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Assessing Career Attainment via a Non-Wage Measure
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ABSTRACT

This paper proposes a non-pecuniary measure of career achievement, seniority. Based on a database of over 150 million resumes, this metric exploits the variation in how long it takes workers to attain job titles. A person's seniority is defined as the number of years it takes the median individual—within the same industry and firm size category—to achieve that person's job title. Seniority aligns with standard markers of success—it is positively correlated with both wages and educational attainment. To demonstrate its value as a measure of career progression, we show that individuals with higher seniority levels in the public sector are more likely to transition to higher-paying positions in the private sector. When non-monetary factors influence career choice, evaluating labor market outcomes using non-wage measures, such as seniority, offers significant advantages.

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1 Introduction

Economists generally use pecuniary measures when studying labor market outcomes. A prime example is the large literature on the returns to college education (Lovenheim and Smith, 2011), which conventionally uses wages to estimate these returns (Angrist and Krueger, 1992; Dale and Krueger, 2011). Pecuniary measures of career achievement are appealing for two reasons. First, they can be easily measured and, hence, are a convenient way for researchers to assess career advancement. Second, because money is a significant driver of human behavior, wages are one of the most important dimensions of career trajectory. However, using salary alone to evaluate careers may have significant drawbacks, especially when comparing jobs across industries and functional areas. For example, comparing salaries of senior academics, government officials, or non-profit executives to earnings of junior technology or finance professionals would likely lead to erroneous conclusions about career achievement. When non-pecuniary factors influence career choice, researchers must look beyond wages to draw meaningful inferences. However, measuring and comparing non-wage characteristics of jobs with different functions and in a variety of industries is challenging. For this reason, many papers that assess careers without an exclusive focus on wages look at single industries or individual companies.

To address this shortcoming, we construct a non-wage measure of career achievement using a database of over 150 million resumes. This measure, which we call *seniority*, exploits the variation in the amount of time that people take to attain a job title. We show that seniority characterizes career trajectories in an intuitive manner and provides valuable insights in a variety of settings, such as the returns to tertiary education and job transitions.

We construct the seniority measure using resume data from Lightcast, which aggregates work history and education information from a major online professional networking platform. The dataset contains detailed education and job title information for over 150 million individuals employed in the United States. Because these profiles are de-identified, we supplement the data with two additional samples that include complete individual information. The first consists of the full set of profiles for graduates of 44 prominent U.S. universities, which includes names, post-secondary degrees and graduation dates, job titles, employers and industries, and job start and end dates. The second includes profile information for founders of venture capital-backed companies, drawn from Dow Jones VentureSource. We use these fully identified samples for our empirical analyses.

Seniority is calculated from this data by examining all individuals— within industry and firm size cells—who achieve a certain job title. We define seniority as the median time (in years) that it takes to first achieve that title after entering the labor force (i.e., from the year of college graduation). For example, the "Analyst" title in the finance industry and a firm in the largest quintile is associated with a median seniority value of one, which indicates that the median individual who becomes an analyst in the finance industry for a firm in the largest quintile first achieves that title one year after graduating from college. Thus, "Analyst" is one of the most junior titles. The typical next title in many finance firms' hierarchies is "Associate," which has a seniority value of four. On the more senior end of the scale in the same industry-quintile, "Vice President" has a seniority value of eleven, "Director" has a seniority value of twelve, and "Chief Executive Officer" has a seniority value of fifteen. As a byproduct, our seniority measure also quantifies an individual's position within the organization's hierarchy. Seniority is time-varying to account for

evolving job functions, firm hierarchies, and industry standards, and so a title's seniority can change from year to year.

It is important to note that the seniority value of a job title is unrelated to an individual's tenure in the labor market.[1] An individual can get "stuck" at the same seniority level until the end of his or her career. This feature starkly contrasts with studies that use workers' tenure or "years on the job" as a measure of relative career progression within firms (Topel and Ward, 1992; Buchinsky et al., 2010; Buhai et al., 2014). Because our seniority measure reflects a job's hierarchical position, it helps quantify the relative economic significance of job changes. For example, we can say that an individual who spends one year in a job with a seniority value of three and moves to a job with a seniority value of five experiences a two-unit gain in non-wage career progression. We can also compare this individual to another who moves from a job of seniority three to a job of seniority four. Both switches are analogous to a promotion, but by using our seniority measure, we can quantify and compare the changes. Changes in seniority thus have more economic meaning than an indicator variable that measures whether a person gets promoted. From this perspective, our seniority measure can also be used to capture the speed of a person's career progression over time; exceptional workers will advance faster and achieve higher seniority earlier in their careers. Importantly, differences in seniority are meaningful even as individuals move across firms and industries. Lastly, the seniority measure avoids the problem of fake promotions or title inflation where the change in job title carries little economic value (Cohen et al., 2023).

To validate the seniority measure, we present several empirical facts which confirm that the measure reasonably captures people's career trajectories. First, we show that seniority is not

[1] Using "Vice President" as an example, an exceptional individual may achieve the Vice President title in seven years after graduating from college, while another may take more than eleven years. The seniority value for the "Vice President" title is identical in both cases because the measure is calculated based on how long it takes the median person in the sample to achieve this title.

mechanically related to career length. Careers tend to eventually reach a plateau, regardless of career-end achievement level. For individuals who reach a peak seniority level between ten and fifteen, their career achievement, as measured by seniority, starts to plateau at around twelve years after college graduation. In addition, only 19% of people with 20 years of career information achieve job titles that have a seniority level of 20 years or greater. These patterns suggest that the seniority measure captures the idea of a corporate pyramid, i.e., not everyone gets to be the CEO of a company. Second, we directly compare our seniority measure with wage data from Revelio Labs. Reassuringly, seniority is positively correlated with wages.

Next, in two illustrative analyses, we show how seniority behaves with respect to educational attainment. First, we show that graduates of elite undergraduate colleges rise in seniority faster and achieve higher terminal levels of seniority, on average, compared to graduates of Tier 2 colleges. In turn, graduates of Tier 2 colleges similarly outperform those who graduate from lower-ranked schools. Our second verification test examines the impact of receiving an MBA degree. We divide individuals in our sample into three groups: those with an elite MBA (Booth, Harvard, Kellogg, Stanford, or Wharton), those with a non-elite MBA, and non-MBA holders. Prior to receiving an MBA, all three groups have jobs with comparable seniority values. However, upon receiving an MBA degree, all MBA graduates receive a seniority boost relative to those who do not pursue an MBA, and the increase is substantially larger for elite MBA graduates. In addition, the differences in average seniority between these three groups increase over time. These patterns reassure us that our seniority measure captures meaningful variation related to labor market outcomes.

Lastly, we use job switchers to demonstrate that seniority captures important economic features of individuals' careers beyond wages. In particular, we examine how individuals can

convert seniority into wages when they change jobs. For all job switches in our sample, we find that, holding fixed the individual's wage, higher seniority values are associated with higher wages in the next job. This pattern is stronger in the subsample of individuals that moved from low-wage industries (e.g., public administration and education) to high-wage industries (e.g., the private sector) than in the subsample that changed jobs within the private sector. The analysis demonstrates that our seniority measure captures valuable information that is priced by the labor market. Seniority can be especially useful in studying job transitions in instances where, due to long-standing compensation structures, the variation in wages within the industry is too small to be informative of the individual's human capital.

Through the construction of the seniority measure as well as its application in empirical analysis, this paper extends and connects various existing literatures. First, this paper contributes to multiple areas within the labor economics literature (Ashenfelter and Card, 2010) by providing a new general measure of career progression that captures a job's non-wage dimension via a data-driven method. Our measure can compare career achievement across industries and functional areas in ways that wages cannot. Hence, our seniority measure is a significant improvement upon methods that previous studies have used to capture non-wage attributes in a person's career.

One approach used in the literature is to exclusively consider one firm or one industry in which there is a well-defined career ladder. For example, Li and Walder (2001) study individuals who work for the Chinese government, while Johnson and Walker (2018) study US federal government employees. The main limitation of this approach is that the researcher is confined to only one industry or organization, potentially limiting the extent to which one can draw general insights about labor market phenomena. Our seniority measure does not have this limitation

because, like wages, it is a general measure of career progression that can be used across industries and organizations.

