Is hiring fast a good sign?
The informativeness of job vacancy duration for future firm profitability

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Abstract

Job vacancy duration reflects the time a firm spends searching, selecting, and hiring for a job opening. Capturing vacancy duration using the creation and deletion dates of job postings by US public firms, we examine the informativeness of vacancy duration for future firm profitability. We find that while firms that quickly fill *low-skill* job vacancies exhibit higher future profitability, firms that take more time to fill *high-skill* jobs exhibit higher future profitability. Our cross-sectional analyses across the benefits and costs of candidate selection and performance expectations suggest that the informativeness of vacancy duration comes from its reflection of firms' hiring strategies. That is, firms expecting higher profitability recruit more intensively to avoid the opportunity cost associated with vacancies for *low-skill* jobs and to ensure the selection of high-quality workers for *high-skill* jobs. Further analyses show that the implication of job vacancy duration for future profitability is not incorporated timely in the capital markets, as evidenced by pessimistic analyst forecasts and positive earnings announcement returns in future quarters for firms with short (long) durations for low-skill (high-skill) jobs. These results demonstrate the informativeness of job vacancy duration for firm profitability and advance the understanding of firms' hiring strategies.

Keywords: Job vacancy duration; Job postings; Human capital; Firm profitability

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1 Introduction

Human capital plays an increasingly important role in firms' success, as employees not only drive innovation but also control product quality and customer experience. To maintain and develop human capital, firms constantly engage with the labor market to recruit new workers. For example, Walmart, the largest employer in the United States with 1.6 million employees, hired more than 700,000 new workers in 2021. Even for less labor-intensive firms, the recruiting process involves numerous decisions and substantial costs. For instance, Google, with less than 130,000 employees, receives more than 3 million job applications annually, and, after an elaborate series of assessments and interviews with recruiters and potential colleagues, roughly 0.25% of applicants are hired.

Different from investments in physical resources, such as fixed assets and inventory, for which the acquisition process is largely unobservable to the public, a firm's acquisition of human capital leaves frequent footprints through interactions with the labor market. In this study, we focus on an observable aspect of firms' hiring activity, job vacancy duration—the time a firm spends searching for, selecting, and hiring a worker for a job opening—and examine its informativeness for future firm profitability.

The relationship between job vacancy duration and future firm profitability is determined by firms' hiring practices—whether firms anticipating higher profitability (high-profitability firms, hereafter) hire fast or slow. Firms have incentives to fill vacancies quickly because leaving a job opening vacant with other physical and human resources already in place limits a firm's productivity and reduces the efficiency of the invested capital (Davis 2001). On the other hand, hiring slowly allows an employer to select from a larger pool of applicants, carefully evaluating

candidates' skill qualifications and culture compatibility with the firm. Although such selection processes take longer, they potentially yield workers of higher quality.

We hypothesize that high-profitability firms hire quickly for jobs with low skill requirements (low-skill jobs, hereafter) but slowly for jobs with high skill requirements (high-skill jobs, hereafter). Rent-sharing theory in labor economics suggests that firms facing higher productivity spend more on job advertising and offer higher wages and better non-wage benefits (Card et al. 2014; Card et al. 2016; Barth et al. 2016). These firms therefore attract more applicants (Marinescu and Wolthoff 2020; Dal Bó et al. 2013; Banfi and Villena-Roldan 2019) and are less likely to lose candidates to competitors. We expect high-profitability firms to utilize such hiring advantages differently for low- versus high-skill jobs. For low-skill jobs, applicants tend to be homogeneous, and extensive candidate screening and selection yields limited benefits. Facing higher opportunity costs, high-profitability firms utilize their advantage in attracting candidates and fill vacancies faster (Kass and Kircher 2015; Gavazza et al. 2018). In contrast, high-skill workers play more important roles, and applicants vary significantly in skills and experience. The benefits of screening and selecting candidates for high-skill jobs are thus significantly higher (Albrecht and Vroman 2002; Davis et al. 2013). High-profitability firms, with the advantage of a larger candidate pool and a lower likelihood of losing candidates, select candidates more carefully to ensure quality hires for high-skill jobs (Wolthoff 2018). High-profitability firms' hiring strategy leads to the reduced vacancy cost of low-skill jobs and higher-quality workers for high-skill jobs, which, in turn, benefit firms' future productivity. This hiring behavior predicts that a shorter vacancy duration for low-skill jobs and a longer vacancy duration for high-skill jobs are associated with higher future firm profitability.

