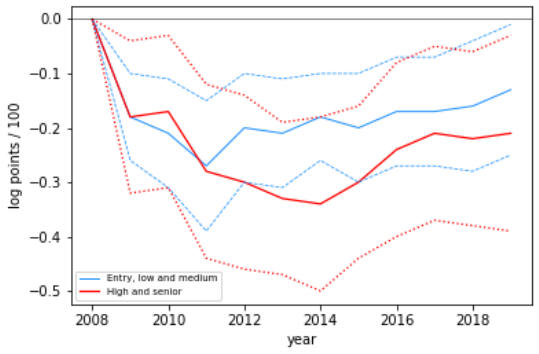
(e) Healthcare



(f) Retail

Notes: This figure plots the year fixed effects (relative to 2008) across industries from regressions of non-base and base pay on the following controls: gender x a quadratic in years of specific experience and employer, O*NET-SOC major occupation code, state, education x gender, and job hierarchy level fixed effects. Standard errors are clustered by employer. Green dashed and blue dotted lines represent 95% confidence intervals.

Figure 9: Industry-Specific Trend in Non-Base Pay for Top and Bottom Hierarchies

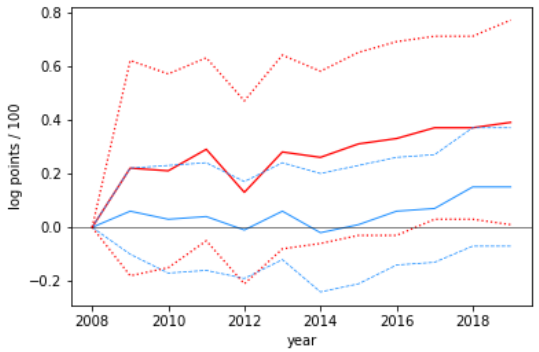


(a) Finance

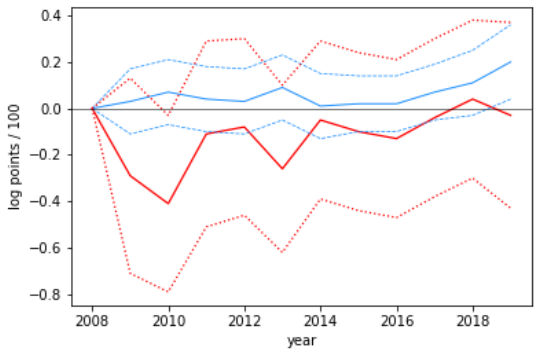
(b) Information Technology

(c) Business Services

(d) Manufacturing



(e) Healthcare



(f) Retail

Notes: This figure plots the year fixed effects (relative to 2008) for two aggregated hierarchy levels, entry / low / medium and high / senior, across industries from regressions of non-base pay on the following controls: gender x a quadratic in years of specific experience and employer, O*NET-SOC major occupation code, state, education x gender, and job hierarchy level fixed effects. Blue dashed and yellow dotted lines represent 95% confidence intervals. Estimates for 2007 are not plotted because of thin sample sizes. Standard errors are clustered by employer.

Table 1: Summary Statistics

Variable of Interest	Finance	Business Services	Healthcare	Information Technology	Manufacturing	Retail
Salary reports	190,164	327,826	214,294	412,892	221,830	263,394
Male	59.72%	55.60%	32.86%	71.80%	67.66%	49.71%
Female	40.28%	44.40%	67.14%	28.20%	32.34%	50.29%
Base pay ($1000s) [1]						
Median	60.4	54.7	49.7	84.8	63.5	36.1
Mean	72.3	64.8	57.4	90.7	70.1	45.0
Standard deviation	43.1	38.2	33.4	44.3	36.6	28.5
p10	30.0	27.2	25.9	37.7	30.7	20.9
p90	131.8	115.8	99.7	150.0	119.0	79.6
Share that reports earning						
Non-Base Pay	55.1%	34.2%	17.4%	47.3%	41.5%	30.5%
Cash bonus	82.8%	71.9%	85.1%	72.0%	78.2%	72.0%
Stock bonus	7.8%	4.4%	5.0%	25.4%	9.7%	6.8%
Profit sharing	7.3%	9.9%	5.6%	7.1%	15.8%	7.7%
Sales commission	18.6%	27.4%	12.3%	22.9%	12.1%	27.2%
Non-base pay ($1000s) [1]						
Median	10.5	7.7	5.0	15.7	7.7	5.1
Mean	24.8	17.2	11.7	30.5	15.0	11.5
Standard deviation	46.3	30.9	23.7	46.1	26.7	21.7
p10	1.8	1.1	0.5	2.2	1.3	0.7
p90	58.3	42.4	28.2	74.3	33.5	28.4
Distribution by job hierarchy						
Entry	35.5%	38.4%	20.5%	28.2%	15.3%	33.4%
Low	23.6%	28.1%	47.4%	26.4%	41.6%	42.1%
Medium	7.0%	6.0%	6.2%	12.1%	8.2%	4.3%
High	7.2%	5.2%	3.3%	10.0%	7.6%	2.1%
Senior	3.6%	1.3%	0.6%	5.8%	3.4%	0.2%
Unassigned	23.1%	21.1%	22.0%	17.6%	23.9%	17.9%

Notes: The table reports summary statistics across all six industries for the sample period of January 2007 – February 2019. Salaries reflect only full-time workers for public or private firms and are inflation-adjusted using U.S. headline CPI to 2018 dollars. Assignment of job hierarchy level reflects the average years of relevant experience across salaries with the same job title in the same industry and are unassigned if there are less than 20 salaries with the same industry-job title pairing.