A second approach relies on administrative data sets that readily classify jobs into levels where low-skilled (e.g., manual labor) jobs are generally ranked below high-skilled (e.g., managerial) jobs (Kunze, 2014; Kunze and Miller, 2014). The downside of this approach is that the classifications are often arbitrary, coarse, and generally not economically interpretable or meaningful. Baptista et al. (2012) use administrative Portuguese data to classify *all jobs* in the formal Portuguese economy into eight levels, over half of which are categorized as jobs of "skilled professionals." However, in this context, it is difficult to interpret what a move from a level-1 job to a level-2 job means. A related approach uses O*NET or survey data to classify jobs into low- or high-skill categories based on the set of skills associated with each job (Treiman, 1976; Speer, 2017). This approach also suffers from an arbitrary method of classification because researchers must determine how to map each job onto the available skill distribution.

Finally, researchers have used promotions as a proxy for career progression (Javdani and McGee, 2019). While intuitively appealing, this approach often lacks clear economic interpretability, as it cannot account for the heterogeneous quality of different promotions. Similarly, it can be difficult to quantify or even identify promotions when an individual switches between functional areas, firms, or industries.

Our seniority measure improves upon these earlier strategies by using a data-driven approach to classify job titles based on "years to first attainment." Seniority values have a straightforward economic interpretation, allowing us to compare jobs across different functional areas, firms, and industries. This advantage facilitates both a deeper understanding of individuals' career trajectories and an evaluation of individuals' careers relative to their peers, especially when

used in conjunction with wage data. Our seniority measure has been used to examine the puzzle related to the returns to entrepreneurship (Amornsiripanitch et al. 2025) and Ivy League intercollegiate varsity athletes versus similar non-athletes (Amornsiripanitch et al. 2023). In a near universe sample of founders of US venture capital-backed companies, Amornsiripanitch et al. (2025) demonstrate that taking into account the post-founding career trajectory relative to non-founders that match the founders' careers prior to founding reverses the conclusions of Hall and Woodward (2010). All categories of founders have better career prospects beause post-founding seniority and wages are significantly higher for founders than non-founders independent of the success or failure of the startup. In the context of Ivy League graduates, Amornsiripanitch et al. 2023) demonstrate that Ivy athletes have better long-term career outcomes in terms of seniority and wages than non-athletes who graduate in the same year, with the same degree, and have the same first job.

The rest of the paper is organized as follows. Section 2 presents our data. Section 3 provides detail on the construction of our seniority and wage variables. Section 4 presents empirical results on our validation exercises and analyses on job switchers that distinguishes our seniority measure from the traditional wage measure. We conclude in Section 5.

2 Data

2.1 Lightcast

Lightcast collects data on resumes from a professional networking site. Lightcast's granular employment data include job title, employment start date, employment end date, firm name, and NAICS (North American Industry Classification System) code. Lightcast uses

proprietary algorithms to streamline job titles and company names and to impute the Occupational Information Network (O*NET) code for each job.

Lightcast also maintains data on individuals' education. These data include start and end dates, institution names, degree types, and areas of study. Education data helps measure key elements of human capital such as earning a STEM degree, receiving an MBA, and the rank of an undergraduate institution. We categorize colleges as one of three mutually exclusive groups: elite colleges (e.g., Ivy League and similar institutions), Tier 2 colleges (e.g., elite liberal arts colleges and highly ranked public universities), and other colleges, which include all other US and non-US colleges. Appendix Table 1 lists the elite and Tier 2 colleges.

We compute seniority for every job title within industry and firm size categories using Lightcast's universe of over 150 million US profiles. These data are de-identified, containing only graduation years, job titles, firm names, job start dates, and job end dates. There is no information on educational institution name, individual name, or O*NET code. We use the de-identified data to (i) separate firms into quintiles by the number of employees in each year and (ii) calculate seniority over a broader range of individuals than what our identified sample would allow.

We have identified data from Lightcast for graduates of 44 prominent undergraduate institutions in the US offering bachelor's degrees, listed in Appendix Table 2. These include Ivy League schools, other elite universities (e.g., Stanford, Duke), and large public universities, (e.g., University of Florida, University of Michigan). Finally, we have data containing the resumes of individuals who share a name with a VentureSource-identified founder.[2] In total, we have identified profile information for 5.6 million individuals, which we use for the analyses presented below.

[2] Dow Jones VentureSource is standard workhorse data set in the venture capital literature. See Amornsiripanitch et al. (2023) for a detailed description of the data source.

The Lightcast data are granular and comprehensive, but self-reported. As a result, there are several notable drawbacks. First, there are gaps in some careers and some underreporting of education data. We consider a year to constitute a gap if there is no reported job or education in the year but the missing information does not appear at the end of a person's career. However, 77.6% of individuals in the sample have no gaps at all, and only 6.2% of individual-year observations are gaps. Second, unlike employment data provided by the Census Bureau, the online profiles constitute a selected sample—they only include individuals who decided to make an online professional profile. As such, the sample likely skews toward white-collar workers. However, to the best of our knowledge, there is no better data set that we can use for the purposes of this paper because even the Census Bureau's employment data set does not contain job title information.

2.3 Revelio Labs Wage Data

We use wage data from Revelio Labs, which uses a proprietary algorithm to estimate wages from resume data from a professional networking site. We compute the mean wage at the job title-industry-year level. We then match jobs by title and industry between Revelio and Lightcast. Finally, we adjust the wages to include a firm-size premium using a supplementary dataset of job postings from Lightcast. The job posting data include wages, O*NET codes, and industries. We regress posted wages on dummy variables for O*NET code and size quintile-industry groups and use the size quintile-industry fixed effect estimates to adjust Revelio Lab's wages. While rough, this adjustment helps account for some of the wage variation across firm size and industry groups.

There are some drawbacks. First, the wage data are estimated, not exact. Second, the literature has found significant wage differences across firms (e.g., Akerman et al., 2013), which we cannot capture even after adjusting for firm size. Finally, our adjustment method uses O*NET

codes, which classify most senior roles into a few coarse categories. This reduces the variation in estimated wages, which may exacerbate issues caused by unobserved inter-firm wage differences. However, we do not expect these drawbacks to change the main conclusions of the paper, as we use wage data primarily to validate the seniority measure. If anything, noise in the wage data biases us against finding a strong relationship. That we uncover a clear link despite this suggests the connection between seniority and wages might be even stronger with more precise wage data.

3 Seniority Measure Construction

Our seniority metric reflects a job title's rank within an organization's hierarchy. For certain careers, non-pecuniary benefits (Hamilton, 2000) make comparing achievement difficult. Similarly, different functional areas within a firm may have different levels of compensation even though the career achievement (e.g., rank in the organization) is similar. Therefore, in these circumstances, relative seniority may capture aspects of a position's desirability that relative wages alone do not reflect. In addition, seniority may more adequately compare the standings of positions across industries where wages are systematically different. For example, the titles of "Assistant Professor" in higher education and "Vice President" in financial services may have relatively similar seniority values, even if average wages for these two titles can be very different. In this section, we describe how we construct seniority.

Seniority is defined as the number of years it takes the median individual to reach a given title within an industry and firm size quintile. We define firm size quintiles as follows. First, we sort firms by headcount, calculated as the number of employees at the end of a given year.[3] Second, we group firms into quintiles such that each quintile makes up 20% of that year's employment.

[3] We define headcount at the end of the year rather than the number of employees who worked for the firm at any point in that year to reduce mismeasurement from employee turnover.

Fixing the number of individuals across quintiles—and not the number of firms—aligns with the focus of subsequent analysis being on individuals.

We observe differences in seniorities for job titles across size quintiles. In general, the same title at a larger firm has higher seniority, especially for high-level roles. However, there are exceptions. For example, the title "Consultant" has its highest seniority in the smallest quintile, likely reflecting individuals who set up small firms or work as self-employed consultants, often in an industry in which they have extensive experience.

After we assign a quintile to each firm, we calculate seniority. First, we estimate individual *i*'s labor force entry date using the individual's college graduation date. Second, for every title *t* in industry *j* in firm with size quintile *k* (henceforth denoted as *tjk*) obtained by individual *i*, we calculate the time it takes *i* to attain *tjk* as the difference between the date when *tjk* first appears in *i*'s work history and *i*'s labor force entry date. Third, we subset the *tjki* observations to jobs that were first attained in year *y*. We define initial seniority value $\widetilde{S_{tjky}}$ as the median time taken to achieve *tjk* for individuals who first achieved *tjk* between in year *y*. The seniority of a position is based on the median time taken to reach the title-industry-firm size combination for jobs started in that year. This allows seniority to vary over time within title-industry-firm size combination as positions and titles evolve. This also allows individuals' seniority to change even if they do not switch jobs, making their position in the seniority hierarchy more dynamic. For titles with too few observations to reliably calculate seniority based on data from one year, we extend the period of observation and consider jobs from year *y-5* to year *y*.