We measure vacancy duration as the number of days between the posting and the closing date of a job opening on a company's career website. Vacancy duration naturally varies with job characteristics, industry, and macroeconomic conditions. To effectively control for these impacts and to isolate variations related to firm characteristics, we adjust the raw value of vacancy duration by the mean duration of vacancies for the same job title in the same industry and closed in the same month. Our job postings data cover 30 million job postings by 3,540 US public companies from August 2007 to December 2018.

Consistent with our expectations, our empirical analyses reveal that the relationship between job vacancy duration and firm future profitability varies with the job's required skill level. We find that shorter vacancy durations for low-skill jobs and longer vacancy durations for high-skill jobs in the current quarter are associated with significantly higher return on assets in the future quarters. The multivariate coefficient estimations suggest that a one-standard-deviation change in vacancy durations is associated with differences of 5% to 6% of the average quarterly return on assets (ROA). Our results are robust to controlling for past financial and stock performances, key firm characteristics (e.g., size and growth), and observable labor-related information, including changes in the number of job postings (Gutiérrez et al. 2020), employee turnover (Li et al. 2022), and employee satisfaction (Edmans et al. 2023; Green et al. 2019).

To further test our hypotheses, we examine variations of the duration–profitability relationship with the benefits and costs of candidate selection. We find that longer vacancy duration for high-skill jobs is more informative of higher future profitability when the benefits of candidate selection are heightened (i.e., when the labor supply is sufficient or hiring competition is low) and when opportunity costs are less of a concern (i.e., during business expansion, when hiring can be synchronized with other capital investments). On the other hand, shorter duration

for low-skill jobs is more informative of higher future profitability when low-profitability firms must wait for applicants (i.e., when the labor supply is limited or hiring competition is high) and when opportunity costs are a major concern (i.e., when the vacancy is more likely to be created by turnover). Collectively, these results support our proposed mechanism: that vacancy duration is informative of future profitability, as it reflects firms' hiring strategies in the tradeoff between the costs and benefits of candidate selection.

Moreover, we find that the duration–profitability relationships are more prominent when firms' anticipation of future profitability is more accurate (hiring strategies more accurately reflect future profitability) and when the anticipated profitability change is more permanent (permanent performance changes are more likely to impact hiring strategies). These results further support our conjecture that vacancy duration is informative of future profitability because firms' hiring strategies incorporate management's expectations about future profitability.

Finally, we find significantly pessimistic analyst forecasts and positive earnings announcement returns in the following two quarters among firms with short vacancy durations for low-skill jobs and long vacancy durations for high-skill jobs. These findings indicate that the incorporation of job duration information into future earnings expectations is delayed, possibly due to costs associated with compiling and processing job vacancy information for firms across industries (e.g., Hong and Stein 1999; Hou and Moskowitz 2005; Peng and Xiong 2006).

Our study adds to the understanding of the informativeness of labor market information for future firm performance. Compared to the extensive research on the informativeness of financial disclosures and capital investments, research on labor-related information and investment is limited.[1] Studies in this area mostly focus on labor characteristics and firm risk

[1] In response to the request from investors and institutions, the US Securities and Exchange Commission amended Item 101(c) of Regulation S-K to require its registrants to include a disclosure of their human capital resources in

(Belo et al. 2014; Belo et al. 2017; Zhang 2019; Donangelo et al. 2019). Only a few recent studies examine labor information and future fundamental performance, and these show that higher employee satisfaction (Edmans 2011; Edmans et al. 2023; Green et al. 2019), low internal employee turnover (Li et al. 2022), and higher employee expectation (Huang et al. 2020) are associated with higher future financial performance. While these studies focus on information regarding *existing* workers, our study examines the time spent on acquiring *future* workers. Complementing Gutiérrez et al. (2020), who investigate the number of job creations, our study provides the first evidence on vacancy duration and future firm performance.