Table 2: Share of Workers Within Firm that Report Earning Type of Bonus

Quantile of Firm Distribution	Finance	Business Services	Health	IT	Manufacturing	Retail
Cash Bonus						
1st	3.5	0.9	0.0	1.5	3.4	0.0
50th	40.0	18.5	8.6	29.0	34.6	20.3
75th	62.7	34.4	16.7	47.0	46.7	28.2
99th	85.1	80.2	61.4	74.4	73.4	50.3
Stock Bonus						
1st	0.0	0.0	0.0	0.0	0.0	0.0
50th	1.8	0.0	0.0	1.9	1.4	0.5
75th	4.9	1.3	0.0	9.0	3.8	1.6
99th	38.3	16.1	6.4	48.3	42.5	17.7
Profit Sharing						
1st	0.0	0.0	0.0	0.0	0.0	0.0
50th	1.3	0.7	0.0	0.9	3.1	0.6
75th	3.2	2.5	1.0	2.6	7.8	1.7
99th	32.4	39.9	9.5	33.0	52.1	23.8
Sales Commission						
1st	0.0	0.0	0.0	0.0	0.0	0.0
50th	5.9	2.3	0.0	8.5	2.0	2.2
75th	15.1	14.5	1.4	20.0	6.1	15.1
99th	48.1	54.3	29.7	52.5	32.4	57.2
Number of firms	419	953	661	924	712	584

Notes: This table reports the fraction of employees that receive a type of bonus across firm quantiles and across industries. The sample period is January 2007 – February 2019. For each firm, the share of workers that report earning cash bonus, stock bonus, profit-sharing and/or sales commission is calculated. Quantiles are then taken from this distribution of worker shares. Firms are excluded if they have fewer than 50 salary reports.

Table 3: Non-Base Pay Within Job Title-Industry Pairs

Job title	Job hierarchy Level	Percent of Salaries		Share that Report Non-Base Pay	Share of Non-Base Pay Earners Reporting this Form of Compensation				Base Pay ($1000s)		Non-Base Pay ($1000s)		Non-Base Pay as Share of Total Pay
		Male	Post Bachelors		Cash bonus	Stock bonus	Profit sharing	Sales commission	Mean	IQR	Mean	IQR	
Finance													
analyst	entry	69	22	56	99	3	3	1	73	29	34	27	17
mortgageloanofficer	low	71	10	60	8	1	1	94	41	21	58	62	48
assistantvicepresident	medium	68	39	73	96	7	7	3	101	33	17	22	13
vicepresident	high	71	49	80	97	19	6	3	144	50	51	56	24
seniorvicepresident	senior	79	56	86	96	32	7	4	181	59	90	91	30
Business Services													
accountexecutive	entry	44	11	37	36	1	3	71	50	16	34	26	16
seniorconsultant	low	67	41	48	89	7	15	4	100	34	11	13	6
accountdirector	medium	39	17	32	75	1	6	26	107	40	17	21	6
director	high	60	42	54	88	11	9	10	132	59	31	33	12
seniordirector	senior	66	46	69	91	17	7	8	162	57	35	48	17
Healthcare													
patientservicerepresentative	entry	13	6	8	91	1	7	1	32	7	1	1	0
registerednurse	low	18	12	4	93	1	8	0	65	20	2	2	0
nursemanager	medium	21	39	14	98	0	5	0	93	28	7	11	2
director	high	49	56	49	92	14	5	4	123	53	20	24	9
seniordirector	senior	57	59	70	96	29	4	4	170	45	45	48	16
Information Technology													
softwareengineer	entry	84	33	34	88	40	6	0	101	42	21	25	8
projectmanager	low	62	30	36	91	9	9	3	90	37	8	10	4
seniorsoftwareengineer	medium	89	40	45	88	40	7	0	127	42	24	31	10
seniorprojectmanager	high	68	38	45	91	15	9	3	117	33	14	15	5
seniordirector	senior	79	51	79	88	42	3	11	192	47	68	80	25
Manufacturing													
processengineer	entry	79	27	42	82	8	18	1	77	19	6	7	3
engineer	low	85	32	32	84	7	20	0	78	26	7	8	3
seniorengineer	medium	86	52	50	85	9	16	0	102	24	9	12	5
principalengineer	high	90	53	57	87	36	9	0	131	39	21	22	9
director	senior	68	50	63	89	35	15	3	152	49	37	46	16
Retail													
salesassociate	entry	48	5	16	28	2	6	75	27	12	27	20	10
storemanager	low	50	4	43	85	5	4	19	52	23	10	11	8
generalmanager	medium	62	5	51	89	6	7	12	64	23	13	15	11
seniormanager	high	56	36	57	94	29	4	1	115	38	22	27	12
seniordirector	senior	61	45	75	93	63	10	1	191	45	64	75	23

Notes: The table reports compensation statistics for a subset of job titles within each of the six industries for the sample period of January 2007 – February 2019. Salaries reflect only full-time workers for public or private firms and are inflation-adjusted using U.S. headline CPI to 2018 dollars. For assignment of job hierarchy levels, see main text.