There are jobs for which we cannot link the raw firm name to a company ID or the firm name and company ID are missing in the raw Lightcast data. For these positions, we estimate seniority using just the title-industry combination. These jobs are similar in title and industry to

those for which we also measure firm size; there does not appear to be significant selection into missing firm size.

4 Summary Statistics and Validation Tests

In this section, we present descriptive statistics and validate the utility of our novel seniority measure.

4.1 Career Length versus Career Achievement

Table 1 summarizes the careers of all individuals in our identified dataset. The average individual has 4.55 jobs over an observed career of 11.42 years. While median (mean) seniority is 5 (6.59) at the job level, most individuals eventually attain more senior positions—with a median (75^{th} percentile) reaching peak seniority of 10.5 (16).

Table 2 presents median seniority values across a subsample of job titles. More influential and prestigious titles have higher seniority values. Panel A reports the twenty most common titles and their median seniority values. The most junior titles are typically held by undergraduates or recent graduates (e.g., intern, research assistant, software engineer). The most senior titles are managerial roles, such as CEO, Principal, or Partner. As shown by Table 1, the peak seniority obtained by the average individual is 11.13. This seniority level corresponds to titles like "Director," a relatively high-ranking role that is typically a level or two below the most senior managerial roles. These summary statistics imply that most individuals progress through an organizational hierarchy over time but do not reach its highest levels.

Panel B reports the most and least senior titles with at least 150 observations in the entire dataset. Academic and advisory positions dominate the most senior titles, led by "Professor

Emeritus" and "Audit Committee Chair" with a seniority of 30. The most junior titles are entry-level jobs, likely often held part-time by our college-educated sample (e.g., "Customer Service Staff").

Figure 1 shows how the mean seniority of different individuals, grouped by the peak seniority achieved over their careers, evolves over time. We see distinct groups of workers who differ not only in peak seniority attained, but also in overall career trajectory. Some groups start and end their careers in low-seniority jobs. Other groups ascend to medium-seniority jobs 10-15 years into their careers and remain in similar positions. Finally, a small group of individuals gradually ascend throughout their careers toward high levels of seniority. This figure presents the general pattern of people's careers. Most people ultimately reach a plateau, and that the plateau can come quite early for most. This plateau captures the idea that career length does not necessarily translate to career achievement. Figure 1 also demonstrates that individuals can descend the seniority hierarchy as well. For example, the average seniority of the group with peak seniority between 10 and 15 is typically below 10, implying that individuals can achieve a peak seniority and then return to lower-seniority jobs. If this were not the case, the average seniority for that group would steadily rise to somewhere between 10 and 15.

Table 3 presents some summary statistics that underscore the fact that seniority is not equivalent to career length. The table presents the share of individuals with a career length of X that, at any point, held a job with seniority level S or greater. For example, only 19% of individuals who have been in the labor force for 20 years have held a job that has a seniority level of 20 or greater. Notably, individuals early in their careers are more likely to reach a seniority level at least equal to their career length, consistent with the notion of a corporate pyramid. Since there are relatively more low- and mid-ranking positions, most individuals are able to progress into the

middle tiers of the hierarchy. Reaching the top of the hierarchy takes years of experience, and with only a few positions available, only a minority make it that far.

4.2 Seniority, Education, and Wage

In this section, we examine the relationship between seniority and education. Figure 2 shows the average seniority over time for graduates of elite colleges, Tier 2 colleges, and all other colleges. The averages are roughly equal at graduation, but over time, graduates of elite colleges outperform those from Tier 2 colleges, who in turn outperform graduates from non-elite and non-Tier 2 colleges. Though discernible, the differences are small. Graduates of elite undergraduate colleges achieve a peak seniority of approximately 12.5, a seniority about 1 year higher than Tier 2 graduates' peak seniority. In turn, Tier 2 college graduates average a peak seniority about 0.5 years higher than non-elite or non-Tier 2 college graduates. Figure 2 shows that these differences widen over time. Note that because of censoring, the composition of each cohort is not the same in each career year. For example, individuals who graduated college in 2018 will only have four years of career information.

The divergence in seniority is clearer when we compare careers of those with and without an MBA. Over their careers, the median recipient of an elite (non-elite) MBA degree reaches a peak seniority of 17.5 (15.0), slightly above (below) the 75th percentile of peak seniority, as shown in Table 1. Figure 3 shows how these differences change over time. Individuals with MBAs begin their careers more senior to non-MBA holders, and the difference between elite MBA holders and individuals without MBAs increases only a few years after labor force entry. These differences expand over time. A decade into their careers, elite MBA recipients are on average about 1.1 (2.1) years more senior than non-elite MBA holders (non-MBA educated individuals). Five years later,

the difference grows to 1.7years over non-elite MBAs and 3.2 over non-MBA holders and expands even further by 20 years into the average career.

Furthermore, post-MBA changes in career trajectory, as opposed to pre-MBA selection, appear to explain most of these seniority differences. Figure 4 examines how seniority values change around the year that someone receives their MBA and shows how an MBA degree incrementally affects seniority. All groups have similar early career trajectories; seniority for individuals who will earn MBAs is only slightly higher than for those who do not pursue an MBA. At graduation, however, those with an MBA see their seniority increase immediately relative to non-MBAs, and the gap between MBA and non-MBA seniority only increases over time. This effect is larger for elite MBA degree recipients than for other MBA degree recipients.

Figure 5 explores how seniority behaves with respect to wages. Specifically, we plot, for the 15 most common job titles, their seniority against the log of their average wage, along with a trend line regressing log of the average wage on seniority, with observations at the title-industry level. We also show the same trend line but weighted by the number of observations of a title-industry pair. Reassuringly, we find that seniority is positively correlated with wage; that is, on average, jobs with higher seniority values tend to come with higher wages, as shown by the trend line.

It is also worth noting that the job titles presented on the plot appear to have sensible wage- and seniority combinations. Starting at the bottom left-hand corner, for example, “Teacher” is a fairly low-seniority job that has below-trend wage levels. Moving upward (increasing wage level), but not necessarily rightward (small seniority increase), we see that software engineers and associates in professional services are not more much more senior but earn significantly more than

teachers. These points align with our priors about these jobs; IT and professional services are higher-paying industries than education, even for titles of similar seniorities.

Job titles that appear in the upper part of the grid also make sense. The wage-by-seniority combinations are particularly sensible for lawyers' career paths. New law school graduates who work as law clerks earn relatively lower wages (plotted in Appendix Figure 1), but their wages jump when they become attorneys in the private sector. After some time, they become partners at their law firms and earn some of the highest wages in the labor market. Overall, these simple analyses show that seniority is a sensible measure of career attainment because it behaves in an intuitive way with respect to education and wages.

4.3 Seniority Versus Wages

One potential critique of the seniority measure is that it may not capture economic value beyond what is already reflected in wages. In this section, we use job transitions to show that seniority contains useful information that is orthogonal to wage. In other words, the analysis below demonstrates that, holding wages fixed, higher levels of seniority command higher economic value in the labor market.

Table 4 presents a three-dimensional grid where, for each job switch that we observe in the data, we assign the previous job to a wage-by-seniority decile cell on the grid and, for all job switches in each cell, we calculate the mean and standard error of the mean of the current job's wage decile. In each previous-job wage decile column, we can see that, generally, the current job's average wage decile increases as previous-job seniority decile increases. The standard errors are generally small such that the means are mostly statistically different from each other. In other words, holding fixed previous job's wage bin, higher previous-job seniority levels are associated

with higher current job wages, which is consistent with the idea that the seniority measure captures economic value that is orthogonal to wage and, therefore, can be used to "buy" higher wages when workers switch jobs.[4]

Seniority is especially useful when studying job switches from the public sector into the private sector because the variation in wages can be relatively low among public sector jobs and changes in wage can be small when public-sector careers progress. This point can be seen in the lower right quadrant of Appendix Figure 1, which shows that the correlation between seniority and wage is especially low in the public sector. Therefore, qualitatively, among individuals who work in the public sector, differences in wage may not be a meaningful indicator of differences in skill, experience, and productivity. In particular, differences in wage may not be a good predictor of private-sector opportunities that public-sector workers are able to obtain. Job transition between the public and private sectors is an important labor market event to study for many branches of economics. For example, the literature on the revolving door of government (Blanes i Vidal et al., 2012) suggest that senior government workers can leverage their deep public sector experience into financially lucrative jobs in the private sector. The same story applies when prominent academics move to the private sector. Table 5 presents the results from the same empirical exercise as in Table 4 but applied to the sample of job switches that can be classified as a switch from the public sector (NAICS codes 61, education services, and 92, public administration) to the private sector (other NAICS codes).[5] Once again, looking down each wage decile column, we can see that,

[4] There is mean reversion in the data. Very high-wage individuals (wage decile 10), on average, transfer into lower-wage jobs. This is to be expected because high-achieving individuals do not always end their careers with the highest paid jobs. For example, CEOs of large companies transition into advisor or academic roles at the end of their careers.