Our study is also interesting to the understanding of firms' recruiting and hiring practices. Despite the importance of human resource investment, empirical evidence on the variations in recruiting and hiring practices across firms is scarce, with a few studies suggesting that firms' hiring intensity varies with growth and employer size (Davis et al. 2013; Mongey and Violante 2019). Although our study is not a direct examination of recruiting and hiring practices, our evidence on vacancy duration and future firm profitability suggests that hiring strategies may incorporate a firm's anticipation of future short-term profitability. Our findings suggest that, for high-skill jobs, firms facing higher profitability may not seek to hire fast**,** but rather to hire deliberately, seeking the most-qualified workers. This unexpected finding cannot be explained by traditional search models that assume homogeneous job candidates (Kass and Kircher 2015; Gavazza et al. 2018), but is consistent with predictions from search models that allow heterogeneity in quality among candidates and hiring practices across firms (Wolthoff 2018).

2 Related literature and hypothesis development

2.1 Related literature

Form 10-K, effective November 9, 2020, if such disclosure is material to understanding the listed company's business as a whole.

2.1.1 Job vacancy duration

Searching friction—the time and effort it takes for an employer and a worker to locate each other—receives substantial attention from theoretical and empirical research in labor economics. Existing research focuses on explaining wage and unemployment at both the worker and macro levels, and the empirical evidence on firm-level vacancies and hiring behavior is limited (Card 2011; Kass and Kircher 2015).[2] Davis et al. (2013) utilize the establishment-level data from the Job Openings and Labor Turnover Survey (JOLTS) program and analyze job vacancies and filling rates at the employer level. Subsequent empirical studies continue the employer-level examination using foreign administrative data and online job-posting data.

The evidence shows variations in job vacancy duration across macroeconomic conditions, job skill requirements, and certain firm (employer) characteristics. First, vacancy duration is countercyclical, as jobs get filled faster when the economy is weak and the unemployment rate is high, and slower when the economy is strong and the unemployment rate is low (Davis et al. 2013; Mongey and Violante 2019). Second, jobs requiring lower (higher) skills tend to have shorter (longer) vacancy durations (Davis et al. 2013; Faberman and Menzio 2018). Third, vacancy duration is longer for larger establishments but shorter for establishments with high employee turnover and those expanding their workforce (Davis et al. 2013; Mongey and Violante 2019). We consider these documented variations of vacancy duration when constructing and validating our vacancy duration measure based on online job postings and when designing our regression analyses.

2.1.2 Labor market information and firm performance

The existing literature connecting labor-related information and firm performance has

[2] Earlier studies use the Help Wanted Index or industry-level JOLTS data and examine patterns of hires, separations, and vacancies at the aggregate level (Abraham 1987; Blanchard and Diamond 1989; Hall 2005; Shimer 2005, 2007; Valetta 2005).

mostly focused on how labor force characteristics impact firm risk.[3] Studies show that firms with higher hiring rates (Belo et al. 2014; Belo et al. 2017), higher labor-technology replacement opportunity (Zhang 2019), less mobile workforces (Donangelo 2014), and lower labor-induced operating leverage (Donangelo et al. 2019) are less sensitive to macro or industry shocks and therefore have lower risk premiums (i.e., lower future returns). Furthermore, firms with higher organizational capital (Eisfeldt and Papanikolaou 2013) and those with low loadings on labor market tightness (Kuehn et al. 2017) are more exposed to labor-related risks and thus require higher risk premiums.

A few recent studies examine labor-related information and firms' future financial performance and abnormal stock returns. Edmans (2011), Edmans et al. (2023), and Green et al. (2019) show that firms with higher employee satisfaction tend to have higher future stock returns, suggesting that aggregated employee satisfaction leads to higher productivity or simply reveals firms' better underlying fundamentals. Their findings also indicate that the stock market is delayed in pricing the value-relevant information contained in employee satisfaction. Li et al. (2022) use LinkedIn data to construct measures for internal employee turnover and find that higher internal employee turnover is negatively related to future profitability. Huang et al. (2020) find that the average employee outlook is informative in predicting future operating performance. While these studies examine the informativeness of opinions from the current workforce (reflected through employee satisfaction, turnover, and employee outlook), we study the informativeness of firms' recruiting and hiring strategy (i.e., the acquisition of future workers). We expect a firm's recruiting and hiring strategy to mainly reflect the management's expectation of profitability rather than the opinions of existing rank-and-file employees.