Table 4: Incidence and Level of Non-Base Pay Within Industries

Industry	Percent of Salary Reports							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	55	48	60*	48	56*	65*	74*	81*
Business Services	34	30	38*	33	34*	41*	48*	54*
Healthcare	17	14	24*	12	14*	30*	40*	55*
Information Technology	47	43	49*	42	44*	50*	61*	69*
Manufacturing	41	37	44*	32	38*	53*	55*	68*
Retail	30	27	34*	22	35*	49*	54*	64*

Industry	Average Pay (thousands of 2018 dollars)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	25.0	17.9	28.5*	18.0	21.4*	21.2*	38.7*	74.3*
Business Services	17.3	13.7	19.5*	14.7	16.6*	17.5*	28.9*	51.2*
Healthcare	11.9	8.7	15.4*	6.6	8.6*	12.6*	18.9*	44.9*
Information Technology	30.6	24.2	32.7*	24.8	28.2*	27.4*	36.4*	57.9*
Manufacturing	15.1	12.6	16.1*	7.5	11.4*	16.2*	19.6*	45.5*
Retail	11.6	8.9	13.4*	9.6	9.5	15.7*	24.2*	62.8*

(a) Overall non-base pay

Industry	Percent of Salary Reports (Conditional on Reporting Non-Base Pay)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	83	82	83	75	79*	91*	95*	97*
Business Services	72	73	72*	64	72*	84*	87*	86*
Healthcare	85	86	84*	80	85*	90*	90*	95*
Information Technology	72	72	72	60	68*	82*	81*	85*
Manufacturing	78	81	77*	77	74*	80*	84*	89*
Retail	72	72	72	53	77*	87*	88*	92*

Industry	Average Pay (thousands of 2018 dollars)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	20.9	15.6	23.6*	15.5	16.5*	18.1*	31.4*	59.2*
Business Services	11.1	8.3	12.8*	7.9	9.1*	12.0*	22.9*	39.5*
Healthcare	8.6	6.4	11.1*	3.4	5.7*	10.3*	14.8*	33.9*
Information Technology	15.3	12.9	16.1*	9.8	11.3*	14.2*	19.1*	33.5*
Manufacturing	11.2	9.7	11.8*	5.4	7.3*	12.4*	15.3*	33.1*
Retail	8.2	6.7	9.4*	3.9	7.1*	12.0*	18.8*	42.4*

(b) Cash bonuses

Table 4: Incidence and Level of Non-Base Pay Within Industries (cont.)

Industry	Percent of Salary Reports (Conditional on Reporting Non-Base Pay)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	8	5	9*	4	5*	7*	17*	29*
Business Services	4	3	5*	3	4*	6*	10*	16*
Healthcare	5	3	7*	2	3*	10*	10*	21*
Information Technology	25	19	27*	19	22*	32*	34*	38*
Manufacturing	10	7	11*	5	6*	10*	14*	31*
Retail	7	5	8*	4	5*	11*	21*	46*

Industry	Average Pay (thousands of 2018 dollars)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	24.3	20.4	25.5*	9.4	12.4*	16.5*	28.8*	44.6*
Business Services	12.4	10.0	13.2*	6.0	7.8*	8.9*	17.7*	36.3*
Healthcare	17.2	14.1	18.7*	6.1	7.0	9.6	19.8*	43.8*
Information Technology	30.6	25.2	31.8*	23.2	22.5	30.4*	36.2*	53.0*
Manufacturing	19.3	19.7	19.3	6.7	9.5*	13.1*	20.5*	38.6*
Retail	13.2	12.9	13.4	4.8	7.2*	15.9*	20.9*	41.9*

(c) Stock bonuses

Industry	Percent of Salary Reports (Conditional on Reporting Non-Base Pay)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	7	6	8*	7	7	7*	9*	8*
Business Services	10	8	11*	8	10*	13*	13*	13*
Healthcare	6	5	6	4	6*	5	6	4
Information Technology	7	6	7*	5	7*	9*	7*	7*
Manufacturing	16	13	17*	15	16	16	15	14
Retail	8	6	9*	8	7*	8	7	13*

Industry	Average Pay (thousands of 2018 dollars)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	9.1	7.3	9.8*	6.0	8.3*	8.9*	12.8*	21.4*
Business Services	8.9	6.6	9.8*	6.7	7.5*	9.5*	16.4*	31.7*
Healthcare	6.7	4.5	9.0*	4.6	4.7	7.7	9.1*	27.1*
Information Technology	8.3	6.9	8.6*	5.2	6.2*	8.2*	10.4*	17.0*
Manufacturing	7.4	6.4	7.7*	4.6	5.8*	8.5*	10.7*	17.2*
Retail	5.5	4.4	6.0*	2.3	4.9*	10.2*	11.1*	24.2*

(d) Profit-sharing

Table 4: Incidence and Level of Non-Base Pay Within Industries (cont.)