[5] Appendix Figure 1 presents common job titles that can be classified into four groups: high-wage and high-seniority jobs, high-wage and low-seniority jobs, low-wage and low-seniority jobs, and low-wage and high-seniority jobs. The lower left quadrant of the figure presents some examples of job titles (e.g., teacher, research assistant, etc.) that are included in the analysis that we present in Table 4.

generally, individuals in the public sector are able to convert higher levels of seniority into higher wage levels in their private sector jobs, holding fixed their previous-job wage.

We also present results from the same exercise for the sample of job transitions within the private sector in Table 6. As in Table 5, individuals with higher seniority move to jobs with higher wages for a given wage decile column. However, the effect of seniority is much smaller. For example, the average wage decile given a previous wage decile of 5 ranges from 6.11 to 6.49 in Table 6, while the comparable range in Table 5 is 5.54 to 7.02. Seniority can provide significant information about a job, especially in the public sector, and even within the private sector, where flexible wages capture most relevant information about a position, seniority stills adds useful information. It is helpful to use real-life examples to contextualize the analysis presented in Table 5 in the larger labor economics literature, which generally uses wages to measure career progression, human capital, or returns to education. Through the lens of wages, Timothy Geithner, who has held many prominent but relatively low-wage public sector jobs (e.g., President of the Federal Reserve Bank of New York and Secretary of Treasury) would appear to have a relatively mediocre career and human capital compared to his peers in the private sector, which is an incorrect conclusion. Our seniority measure, on the other hand, would suggest that Timothy Geithner had an exceptional career in the public sector because his last two public-sector jobs have very high seniority values, which correctly reflects his labor market value and human capital accumulation. Of course, this conclusion is correctly corroborated by the fact that, after serving as Secretary of Treasury, Timothy Geithner was able to obtain a lucrative private-sector job, Chairman of Warburg Pincus, a prominent private equity firm. Vice versa, wages alone would suggest that Jerome Powell's transition from his lucrative job in private equity to the Federal Reserve Board is a demotion or a "bad" career progression. However, our seniority measure would

correctly capture the economic reality that his transition to become the chairman of the Federal Reserve is an exceptional career achievement.

5 Conclusion

In this paper, we propose a non-pecuniary measure of career achievement, *seniority*. We construct this measure based on a detailed database of over 150 million resumes. This measure exploits the variation in median time to attain different job titles in different industries for firms of different sizes. By evaluating the time required to reach a certain job title, seniority captures a person's standing in a general employment hierarchy. These standings facilitate inference about career progression across industries or functional roles—even when stark differences in wages render these sectors or areas of business not directly comparable. As such, the seniority measure offers an important new measure for evaluating labor market outcomes, complementing the traditionally used pecuniary measures, such as wages.

Seniority captures meaningful variation across people's career trajectories. First, the most common job titles follow a clear pattern. Typical entry-level roles (e.g., "analyst") are more junior, while executive and advisory roles are the most senior. Second, career trajectories by educational attainment follow paths we would expect. Graduates of more prestigious colleges and, especially, individuals with MBAs outperform other individuals in terms of how quickly their seniority rises and the peak seniority they achieve over their careers. For most individuals, seniority plateaus around fifteen to twenty years into their careers. Relatively few individuals progress to the highest levels of their organization; most reach middle levels of seniority and remain there. This pattern accurately captures the reality of corporate pyramids. Lastly, we use job switchers to provide evidence that seniority contains economic information about a person's human capital that is

priced by the labor market: higher seniority enables moves to higher-paying jobs, especially in wage-compressed sectors such as the public and education sectors.

We view seniority as an important new metric by which researchers can assess career achievement. While standard analysis of wages will always be important, we believe that in many contexts, seniority will have greater utility in assessment of career achievement across industries and functional areas and will open up new areas of labor economics research such as topics related to the economic value of job titles, the non-pecuniary benefits of work, and how people in the job market make trade-offs between titles, hierarchies, and wages.

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Figure 1: Seniority Levels Over Time

This figure presents average seniority levels over peoples' careers where individuals in the sample are sorted into five groups according to the peak seniority level that they achieve in their career. The x-axis is the number of years since college graduation.

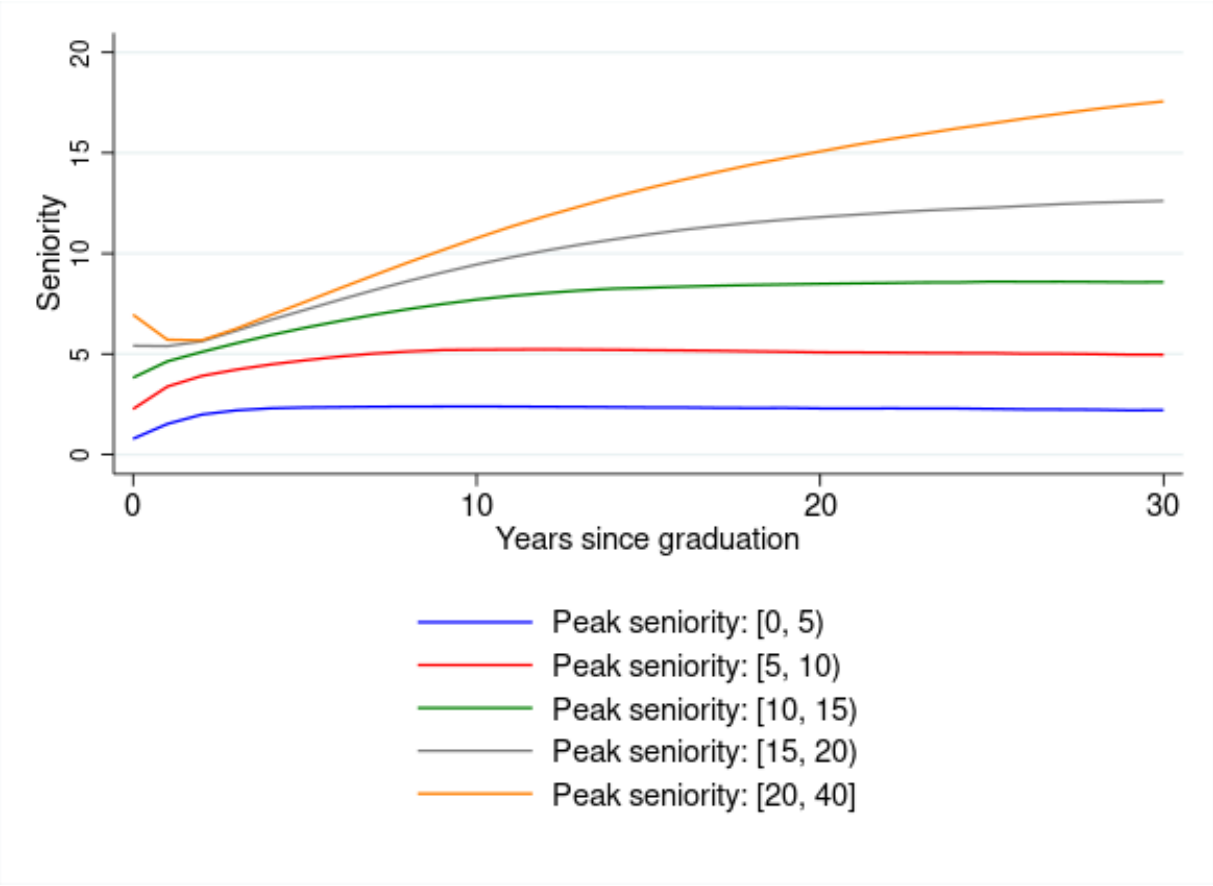


Figure 2: Average Seniority Level Over Time by College Tier

This figure presents average seniority level over peoples' careers where individuals in the sample are sorted into three groups according to the tier of college that they attended. The x-axis is the number of years since college graduation. Appendix Tables 1 and 2 list colleges that belong to each tier.