[3] A parallel literature examines how firm characteristics predict unemployment or job creations on the aggregate level (e.g., Kalay et al. 2018; Nallareddy and Ogneva 2017; Rouxelin et al. 2018; Li et al. 2021) or differences in worker pay on the firm level (e.g., Card et al. 2018; Granham et al. 2021; Choi et al. 2023b).

Our study adds to Gutiérrez et al. (2020), who show that an increase in the number of job postings predicts a firm's growth in revenue and earnings. Their findings provide evidence of the informativeness of online job posting information as a timely reflection of a firm's investment in human capital. We extend Gutiérrez et al. (2020) by examining a different aspect of human capital acquisition: the time spent recruiting, selecting, and hiring new workers. As how many to hire and how quickly to hire are two different hiring decisions, we expect job vacancy duration to be informative incremental to changes in the number of job postings.[4]

Our study is related to research in human resource management, which has documented a positive relationship between the overall progressiveness of human resource management practices and operational and financial outcomes. A few studies include recruiting and selection as one aspect of human resource management (Jiang et al. 2012; Huselid 1995); however, research in this area typically relies on survey data, which suffer from non-respondents and respondents' biases and are limited to observations within an organization or a single period. Our study complements this line of work by examining continuous and external observations on the near-universe population of public firms over more than a decade. The timeliness and longitudinal nature of our data enable us to study the informativeness of vacancy duration for future firm performance and examine its cross-sectional variations across firms, job characteristics, and macroeconomic conditions.

2.2 Hypothesis development

Job vacancy duration is the time it takes a firm to identify, evaluate, recruit, and hire a worker for a particular job opening. To facilitate the discussion, we use graphs to visually

[4] In our empirical analyses, we explicitly control for the changes in the number of job postings. In robustness tests, we also test vacancy duration's incremental informativeness after controlling for internal employee turnover and employee satisfaction. To avoid sample attrition, we do not control for employee turnover and employee satisfaction in our main analyses.

demonstrate the tradeoffs between the costs and benefits of spending time on candidate recruiting and selection.

The cost for job vacancy is intuitive. With other physical and human resources already in place, leaving a job position vacant limits a firm's productivity and reduces the efficiency of the invested capital (Davis 2001). Figure 1.1 shows that, for both low- (on the left) and high-skill labor (on the right), the marginal loss of productivity is positive and increases with vacancy duration, reflecting the escalating damage caused by the lasting vacancy.[5] Leaving a position open carries a higher loss of productivity (opportunity cost) for firms anticipating higher profitability (represented in black) than for those anticipating low profitability (represented in grey) for both low- and high-skill labor.

However, the benefits of investing more time in searching for and selecting workers depend on the job's skill requirements. Low-skill jobs require limited skills and discretion, and applicants tend to be relatively homogeneous. Thus, the benefit of spending time searching for and selecting a candidate diminishes quickly beyond basic screening. As shown in Figure 1.2, the marginal benefit for low-skill candidate selection (the graph on the left) declines quickly for both high- (the black line) and low-profitability firms (the grey line).[6] Due to the quickly diminishing marginal benefit from candidate selection for low-skill jobs, the opportunity cost dominates the equilibrium duration. Because high-profitability firms suffer higher opportunity costs with job vacancy, they have an incentive to fill the vacancy faster by spending more on job advertisements and offering higher wages or non-wage benefits. Consequently, they attract more

[5] The increase of marginal loss with vacancy duration captures the fact that existing laborers might be able to partially cover the vacancy in the short run or the loss of sales might be partially recovered in the short run. The marginal loss can also stay constant with duration. As long as high-profitability firms have higher marginal costs than low-future-productivity firms, our predicted equilibriums exist.