Industry	Percent of Salary Reports (Conditional on Reporting Non-Base Pay)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	19	19	19	28	23*	9*	5*	2*
Business Services	27	27	27	37	27*	14*	9*	9*
Healthcare	12	12	13	19	12*	7*	7*	3*
Information Technology	23	24	23*	38	28*	9*	12*	10*
Manufacturing	12	12	12	13	16*	11*	5*	2*
Retail	27	27	27	46	23*	12*	8*	1*

Industry	Average Pay (thousands of 2018 dollars)							
	Overall	Within gender		Within job hierarchy level				
		women	men	entry	low	medium	high	senior
Finance	28.8	19.8	33.2*	21.1	33.2*	34.0*	65.0*	99.3*
Business Services	31.8	28.2	33.9*	26.5	36.7*	44.7*	54.7*	77.9*
Healthcare	29.3	23.7	35.1*	21.8	29.5*	29.1*	46.5*	60.1*
Information Technology	49.6	41.8	52.1*	38.8	55.9*	59.8*	62.7*	81.4*
Manufacturing	29.4	24.9	30.9*	20.2	29.3*	33.5*	40.1*	51.9*
Retail	19.4	14.9	22.1*	21.2	17.4*	23.6	29.8*	105.7*

(e) Sales commissions

Notes: The table contains five panels that report statistics on non-base pay and its four subcomponents for the sample period of January 2007 – February 2019. Salaries are inflation-adjusted using U.S. headline CPI. An asterisk for within gender implies that the difference between men and women is statistically significant at the 1 percent level; for within job hierarchy level, the relevant comparison is the result for entry job hierarchy level.

Table 5: Hierarchy and Non-Base Pay

Variable of Interest	Finance	Business Services	Healthcare	Information Technology	Manufacturing	Retail
female	-0.239***	-0.216***	-0.200***	-0.238***	-0.171***	-0.244***
	(0.013)	(0.012)	(0.018)	(0.009)	(0.010)	(0.017)
pre-bachelor's degree	-0.111***	-0.095***	-0.129***	-0.082***	-0.131***	-0.073***
	(0.022)	(0.026)	(0.039)	(0.022)	(0.024)	(0.019)
post-bachelor's degree	0.149***	0.062***	0.149***	0.093***	0.134***	0.190***
	(0.014)	(0.015)	(0.021)	(0.010)	(0.013)	(0.024)
years of specific experience	0.059***	0.065***	0.034***	0.055***	0.047***	0.062***
	(0.004)	(0.005)	(0.003)	(0.003)	(0.002)	(0.003)
level of job hierarchy (relative to entry)						
low	0.070**	0.243***	0.230***	0.206***	0.185***	0.337***
	(0.031)	(0.018)	(0.032)	(0.025)	(0.024)	(0.069)
medium	0.286***	0.309***	0.485***	0.287***	0.437***	0.908***
	(0.054)	(0.047)	(0.047)	(0.025)	(0.026)	(0.123)
high	0.663***	0.657***	0.841***	0.515***	0.625***	1.283***
	(0.053)	(0.051)	(0.056)	(0.035)	(0.030)	(0.093)
senior	1.228***	1.177***	1.637***	0.906***	1.358***	2.320***
	(0.056)	(0.074)	(0.105)	(0.062)	(0.049)	(0.120)
Year and state fixed effects	X	X	X	X	X	X
Occupation ----------	X	X	X	X	X	X
Employer ----------	X	X	X	X	X	X
Job title ----------	-	-	-	-	-	-
N	70291	69650	19758	141654	55757	45731
R^2	0.52	0.57	0.65	0.54	0.55	0.43

Notes: This table reports results from a regression of hierarchy dummy variables on log non-base pay. The sample period is January 2007 – February 2019. Each column reflects a separate regression on a sample consisting only of salaries from employers in that industry. Salaries corresponding to job titles for which too few observations were available to determine job hierarchy level were excluded. Coefficients for post-bachelor's (Master's, MBA, JD, MD, and PHD) and pre-bachelor's (high school graduate and Associate's) relative to workers with Bachelor's or for whom educational attainment is missing. A quadratic term in years of specific experience is included but omitted. Standard errors are clustered by employer. One, two, and three stars denote significance at the 10, 5, and 1 percent levels, respectively.