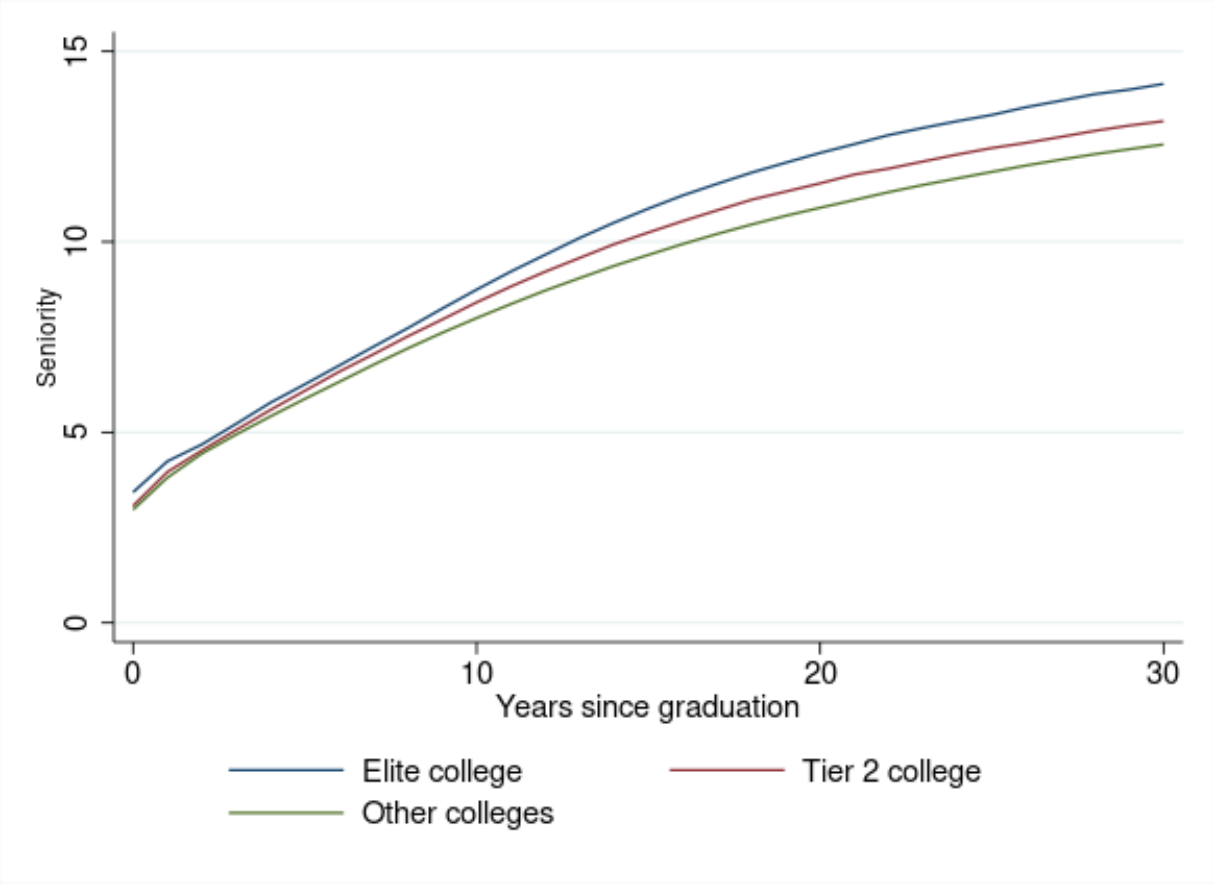


Figure 3: Average Seniority Level Over Time by MBA Education Group

This figure presents average seniority level over peoples' careers where individuals in the sample are sorted into three groups according their graduate business school education attainment. The x-axis is the number of years since college graduation. Elite MBA schools are Booth, Harvard, Kellogg, Stanford, and Wharton.

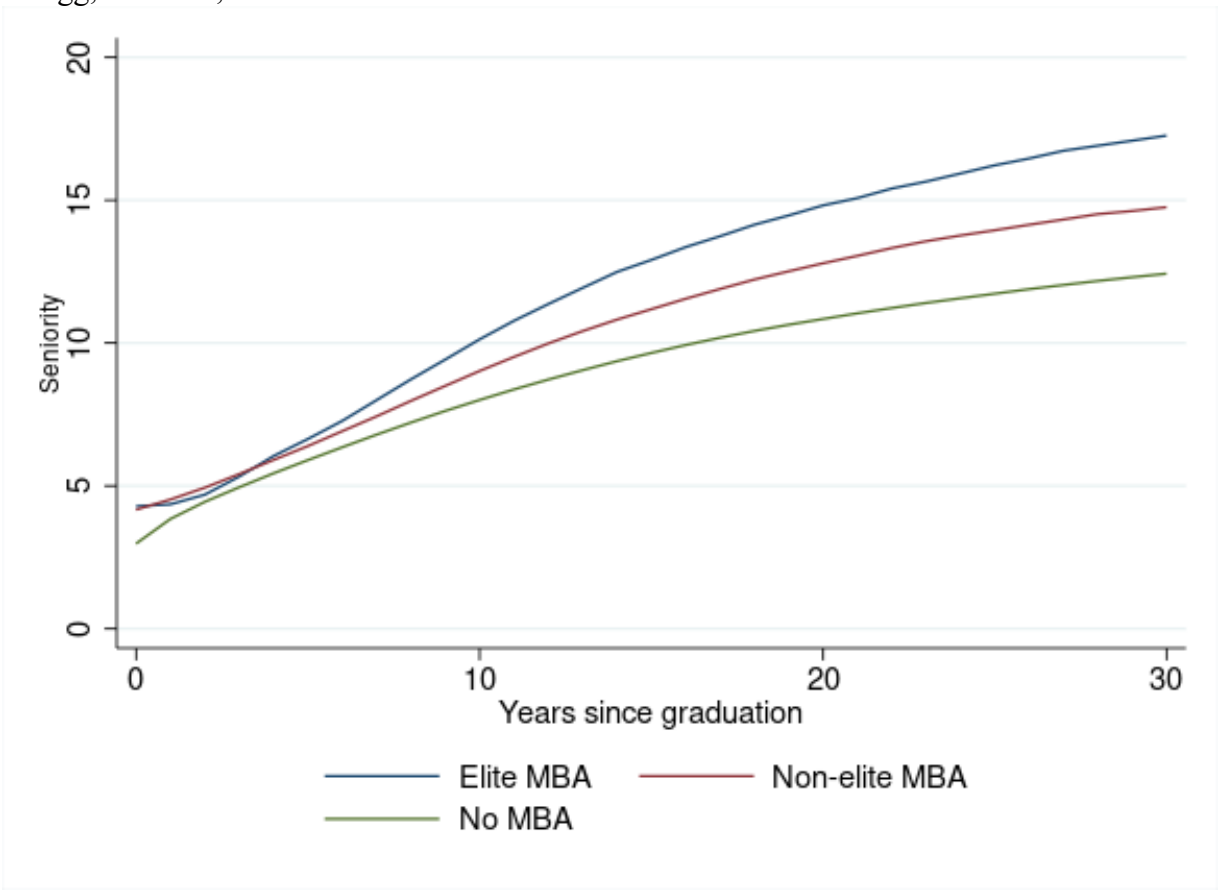


Figure 4: Average Seniority Level Around MBA Graduation Year

This figure presents average seniority level around the year when people receive their MBA degree. Individuals in the sample are sorted into three groups according their graduate business school education attainment. Elite MBA schools are Booth, Harvard, Kellogg, Stanford, and Wharton. The x-axis is the year relative to MBA graduation. For MBA holders, MBA graduation year is set to t = 0. For non-MBA holders, the median time to MBA graduation is set to t = 0.