[6] The marginal benefit for high-profitability firms is higher (black above grey) because a worker of the same quality creates more value in high- than in low-productivity firms (e.g., Card et al. 2018).

applicants, and qualified candidates are more likely to accept their offer upon receiving it. The intuition is consistent with predictions from theoretical models on the searching and matching process between firms and *homogeneous* workers. Kass and Kircher (2015) and Gavazza et al. (2018) predict that firms with higher productivity or facing higher growth recruit more intensively and fill job vacancies faster. Such hiring strategy implies that, for low-skill jobs, hiring quickly is indicative of the hiring firm anticipating higher profitability, suggesting a negative relationship between vacancy duration and future firm profitability.

Based on the above arguments, we form the following hypothesis (stated in the alternative form):

> ***H1: Longer vacancy duration for jobs with low skill requirements is associated with lower future firm profitability.***

In contrast, high-skill workers play more important roles in organizations and exercise more discretion in their job functions. The most likely hiring goal for a high-skill position is to select the best among all candidates, not merely someone who meets the minimum standards (as for a low-skill position). Applicants for high-skill jobs also vary more substantially in their background, experiences, and skills, and the selection of high-skill workers involves exams, interviews, and meetings with managers and future colleagues, which are unlikely to be expedited by investment in the human resources department. For these reasons, compared with hiring for low-skill jobs, hiring for high-skill jobs takes longer, and the marginal benefit of candidate selection for these jobs declines at a much slower pace (Albrecht and Vroman 2002; Davis et al. 2013). As shown in Figure 1.2, the marginal benefit lines are much flatter for high- (graph on the right) than for low-skill labor (graph on the left), reflecting the slower decline in marginal benefit.

High-profitability firms have a higher marginal benefit from candidate selection (the black line is above the grey line) partly because higher-quality workers create more value in high-profitability firms than in low-profitability firms (e.g., Card et al. 2018). Moreover, the decline of marginal benefit of candidate selection is slower for high-profitability firms (the black line is flatter than the grey line). The different positions and slopes of the marginal benefits for high- versus low-profitability firms are also caused by two factors: the size of the candidate pool, and hiring competition.

The size of the candidate pool. According to rent-sharing theory, high-profitability firms spend more resources on recruiting and offer workers higher wages and more attractive non-wage terms (Card et al. 2014; Card et al. 2016; Barth et al. 2016); consequently, they attract a larger candidate pool (Marinescu and Wolthoff 2020; Dal Bó et al. 2013; Banfi and Villena-Roldan 2019).[7] As the goal of candidate selection for high-skill jobs is to hire the best applicants, a larger candidate pool leads to a higher marginal benefit and a slower decline in the marginal benefit from candidate selection. Low-profitability firms, with their smaller candidate pools, run out of candidates to evaluate sooner, and consequently their benefit from additional time spent on candidate selection is lower and decreases faster.

Hiring competition. If a firm takes its time to evaluate a large group of applicants, it may lose qualified candidates to competitors. Such a potential loss reduces the benefit of spending time on candidate selection. The likelihood of losing a candidate is higher for low-profitability

[7] Choi et al. (2023a) and deHaan et al. (2023) document that the labor market pays attention to past firm performance and favors better-performing firms. When firms anticipating higher profitability in the future also have higher past performance, such findings can explain why high-productivity firms attract more job applicants. However, if past performance were the only channel, labor supply (and therefore vacancy duration) would not be informative of future performance after controlling for past performance. While it is likely that internal employees have private information on firm future profitability beyond what is known through firm disclosure and equity market movements (e.g., Li et al. 2022; Huang et al. 2020), it is much less likely that external job candidates (who make up the labor supply in this study) do. However, we acknowledge that certain high-skill workers may have technological or industry-specific insights that provide them with foresight regarding future firm profitability.

firms because they cannot afford to offer wages or non-wage benefits that are as attractive as those of high-profitability firms, leading to faster decline in the marginal benefit from candidate selection for low-profitability firms.