Table 6: Hierarchy and Tenure

Variable of Interest	Finance	Business Services	Healthcare	IT	Manufacturing	Retail
female	-0.351***	-0.351***	-0.226***	-0.223***	-0.250***	-0.365***
	(0.034)	(0.043)	(0.053)	(0.029)	(0.037)	(0.047)
pre-bachelor's degree	-0.103	-0.095	-0.071	-0.122**	-0.022	-0.053
	(0.085)	(0.089)	(0.117)	(0.053)	(0.077)	(0.059)
post-bachelor's degree	0.228***	0.087*	0.268***	0.141***	0.177***	0.177**
	(0.048)	(0.049)	(0.068)	(0.031)	(0.047)	(0.069)
years of specific experience	0.046***	0.017**	0.025**	0.055***	0.033***	0.036***
	(0.008)	(0.007)	(0.011)	(0.005)	(0.007)	(0.009)
level of job hierarchy (relative to entry)						
low	-0.045	0.118**	0.220**	0.222***	0.073	0.361***
	(0.062)	(0.055)	(0.098)	(0.044)	(0.057)	(0.106)
medium	0.273***	0.185*	0.718***	0.283***	0.416***	0.912***
	(0.104)	(0.099)	(0.137)	(0.062)	(0.069)	(0.151)
high	0.674***	0.545***	1.004***	0.520***	0.636***	1.312***
	(0.094)	(0.097)	(0.145)	(0.071)	(0.081)	(0.128)
senior	1.315***	1.095***	1.876***	0.856***	1.418***	2.304***
	(0.126)	(0.137)	(0.242)	(0.119)	(0.114)	(0.267)
length of firm tenure (relative to 0-2 years)						
3-5 years	0.022	0.126**	-0.082	-0.023	0.058	0.056
	(0.042)	(0.054)	(0.067)	(0.030)	(0.040)	(0.054)
6-10 years	0.144***	0.218***	-0.142**	-0.044	0.097**	0.104**
	(0.042)	(0.060)	(0.068)	(0.044)	(0.042)	(0.051)
+10 years	0.153**	0.343***	0.129	-0.183	0.059	0.348***
	(0.061)	(0.071)	(0.095)	(0.120)	(0.056)	(0.068)
Year and state fixed effects	X	X	X	X	X	X
Occupation ----------	X	X	X	X	X	X
Employer type ----------	X	X	X	X	X	X
Job title ----------	-	-	-	-	-	-
Observations	5925	7398	2231	13265	5085	4632
R^2	0.45	0.30	0.55	0.38	0.43	0.31

Notes: This table reports results from regressing hierarchy and tenure on log non-base pay. The sample period is January 2007 – February 2019. Length of tenure is available only for workers whom also leave an employer review on Glassdoor. Each column reflects a separate regression on a sample consisting only of salaries from employers in that industry for whom length of tenure is available. Salaries corresponding to job titles for which too few observations were available to determine job hierarchy level were excluded. Employer type refers to public, private, non-profit, hospital or subsidiary company. Standard errors are clustered by employer. One, two, and three stars denote significance at the 10, 5, and 1 percent levels, respectively.

Table 7: Occupational Skill Requirements and Non-Base Pay

Variable of Interest	Finance	Business Services	Healthcare	IT	Manufacturing	Retail
Base pay						
routine, cognitive	-0.130***	0.010	-0.001	0.023***	0.012**	0.011
	(0.015)	(0.007)	(0.033)	(0.006)	(0.005)	(0.019)
routine, manual	0.090***	0.056***	0.025*	0.033***	-0.017**	0.032***
	(0.011)	(0.009)	(0.014)	(0.007)	(0.007)	(0.012)
non-routine, cognitive analytic	0.033***	0.029***	0.078***	0.038***	0.085***	0.171***
	(0.011)	(0.007)	(0.015)	(0.009)	(0.005)	(0.012)
non-routine, cognitive interpersonal	0.064***	0.079***	0.080***	0.095***	0.071***	0.054***
	(0.011)	(0.007)	(0.009)	(0.006)	(0.006)	(0.011)
non-routine, manual interpersonal	-0.076***	0.036***	0.034***	-0.021***	0.026***	-0.010
	(0.011)	(0.009)	(0.012)	(0.007)	(0.006)	(0.015)
Observations	84812	85324	27386	160455	72200	51642
R^2	0.63	0.72	0.59	0.66	0.62	0.53
Non-base pay						
routine, cognitive	-0.022	-0.086***	-0.265***	-0.108***	-0.064***	-0.077***
	(0.027)	(0.018)	(0.024)	(0.016)	(0.010)	(0.021)
routine, manual	-0.180***	-0.069**	-0.079**	-0.142***	-0.240***	-0.087*
	(0.025)	(0.033)	(0.032)	(0.013)	(0.014)	(0.052)
non-routine, cognitive analytic	-0.101***	-0.203***	-0.172***	-0.272***	-0.091***	0.071
	(0.018)	(0.021)	(0.024)	(0.027)	(0.015)	(0.059)
non-routine, cognitive interpersonal	0.053**	0.095***	0.188***	0.067***	0.082***	-0.024
	(0.024)	(0.018)	(0.030)	(0.017)	(0.013)	(0.052)
non-routine, manual interpersonal	0.152***	0.215***	0.081*	0.148***	0.242***	0.183***
	(0.025)	(0.019)	(0.045)	(0.018)	(0.017)	(0.034)
Observations	84812	85324	27386	160455	72200	51642
R^2	0.43	0.55	0.53	0.47	0.51	0.38
Reports earning non-base pay						
routine, cognitive	-0.013**	-0.023***	-0.020***	-0.017**	-0.010***	-0.021***
	(0.006)	(0.003)	(0.003)	(0.007)	(0.003)	(0.003)
routine, manual	-0.036***	-0.017***	-0.021***	-0.040***	-0.054***	-0.006
	(0.005)	(0.004)	(0.006)	(0.003)	(0.003)	(0.005)
non-routine, cognitive analytic	-0.029***	-0.028***	-0.013***	-0.033***	0.001	0.024***
	(0.004)	(0.003)	(0.004)	(0.009)	(0.003)	(0.004)
non-routine, cognitive interpersonal	0.030***	0.022***	0.041***	-0.001	0.012***	0.028***
	(0.006)	(0.003)	(0.005)	(0.004)	(0.004)	(0.007)
non-routine, manual interpersonal	0.015**	0.043***	-0.011***	0.052***	0.044***	0.032***
	(0.007)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)
Observations	160976	272792	180006	350714	183874	206285
R^2	0.23	0.33	0.27	0.29	0.28	0.18