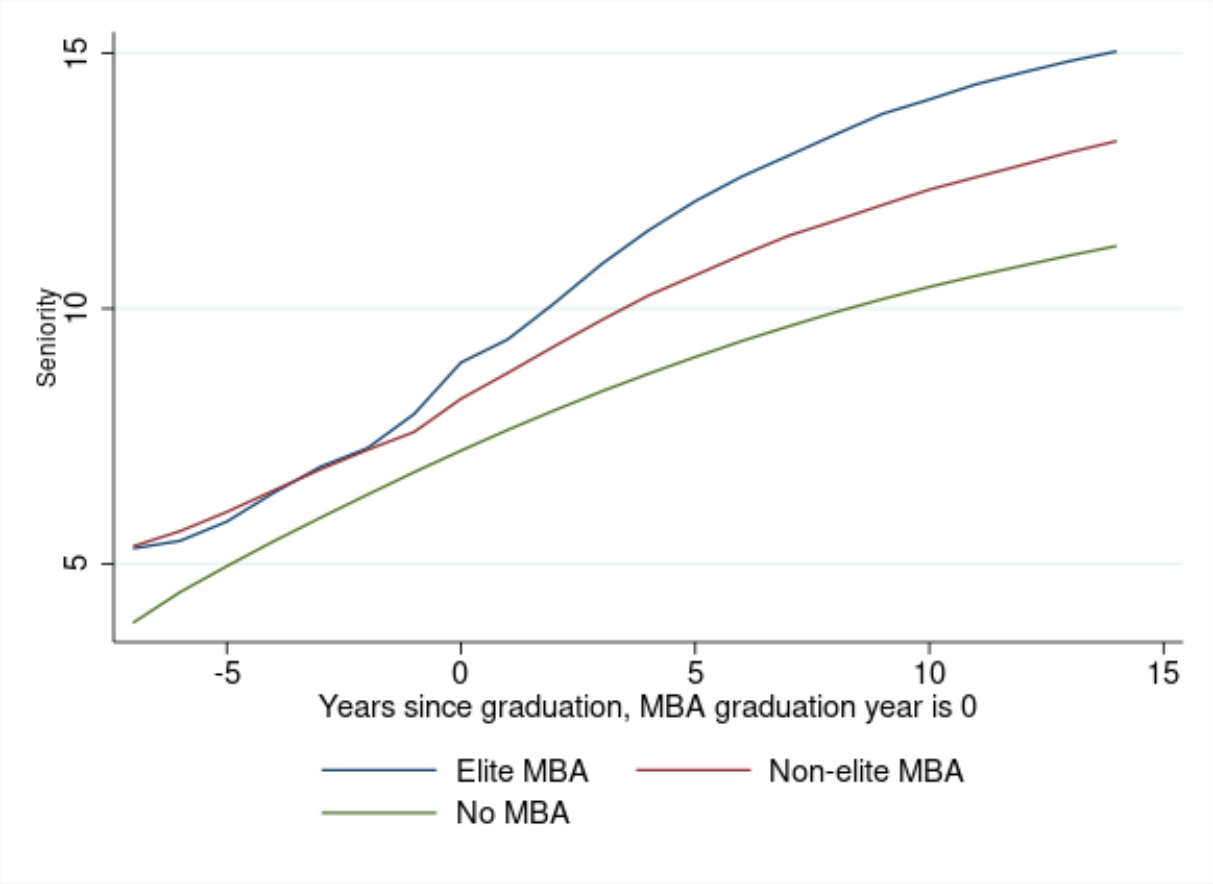


Figure 5: Job Titles, Seniority Levels, and Wage

This figure plots the fifteen most common job titles and their respective NAICS codes by the log of their mean wage and seniority. The solid trend line plots predicted log wages from regressing the log of mean wage on mean seniority, weighted by the total number of title-industry observations. The dashed trend line is produced from the same model but is unweighted. Observations are at the title-industry level. The NAICS codes corresponding to the industries in the figure are: 52 – Finance; 54 – Professional services; 61 – Education.

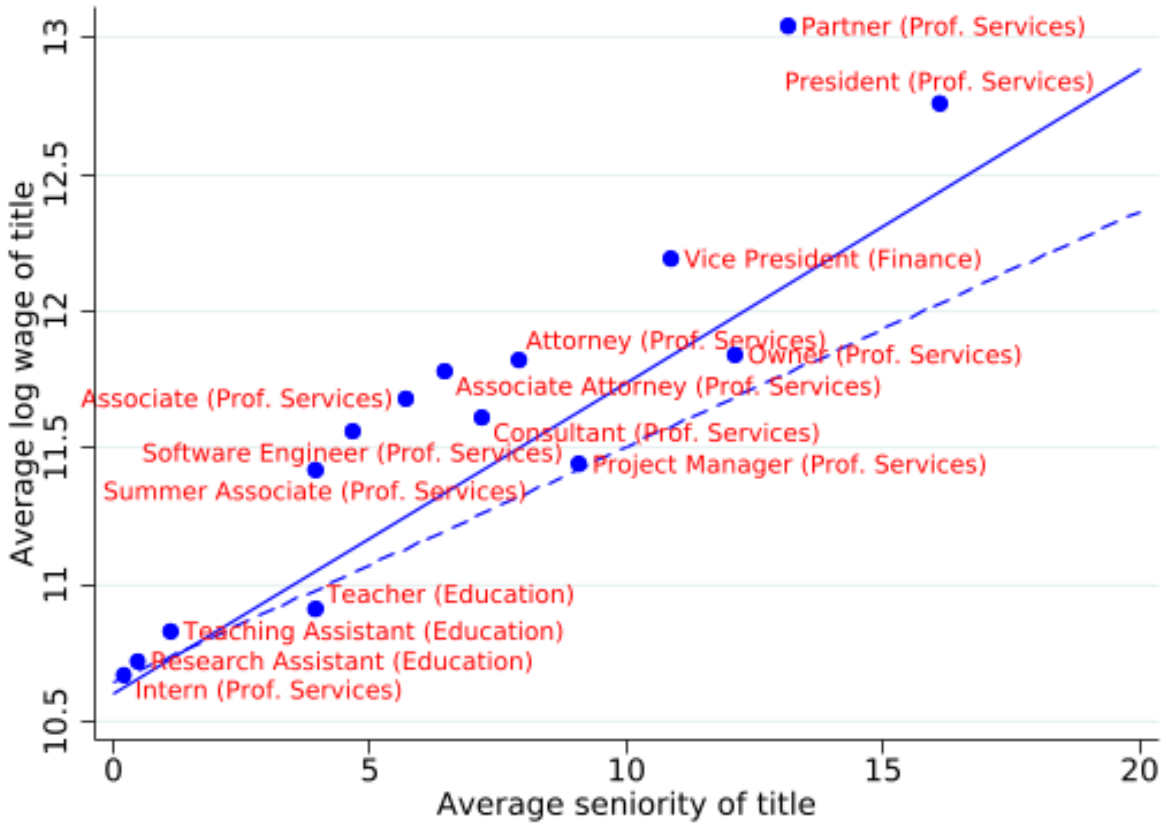


Table 1: Sample Summary Statistics

This table presents summary statistics for all individuals in our sample. Tenure is the number of years spent in a role. Seniority, defined precisely in the text, captures the median number of years it takes to obtain a given job. Estimated wages are in USD, use data from Revelio Labs, and are inflation-adjusted to 2024 levels. Years in data is defined as the total time of an individual's career (their last end date minus their first start date). Peak seniority (wage) is an individual's maximum seniority (wage) attained over the course of their career.

Job-level variables	Count	Mean	S.D.	25th Percentile	Median	75th Percentile
Tenure	19,307,914	2.81	3.95	1.00	2.00	3.00
Seniority	14,125,431	6.59	5.77	2.00	5.00	10.00
Wage	15,778,944	111,047	127,849	48,127	74,217	118,568
Person-level variables	Count	Mean	S.D.	25th Percentile	Median	75th Percentile
Career						
Years in data	4,690,911	11.42	9.99	4.00	9.00	17.00
Total jobs	5,598,611	4.55	3.58	2.00	4.00	6.00
Seniority						
Peak seniority	4,324,161	11.13	6.66	6.00	10.50	16.00
First reported seniority	4,324,161	4.88	4.84	1.00	4.00	7.00
Last reported seniority	4,324,161	9.15	6.29	4.00	8.00	13.00
Wages						
Peak wage	4,309,117	181,566	197,594	74,928	116,831	212,720
First reported wage	4,309,117	89,691	109,638	41,426	59,429	92,330
Last reported wage	4,309,117	147,941	158,678	63,690	98,322	165,225

Table 2: Examples of Job Titles and Seniority Levels

This table lists the most common job titles in our sample (Panel A) and the most senior and the most junior job titles (Panel B). Here, seniority is defined as the unconditional median of years since college graduation that it took to first attain this title, based on all resumes in the data. Titles with fewer than 150 observations are excluded from Panel B.