As shown in Figure 1.2, high-profitability firms spend more time than low-profitability firms on selecting high-skill candidates (longer vacancy duration) because of higher and more slowly declining marginal benefits despite the higher opportunity costs they face. The intuition demonstrated in Figure 1.2 is consistent with Wolthoff (2018), who studies the matching process of the labor market, allowing heterogeneity in workers' quality and employers' recruiting decisions and hiring standards. His model predicts that, in equilibrium, firms that post higher wages receive more applications, conduct more interviews, and set higher hiring standards. The prediction that firms anticipating higher future profit select candidates more carefully and set higher hiring standards is also consistent with the evidence of "sorting" in the labor market, with higher-quality workers more likely to be matched with more productive firms (Abowd et al. 2004; Card et al. 2012; Card et al. 2016). Overall, the above empirical and theoretical findings support our proposition that investing more time on filling high-skill job openings (i.e., longer vacancy duration for high-skill jobs) reflects a firm's higher future profitability.[8]

Based on the above discussions, we form the following hypothesis (stated in the alternative form):

> ***H2: Longer vacancy duration for jobs with high skill requirements is associated with higher future firm profitability.***

3 Sample and research design

[8] According to recent studies of activities on online job platforms, most job applications are filed within the first days of the job posting (Albrecht et al. 2023; Davis and Samaniego de la Parra 2020). Thus, for high-skill jobs, the application-gathering portion of the search process must be short compared to the process devoted to candidate screening and selecting. Therefore, variations in vacancy duration most likely reflect variations in time spent on screening and selecting candidates.

3.1 Sample construction

We obtain job postings data from LinkUp, a leading provider of job market data and analytics. LinkUp assembles a comprehensive database of job postings by crawling company career websites and capturing information on, among other things, job title, location, and job creation and deletion dates. For each job posting, LinkUp assigns a firm/employer identifier and matches the job with an O*NET occupation code. The dataset is updated daily and covers over 50,000 employers starting in August 2007. By 2018, LinkUp covered about 70% of US public firms, which together accounted for 93% of total market capital.[9]

Although hiring could happen without a formal vacancy or recruiting (Faberman and Menzio 2018),[10] research shows that the majority of hiring activities in the past decade have left online footprints. Campello et al. (2020) compare LinkUp job posting data with administrative data on employment (i.e., data from the BLS JOLTS and from the US Census Bureau's Quarterly Workforce Indicators) and find that LinkUp data provide a reasonable representation of corporate hiring activities.

Table 1 Panel A presents the sample construction. Our sample runs from August 2007 through December 2018. We restrict our sample to US public firms covered by both COMPUSTAT and CRSP and to jobs located in the United States. The initial sample includes 32,159,194 job postings. We measure job vacancy duration as the number of days between the job creation and job deletion dates. We eliminate jobs with a vacancy duration greater than 180 days—the "evergreen" jobs—as they are rarely removed from a company's career page.[11] This

[9] We compare the number of unique firms covered in LinkUp to the number of US firms covered in the CRSP/Compustat merged data.

[10] Using data on job applications and hires in the 1982 wave of the Employment Opportunity Pilot Project Survey, Faberman and Menzio (2018) report that 20% of all new hires involve no formal vacancy or recruiting time by the employer.

[11] LinkUp recommends identifying job durations greater than 180 days as "evergreen" jobs. Our results remain the same when we keep these jobs.

additional sample screen yields a total of 30,038,520 job postings created by 3,540 US firms. Our job-level data show that the average (median) vacancy duration of the 30 million jobs is 36.5 (23) days.[12] Our sample firms create a median of 97 job postings in a quarter. We use these job postings to construct our quarterly vacancy duration measure and end up with 59,779 firm-quarter observations. Finally, we delete firm-quarter observations that have missing values for the job vacancy duration measures (for either high- or low-skill jobs) or for the necessary financial and stock return data. The final sample consists of 38,115 firm-quarter observations.

Table 1 Panel B reports the distribution of the sample by year. The number of job postings is growing over time, and so is the number of firms. This growth may be because firms have increased their use of career webpages for recruiting, or because LinkUp has expanded its coverage over the years. We also report the median job vacancy duration across our sample period and observe that vacancy duration is shorter during the financial crisis (years 2008 and 2009) and gradually increases in the following years, consistent with the countercyclical pattern documented in Davis et al. (2013).