Notes: This table reports results from regressing O*NET occupation skill indices on non-base pay. The sample period is January 2007 – February 2019. Skill requirements for each occupation from Acemoglu and Autor (2011). Each column reflects a separate regression on a sample consisting only of salaries from employers in that industry. Each regression includes the following set of observables: state, education x gender and year fixed effects, gender x a quadratic in specific years of experience, and employer fixed effects. Standard errors are clustered by employer. One, two, and three stars denote significance at the 10, 5, and 1 percent levels, respectively.

Table 8: Non-Base Pay Within Job Titles and Employers

Variable of Interest	Finance	Business Services	Healthcare	Information Technology	Manufacturing	Retail
female	-0.134***	-0.153***	-0.129***	-0.137***	-0.113***	-0.151***
	(0.012)	(0.010)	(0.014)	(0.007)	(0.009)	(0.013)
pre-bachelor's degree	-0.028	-0.001	-0.026	0.011	-0.009	-0.008
	(0.019)	(0.023)	(0.031)	(0.015)	(0.022)	(0.018)
post-bachelor's degree	0.043***	0.009	0.029*	0.030***	0.054***	0.073***
	(0.010)	(0.011)	(0.016)	(0.006)	(0.011)	(0.020)
years of specific experience	0.024***	0.031***	0.008**	0.014***	0.016***	0.018***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.004)
base pay relative to average within job title-year (log points)	1.153***	0.833***	1.140***	1.190***	1.096***	1.124***
	(0.078)	(0.046)	(0.053)	(0.048)	(0.066)	(0.109)
Year and state fixed effects	X	X	X	X	X	X
Occupation ----------	-	-	-	-	-	-
Employer ----------	X	X	X	X	X	X
Job title ----------	X	X	X	X	X	X
N	70275	69536	19592	141595	55702	45637
R^2	0.64	0.65	0.74	0.66	0.65	0.59

Notes: This table reports results from regressing non-base pay on base pay relative to job title average and job title fixed effects on non-base pay. The sample period is January 2007 – February 2019. Each column reflects a separate regression on a sample consisting only of salaries from employers in that industry. Salaries corresponding to job titles for which too few observations were available to determine job hierarchy level were excluded. Coefficients for post-bachelor's (Master's, MBA, JD, MD, and PHD) and pre-bachelor's (high school graduate and Associate's) relative to workers with Bachelor's or for whom educational attainment is missing. A quadratic term in years of specific experience is included but omitted. Standard errors are clustered by employer. One, two, and three stars denote significance at the 10, 5, and 1 percent levels, respectively.