Panel A: Most common job titles

Rank	Title	Median Seniority	Rank	Title	Median Seniority
1	Intern	0	11	Founder	9
2	Owner	11	12	Partner	14
3	President	16	13	Manager	5
4	Research Assistant	1	14	Account Executive	5
5	Associate	6	15	Sales Associate	-1
6	Project Manager	9	16	Director	11
7	Chief Executive Officer	14	17	Principal	15
8	Consultant	8	18	Account Manager	6
9	Software Engineer	5	19	Attorney	8
10	Vice President	13	20	General Manager	9

Panel B: Most senior and most junior job titles

Title	Median seniority	Title	Median seniority
Professor Emeritus	30	Security Police Officer	-3
Audit Committee Chair	30	Floor Model	-3
Executive in Residence	28	Customer Service Staff	-3
Vice President of Clinical Development	27	Pool Lifeguard	-3
Vice President of Exploration	27	ROTC Cadet	-3
Chair Emeritus	27	Carhop	-3
Consulting Chief Financial Officer	26	Bag Room Attendant	-3
Distinguished Scientist	26	Party Host/Hostess	-3
Member of Strategic Advisory Board	26	Front Services Clerk	-3
Executive Chairman	26	Lifeguard Assistant Manager	-3

Table 3: Seniority Achievement and Career Length

This table shows the percentage of individuals at a given career length (vertical axis) who reach or exceed a given seniority level (horizontal axis). For example, 81% of individuals with exactly 8 years of career information in our data have a peak seniority of 6 or higher. Seniority, defined precisely in the data section, captures the number of years it takes, on average, to obtain a given job title in a given industry.

Career length \ Seniority	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	100																			
2	100	93																		
3	100	96	89																	
4	100	97	92	84																
5	100	98	94	88	79															
6	100	98	95	91	83	74														
7	100	99	96	92	86	78	68													
8	100	99	97	94	88	81	73	63												
9	100	99	97	95	90	84	76	67	59											
10	100	99	98	95	91	86	79	71	64	56										
11	100	99	98	96	93	88	81	74	67	60	52									
12	100	99	98	96	93	89	83	77	70	63	56	49								
13	100	100	98	97	94	90	85	79	73	66	59	52	44							
14	100	100	99	97	95	91	86	81	75	69	62	55	48	41						
15	100	100	99	97	95	92	87	82	77	71	64	57	50	44	37					
16	100	100	99	98	95	92	88	83	78	73	67	60	53	46	40	34				
17	100	100	99	98	96	93	89	84	80	74	69	62	55	48	42	36	30			
18	100	100	99	98	96	93	90	86	81	76	70	64	57	51	45	38	32	27		
19	100	100	99	98	96	93	90	86	82	77	72	66	59	53	46	40	34	28	23	
20	100	100	99	98	96	94	90	87	83	78	73	67	61	55	48	42	36	30	24	19

Table 4: Wage Decile by Previous Seniority and Previous Wage Decile – All Job Switchers

Using all job switchers in the sample, we assign jobs to a seniority-by-wage decile cell in the grid and compute the mean and standard error of the mean of the wage decile of the individual's next job. Deciles are calculated over all jobs.

		Previous job wage decile									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Previous job seniority decile	**1**	3.60 (.01)	4.14 (.01)	4.67 (.01)	5.10 (.01)	5.75 (.01)	6.11 (.01)	6.53 (.02)	7.09 (.02)	6.54 (.04)	6.96 (.05)
	2	3.70 (.01)	4.27 (.01)	4.77 (.01)	5.24 (.01)	5.87 (.01)	6.33 (.01)	6.61 (.02)	6.75 (.03)	6.95 (.04)	8.31 (.05)
	3	3.75 (.01)	4.32 (.01)	4.76 (.01)	5.31 (.01)	5.86 (.01)	6.43 (.01)	6.77 (.01)	6.96 (.02)	7.06 (.03)	8.32 (.05)
	4	3.81 (.01)	4.38 (.01)	4.79 (.01)	5.30 (.01)	5.98 (.01)	6.52 (.01)	7.09 (.01)	7.30 (.01)	7.32 (.02)	8.42 (.03)
	5	4.00 (.02)	4.46 (.01)	4.92 (.01)	5.44 (.01)	6.06 (.01)	6.56 (.01)	7.13 (.01)	7.68 (.01)	7.68 (.01)	8.46 (.02)
	6	4.28 (.04)	4.55 (.02)	4.97 (.02)	5.54 (.01)	6.08 (.01)	6.58 (.01)	7.02 (.01)	7.58 (.01)	7.74 (.01)	8.38 (.02)
	7	4.42 (.04)	4.78 (.02)	5.21 (.01)	5.70 (.01)	6.14 (.01)	6.58 (.01)	7.02 (.01)	7.45 (.01)	7.80 (.01)	8.46 (.01)
	8	4.73 (.05)	4.95 (.03)	5.26 (.02)	5.74 (.02)	6.30 (.01)	6.73 (.01)	7.17 (.01)	7.39 (.01)	7.94 (.01)	8.57 (.01)
	9	5.05 (.08)	5.31 (.06)	5.63 (.04)	5.75 (.03)	6.33 (.02)	6.80 (.02)	7.25 (.01)	7.56 (.01)	8.15 (.01)	8.72 (.01)
	10	5.88 (.11)	5.51 (.08)	6.05 (.06)	6.33 (.04)	6.59 (.03)	6.91 (.02)	7.34 (.02)	7.72 (.01)	8.41 (.01)	8.98 (.00)

Table 5: Wage Decile by Previous Seniority and Previous Wage Decile – Public Sector to Private Sector

Using job switchers who moved from a public sector (NAICS codes 61 and 92) job to a private sector job, we assign jobs to a seniority-by-wage decile cell in the grid and compute the mean and standard error of the mean of the wage decile of the individual's next job. Deciles are calculated over all jobs.

		Previous job wage decile									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Previous job seniority decile	**1**	4.10 (.02)	4.55 (.01)	4.96 (.01)	5.38 (.02)	5.54 (.03)	5.69 (.04)	6.00 (.05)	5.98 (.06)	6.25 (.08)	5.57 (.10)
	2	4.33 (.02)	4.79 (.02)	5.29 (.02)	5.60 (.03)	5.80 (.04)	5.92 (.05)	6.07 (.07)	5.94 (.12)	5.83 (.13)	5.83 (.27)
	3	4.21 (.03)	4.69 (.03)	5.15 (.02)	5.55 (.03)	5.93 (.03)	5.97 (.05)	6.38 (.07)	6.11 (.12)	6.14 (.12)	6.65 (.21)
	4	4.29 (.05)	4.70 (.03)	4.97 (.02)	5.35 (.02)	6.09 (.03)	6.63 (.03)	6.91 (.03)	6.34 (.09)	5.97 (.11)	6.70 (.18)
	5	4.45 (.06)	4.86 (.04)	5.17 (.03)	5.52 (.02)	6.10 (.03)	6.54 (.03)	7.01 (.04)	6.82 (.05)	6.52 (.07)	7.36 (.12)
	6	4.77 (.11)	4.95 (.07)	5.19 (.05)	5.66 (.04)	6.02 (.04)	6.53 (.05)	6.72 (.06)	6.78 (.07)	6.87 (.09)	7.32 (.15)
	7	4.82 (.09)	5.25 (.06)	5.62 (.04)	6.14 (.03)	6.24 (.03)	6.39 (.04)	6.77 (.05)	7.24 (.05)	7.20 (.05)	7.66 (.08)
	8	5.32 (.17)	5.63 (.11)	5.50 (.07)	5.92 (.05)	6.52 (.04)	6.86 (.04)	7.20 (.04)	7.14 (.03)	7.43 (.03)	8.03 (.05)
	9	5.33 (.26)	5.60 (.20)	5.75 (.12)	5.90 (.10)	6.49 (.09)	7.02 (.08)	7.04 (.07)	7.35 (.06)	7.80 (.03)	8.01 (.05)
	10	5.97 (.31)	6.96 (.27)	6.60 (.15)	6.78 (.14)	7.02 (.11)	7.10 (.10)	7.28 (.09)	7.47 (.08)	8.07 (.03)	8.55 (.03)