Panel C shows the distribution of the job postings by industry, using North American Industry Classification System (NAICS) two-digit classifications. The industries with the most job postings are Manufacturing, Retail Trade, and Finance and Insurance.[13] Among industries that have job postings representing more than 2% of total job postings in our sample, Health Care and Social Assistants and Professional Scientific and Technical Services have the highest vacancy durations, while Accommodation and Food Services, Transportation and Warehousing,

[12] Davis et al. (2013) estimate the mean vacancy duration ranges as being from 14 to 25 days between 2001 and 2009 using the JOLTS data. The difference between our sample mean duration and theirs could reflect the difference in sample composition; while Davis et al. (2013) estimate vacancy duration at the establishment level for both public and private firms, we focus on job postings by large, public US firms. Further, Davis et al. (2013) estimate the job-filling rate and vacancy duration using monthly JOLTS data, whereas we calculate vacancy duration directly as the number of days between the job creation and deletion dates.

[13] Our sample covers only US public companies, and, therefore, our job distribution does not reflect jobs in private entities or governments.

and Wholesale Trade have the lowest. Overall, we observe significant variations in vacancy duration across industries, and these variations are consistent with industries with high skill requirements having longer vacancy duration for job openings.

3.2 Validation of vacancy duration measure

Using job posting data to measure vacancy duration is relatively new to academic research. Prior empirical studies on vacancy duration in labor economics estimate vacancy duration at the industry or sector level using JOLTS, which misses a significant portion of filled vacancies due to the survey's voluntary nature and monthly frequency (Davis et al. 2008; Davis et al. 2013).[14] Our measure of vacancy duration avoids these shortcomings and provides direct observations at the firm level. That said, using job posting and deletion dates to measure vacancy duration may contain measurement error. We perform validations to ensure that our empirical proxy sufficiently captures job vacancy duration.

To validate our vacancy duration measure, we examine univariate variations of vacancy duration across job skill requirements, employee turnover, and unemployment rate and compare the patterns with evidence from prior literature. We use the industry-year average salary for a specific job title to proxy for its skill requirements. We obtain salary estimates from the Occupational Employment Statistics (OES) program of the US Bureau of Labor Economics and link that information with job postings using NAICS industries and the O*NET occupation code. We estimate firm-level employee turnover ($Empoyee\ Turnover$) using our job postings data

[14] JOLTS provides monthly reports on hires and separations, snapshots on employment on the 12th of each month, and job openings at the month's end. Davis et al. (2013) show that employers with no recorded vacancies at month's end account for 45% of aggregate employment, while establishments reporting zero vacancies at month end account for 42% of all hires in the following month. This suggests that a significant portion of vacancies are opened and filled within a month and therefore missed by the JOLTS data. As a result, studies using JOLTS must estimate vacancy duration (for an industry or certain group of firms) based on assumptions regarding the behavior of vacancy duration, potentially omitting critical cross-sectional variations (Davis et al. 2013). In addition, because JOLTS is a voluntary survey, imputation errors for nonrespondents could bias the estimate of the vacancy duration (Davis et al. 2008).

and the number of employees reported in COMPUSTAT. Specifically, we calculate the number of employees departed as the number of employees joined (proxied by the number of job postings deleted during the year) minus the change in the number of employees and measure employee turnover as the number of employees departed during a year divided by the number of employees at the beginning of the year. We obtain monthly unemployment rates by state from the Bureau of Labor Statistics.

Table 2 presents the median vacancy duration across quintiles of job salary, employee turnover, and unemployment rate. Vacancy duration increases with salary (job skill requirements) and decreases with employee turnover and the local unemployment rate (i.e., countercyclical). These observations are consistent with prior evidence using JOLTS data (e.g., Davis et al. 2013), validating our vacancy duration measure based on job postings.