Table 9: Compensation Rigidity Among Peers

Industry	Wthin-group averages	Standardized real base pay			Reports earning non-base pay			Standardized real non-base pay			Group counts		
											group	base	non-base
Finance	job title-firm excluding self	0.936*** (0.001)	0.641*** (0.014)	0.747*** (0.012)	0.847*** (0.009)	0.327*** (0.025)	0.613*** (0.022)	0.733*** (0.002)	0.508*** (0.018)	0.650*** (0.009)	job titles	698	388
	job title excluding own firm			0.077*** (0.009)			0.195*** (0.019)			0.048*** (0.008)	employers	434	370
	firm excluding own job title			0.013*** (0.004)			0.224*** (0.021)			-0.003 (0.003)	job title-employers	4197	2269
	R^2	0.85	0.87	0.88	0.22	0.24	0.25	0.59	0.61	0.62	salaries	73414	36891
Business Services	job title-firm excluding self	0.999*** (0.001)	0.737*** (0.013)	0.848*** (0.010)	0.903*** (0.006)	0.323*** (0.033)	0.702*** (0.018)	0.687*** (0.003)	0.370*** (0.028)	0.665*** (0.005)	job titles	1013	311
	job title excluding own firm			0.045*** (0.006)			0.113*** (0.019)			0.014*** (0.004)	employers	1105	693
	firm excluding own job title			0.048*** (0.003)			0.241*** (0.018)			0.006** (0.002)	job title-employers	5881	1798
	R^2	0.89	0.90	0.91	0.36	0.37	0.39	0.60	0.61	0.63	salaries	89985	26422
Healthcare	job title-firm excluding self	0.958*** (0.001)	0.618*** (0.018)	0.801*** (0.024)	0.874*** (0.015)	0.112** (0.049)	0.625*** (0.060)	0.680*** (0.004)	0.177 (0.110)	0.584*** (0.019)	job titles	740	121
	job title excluding own firm			0.114*** (0.016)			0.280*** (0.052)			0.087*** (0.014)	employers	767	110
	firm excluding own job title			0.005 (0.005)			0.206*** (0.044)			-0.009 (0.005)	job title-employers	4138	389
	R^2	0.89	0.91	0.91	0.32	0.34	0.37	0.65	0.66	0.68	salaries	51844	5176
IT	job title-firm excluding self	0.955*** (0.001)	0.694*** (0.014)	0.809*** (0.014)	0.884*** (0.009)	0.379*** (0.033)	0.666*** (0.028)	0.721*** (0.003)	0.522*** (0.017)	0.677*** (0.010)	job titles	1324	641
	job title excluding own firm			0.032*** (0.008)			0.171*** (0.018)			0.023*** (0.005)	employers	1090	718
	firm excluding own job title			0.022*** (0.006)			0.270*** (0.029)			0.007*** (0.002)	job title-employers	8636	3983
	R^2	0.85	0.87	0.88	0.29	0.31	0.32	0.61	0.62	0.63	salaries	148726	65112
Manufacturing	job title-firm excluding self	0.850*** (0.001)	0.507*** (0.020)	0.687*** (0.011)	0.763*** (0.017)	0.044 (0.043)	0.498*** (0.027)	0.616*** (0.003)	0.220*** (0.035)	0.552*** (0.008)	job titles	596	291
	job title excluding own firm			0.089*** (0.008)			0.346*** (0.029)			0.048*** (0.006)	employers	626	332
	firm excluding own job title			0.024*** (0.005)			0.357*** (0.028)			0.010*** (0.003)	job title-employers	3378	1267
	R^2	0.82	0.84	0.85	0.19	0.22	0.26	0.54	0.55	0.58	salaries	36590	12972
Retail	job title-firm excluding self	0.870*** (0.001)	0.713*** (0.009)	0.792*** (0.006)	0.888*** (0.010)	0.540*** (0.030)	0.765*** (0.016)	0.710*** (0.006)	0.527*** (0.036)	0.682*** (0.008)	job titles	915	218
	job title excluding own firm			0.036*** (0.005)			0.153*** (0.017)			0.019*** (0.004)	employers	624	400
	firm excluding own job title			0.002 (0.002)			0.164*** (0.015)			0.004* (0.002)	job title-employers	5590	1343
	R^2	0.84	0.85	0.86	0.25	0.27	0.27	0.57	0.58	0.59	salaries	118117	22630
Includes employer and job title fixed effects		-	X	-	-	X	-	-	X	-			
Controls for worker observables		-	X	X	-	X	X	-	X	X			

Notes: This table reports results from regressing the "within", "between", and "across" job title indices on base pay, non-base pay, and the incidence of non-base pay. The sample period is January 2007 – February 2019. Controls for worker observables include a quadratic in experience x gender, along with gender x education, year, and state fixed effects. For exclusion variables, employers are only included if they have at least 30 salaries overall, job titles if they have at least 30 salaries overall, and job title-firm groupings if they have at least 5 salaries overall. Standard errors are clustered by employer. One, two, and three stars denote significance at the 10, 5, and 1 percent levels, respectively.

Table 10: Non-Base Compensation Variance Across Job Titles

Variable of Interest	Finance	Business Services	Healthcare	Information Technology	Manufacturing	Retail
without job title fixed effects						
year of salary report	-0.010**	0.015***	0.018*	0.021***	0.002	0.003
	(0.004)	(0.005)	(0.010)	(0.003)	(0.004)	(0.008)
(standardized) skill requirements						
routine, cognitive	0.067**	-0.046	-0.031	0.013	-0.007	-0.022
	(0.033)	(0.036)	(0.040)	(0.022)	(0.022)	(0.041)
routine, manual	-0.064***	-0.041	0.031	0.043**	0.001	-0.031
	(0.024)	(0.029)	(0.040)	(0.018)	(0.024)	(0.037)
non-routine, cognitive analytic	-0.021	-0.139***	-0.043	0.048**	-0.060***	-0.097**
	(0.030)	(0.028)	(0.037)	(0.019)	(0.022)	(0.040)
non-routine, cognitive interpersonal	-0.115***	0.003	0.018	-0.053**	-0.083***	-0.057
	(0.033)	(0.034)	(0.049)	(0.026)	(0.027)	(0.052)
non-routine, manual interpersonal	0.116***	0.007	0.019	0.010	0.068**	0.094*
	(0.037)	(0.037)	(0.046)	(0.030)	(0.030)	(0.052)
job title-year observations	2833	2700	1006	4925	2678	1562
R^2	0.03	0.04	0.01	0.02	0.03	0.02
with job title fixed effects						
year of salary report	-0.003	0.018***	0.011	0.018***	0.005	0.010
	(0.004)	(0.006)	(0.013)	(0.004)	(0.005)	(0.008)
job title-year observations	2833	2700	1006	4925	2678	1562
R^2	0.53	0.51	0.53	0.45	0.47	0.52