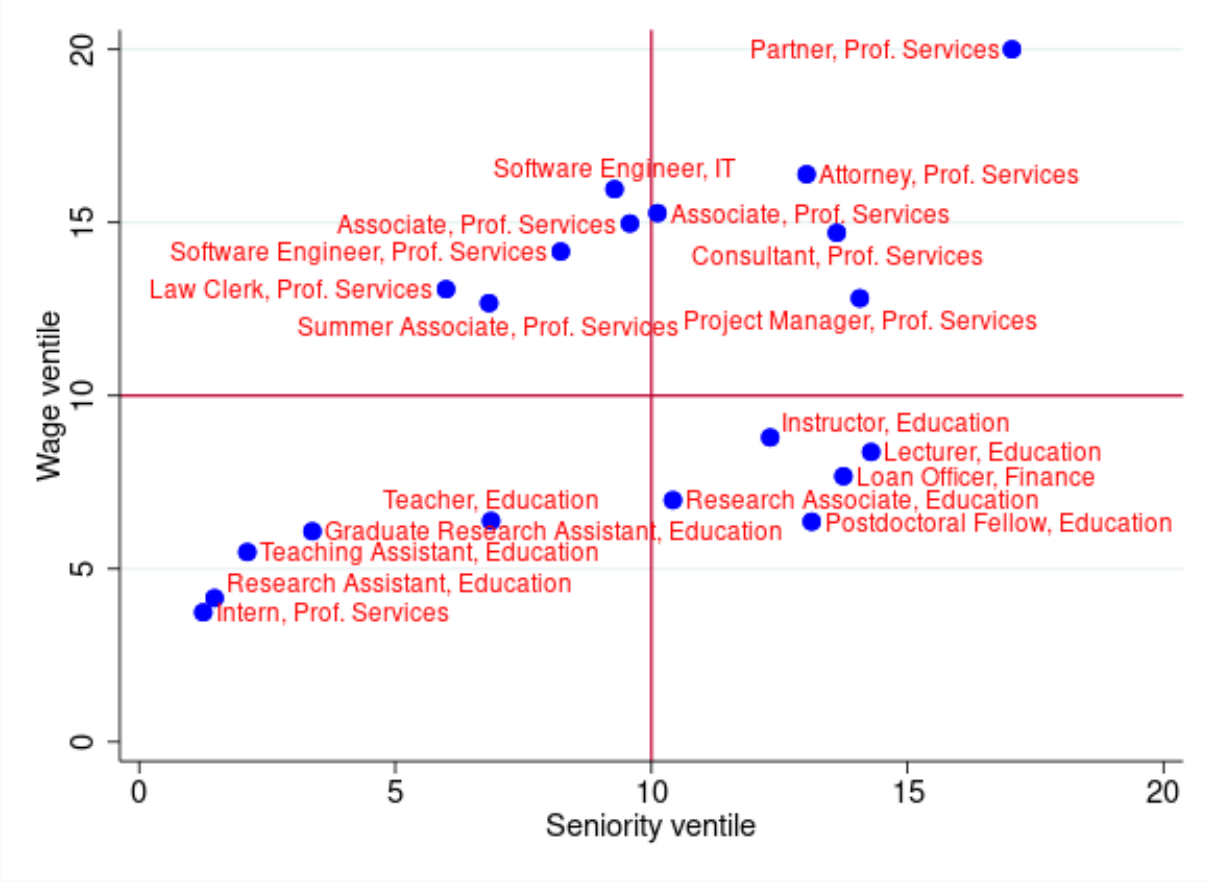
Table 6: Wage Decile by Previous Seniority and Previous Wage Decile – Private Sector to Private Sector

Using job switchers who moved between private sector jobs, we assign jobs to a seniority-by-wage decile cell in the grid and compute the mean and standard error of the mean of the wage decile of the individual's next job. Deciles are calculated over all jobs.

		Previous job wage decile									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Previous job seniority decile	**1**	3.64 (.01)	4.26 (.01)	4.92 (.01)	5.39 (.01)	6.11 (.02)	6.60 (.01)	6.89 (.02)	7.58 (.02)	7.80 (.04)	8.03 (.06)
	2	3.70 (.01)	4.31 (.01)	4.90 (.01)	5.39 (.01)	6.09 (.01)	6.61 (.01)	7.05 (.02)	7.00 (.03)	7.37 (.03)	8.85 (.05)
	3	3.79 (.02)	4.38 (.01)	4.92 (.01)	5.46 (.01)	6.01 (.01)	6.68 (.01)	7.10 (.01)	7.28 (.02)	7.58 (.03)	8.85 (.04)
	4	3.81 (.02)	4.42 (.01)	4.97 (.01)	5.49 (.01)	6.09 (.01)	6.70 (.01)	7.33 (.01)	7.67 (.01)	7.75 (.02)	8.84 (.03)
	5	3.95 (.03)	4.45 (.02)	5.00 (.01)	5.56 (.01)	6.12 (.01)	6.65 (.01)	7.20 (.01)	7.90 (.01)	8.15 (.01)	8.78 (.02)
	6	4.22 (.05)	4.59 (.03)	5.03 (.02)	5.56 (.02)	6.15 (.01)	6.66 (.01)	7.11 (.01)	7.64 (.01)	8.17 (.01)	8.67 (.02)
	7	4.39 (.05)	4.69 (.03)	5.15 (.02)	5.61 (.01)	6.18 (.01)	6.66 (.01)	7.09 (.01)	7.54 (.01)	8.08 (.01)	8.74 (.01)
	8	4.81 (.07)	4.85 (.04)	5.28 (.03)	5.68 (.02)	6.24 (.01)	6.72 (.01)	7.17 (.01)	7.55 (.01)	8.06 (.01)	8.87 (.01)
	9	5.09 (.12)	5.16 (.08)	5.76 (.06)	5.79 (.03)	6.27 (.02)	6.81 (.02)	7.26 (.01)	7.62 (.01)	8.14 (.01)	9.00 (.01)
	10	5.51 (.16)	5.21 (.11)	5.70 (.09)	6.16 (.06)	6.49 (.03)	6.92 (.02)	7.36 (.02)	7.73 (.01)	8.33 (.01)	9.17 (.00)

Appendix Figure 1: Job Titles and Seniority Levels by High/Low Seniority/Wage Combinations

This figure plots the five most common job titles and their respective NAICS codes for each seniority-by-wage quadrant. The NAICS codes corresponding to the industries in the figure are: 51 – IT, 52 – Finance; 54 – Professional services; 61 – Education.



Appendix Table 1: College Classification

This table presents our classification of elite and Tier 2 classification of colleges.

Elite Colleges	Tier 2 Colleges
Brown University	Amherst College
Columbia University	Boston University
Cornell University	Georgetown University
Dartmouth College	Johns Hopkins University
Duke University	Macalester College
Harvard University	New York University
Massachusetts Institute of Technology	Northeastern University
Northwestern University	Pomona College
Princeton University	Rice University
Stanford University	Tufts University
University of California, Berkeley	University of California - San Diego
University of Chicago	University of Michigan
University of Pennsylvania	University of North Carolina at Chapel Hill
Yale University	University of Southern California
	University of Virginia
	Vanderbilt University
	Wesleyan University
	Williams College

Appendix Table 2: Colleges in the Sample

This table presents colleges whose graduates appear in our core sample.

1	Boston University	23	Stanford University
2	Brigham and Young University	24	Syracuse University
3	Brown University	25	Texas A&M University
4	Colgate University	26	Tufts University
5	Colorado University	27	U. of Arizona
6	Columbia University	28	U. of California (Berkeley)
7	Cornell University	29	U. of California (Davis)
8	Dartmouth College	30	U. of California (Los Angeles)
9	Duke University	31	U. of Florida
10	Georgetown University	32	U. of Illinois (Urbana-Champaign)
11	Georgia Institute of Technology	33	U. of Maryland (College Park)
12	Harvard University	34	U. of Michigan
13	Indiana University	35	U. of Minnesota (Twin Cities)
14	Johns Hopkins University	36	U. of North Carolina (Chapel Hill)
15	Lehigh University	37	U. of Pennsylvania
16	Michigan State University	38	U. of Southern California
17	Northeastern University	39	U. of Texas
18	Ohio State University	40	U. of Virginia
19	Penn State University	41	U. of Washington
20	Purdue University	42	U. of Wisconsin
21	Rice University	43	US Naval Academy
22	Southern Methodist University	44	Yale University