Notes: This table reports the results from regressing yearly observations of job title variance on the O*NET skills and a linear time trend (upper panel), and on job title fixed effects and a linear time trend (lower panel) for all six industries. The sample period is January 2007 – February 2019. Job title-industry pairings are included if they represent at least 30 unique salaries. Skill requirements for each occupation from Acemoglu and Autor (2011).

Table 11: One Standard Deviation in Firm Financial Characteristics and Compensation

Variable of Interest	Finance		Business Services		Healthcare		IT		Manufacturing		Retail	
	Base	Non-Base	Base	Non-Base	Base	Non-Base	Base	Non-Base	Base	Non-Base	Base	Non-Base
Standardized performance metrics												
earnings before interest, tax, depreciation, and amortization	-0.022**	0.106***	0.021	0.005	0.027	0.135**	-0.008	0.098	0.008	0.024	0.085***	-0.065
	(0.009)	(0.035)	(0.022)	(0.045)	(0.022)	(0.057)	(0.009)	(0.070)	(0.009)	(0.047)	(0.021)	(0.070)
average earnings per share	-0.006*	0.050***	0.001	0.025	-0.011	0.040	-0.015***	0.028	0.003	-0.000	-0.013	0.031
	(0.003)	(0.018)	(0.009)	(0.036)	(0.014)	(0.049)	(0.006)	(0.030)	(0.005)	(0.044)	(0.009)	(0.022)
stock return	-0.001	0.010	-0.008	-0.010	0.005	0.016	0.005	0.032**	-0.003	0.047***	-0.008*	0.034**
	(0.002)	(0.010)	(0.006)	(0.021)	(0.008)	(0.046)	(0.004)	(0.013)	(0.002)	(0.013)	(0.004)	(0.015)
sales to lagged assets ratio	-0.004	-0.008	-0.009	-0.079**	0.035	-0.051	-0.043*	0.141**	-0.025*	0.172**	-0.022	0.168**
	(0.005)	(0.017)	(0.011)	(0.033)	(0.024)	(0.067)	(0.024)	(0.061)	(0.015)	(0.079)	(0.019)	(0.072)
Additional controls												
log assets	0.029***	0.029	-0.010	0.099*	0.086*	-0.063	0.037*	0.167**	0.022**	0.229***	-0.057	0.412***
	(0.011)	(0.045)	(0.022)	(0.055)	(0.046)	(0.157)	(0.020)	(0.083)	(0.010)	(0.068)	(0.036)	(0.079)
log leverage ratio	-0.006	-0.077***	0.011	0.110***	-0.005	-0.057	0.003	-0.042	-0.004	0.012	0.012	0.025
	(0.005)	(0.019)	(0.011)	(0.029)	(0.014)	(0.059)	(0.006)	(0.030)	(0.006)	(0.036)	(0.013)	(0.045)
log total employment	-0.003	-0.072***	-0.013	-0.111***	-0.041**	0.015	-0.011	-0.105**	-0.018***	-0.114**	0.047***	-0.295***
	(0.006)	(0.026)	(0.014)	(0.027)	(0.016)	(0.077)	(0.009)	(0.043)	(0.007)	(0.046)	(0.016)	(0.057)
vector of estimated employer fixed effects: non-base pay	0.104***		0.089**		0.187***		0.163***		0.083***		0.170***	
	(0.015)		(0.041)		(0.043)		(0.017)		(0.011)		(0.028)	
vector of estimated employer fixed effects: base pay		2.549***		0.841**		1.518***		2.718***		2.173***		1.455***
		(0.322)		(0.365)		(0.368)		(0.290)		(0.365)		(0.307)
Observations	39135	39135	6466	6466	2791	2791	44194	44194	16809	16809	12963	12963
R^2	0.87	0.63	0.83	0.68	0.90	0.84	0.81	0.61	0.82	0.64	0.82	0.60

Notes: The sample period is January 2007 – February 2019. Firm financial characteristics available through Compustat. All variables of interest are lagged one period, have been converted to standardized z-scores within each year for each industry, and have had the top/bottom 1% truncated to control for outliers. Each regression includes the following controls: a quadratic in experience x gender, along with gender x education, year, state and job title fixed effects. Log total employment is a snapshot from 2018 and so does not vary over time. Vector of estimated firm fixed effects depicted in Figure 7. Standard errors are clustered by employer. One, two, and three stars denote significance at the 10, 5, and 1 percent levels, respectively.