3.3 Research design

To examine the relationship between vacancy durations and future firm profitability, it is important to first control for any job, industry, and macroeconomic effect on vacancy duration. We therefore adjust vacancy duration of each job by the mean value of vacancy duration from jobs with the same title, posted by firms in the same NAICS four-digit industry, and closed in the same month. We then use salary estimates obtained from the OES program of the US Bureau of Labor Economics to proxy for skill requirements and classify jobs with salary above (below) the industry-year median as jobs with high (low) skill requirements.[15] Finally, we average the mean-adjusted vacancy durations of low- and high-skill jobs separately for each firm-quarter and use them as the main explanatory variables in our analyses ($Duration\ Low\ Skill$ and

[15] We acknowledge that although we use the most refined (six-digit) O*NET occupation code, industry-average salary only captures the average skill requirements for the job title and does not reflect individual firms' specific skill requirements. It is likely that firms anticipating higher future profitability require higher skills, and that higher-skilled positions take longer to fill. This could explain our findings on high-skill jobs but is inconsistent with our findings on low-skill jobs.

$Duration\ High\ Skill$). We aggregate duration measures by job deletion date instead of job posting date because we are interested in the informativeness of duration on future profitability. To examine whether vacancy duration is informative of future firm performance, vacancy duration must be publicly observable—that is, when the job position is filled and the posting is deleted.

To examine the association between vacancy durations and future firm performance, we estimate the following equation:

$$ROA_{i,t+1} = \alpha_1 + \beta_1 Duration\ Low\ Skill_{i,t} + \beta_2 Duration\ High\ Skill_{i,t} + \beta_3 Job\ Creation_{i,t} + Firm\ Controls_{j,i,t} + Ind\ FE + Year \times Quarter\ FE + \varepsilon_{it} \quad (1)$$

where $ROA_{i,t+1}$ is the return on assets for firm i and quarter *t*+1. Because duration measures are constructed using jobs closed in quarter *t* and job posting information is updated daily in LinkUp, $Duration\ Low\ Skill_{i,t}$ and $Duration\ High\ Skill_{i,t}$ are observable at the end of quarter *t*.

To examine the incremental informativeness of vacancy duration, we control for a firm's labor demand and a series of firm characteristics, performances, and available forecasts that could predict future profitability and be related to hiring strategies. First, to control for firms' demand and acquisition of labor (Gutierrez et al. 2020), we include the change in the number of job postings from quarter *t*-1 to quarter *t*, scaled by total assets ($Job\ Creation_{i,t}$). $Firm\ Controls_{j,i,t}$ represents a vector of firm-quarter level controls. We include the return on assets (ROA) for the current quarter ($ROA_{i,t}$) and for quarter *t*-3 ($ROA_{i,t-3}$) to control for current and past profitability, as Choi et al. (2023a) and deHaan et al. (2023) show that job seekers pay attention to firms' financial performance. We add firm size ($Size_{i,t}$) and financial leverage ($Leverage_{i,t}$) to control for operating scale and financing risk. We include sales growth ($Sales\ Growth_{i,t}$) to control for current growth and the book-to-market ratio

($BTM_{i,t}$) to control for future growth opportunities. To control for investments in tangible and intangible capital, we include capital expenditures ($Capex_{i,t}$), R&D expense ($R\&D_{i,t}$), and labor intensity ($Labor\ Intensity_{i,t}$). We add stock return in the past year ending in quarter t ($Return_{i,t}$) to control for information, contained in stock returns, about future profitability. We control for financial distress using the Altman's Z score ($Altman\ Z_{i,t}$), as Brown and Matsa (2016) show that financial distress reduces an employer's popularity on the labor market. To control for information from public sources in the capital markets, we follow Huang et al. (2020) and add the latest analyst ($AF\ News_{i,t}$) and management forecast news ($MF\ News_{i,t}$). Last, we include industry fixed effects at the NAICS four-digit level and year-quarter fixed effects to control for industry and time factors affecting firm profitability. Appendix A contains detailed variable definitions.

4 Empirical results

4.1 Descriptive statistics

Table 3 reports the descriptive statistics of variables we include in the multivariate analyses. *Duration Low Skill* and *Duration High Skill*, reported here, are the natural log of duration days, first adjusted by the mean of vacancy durations from the same job title in the same industry and closed in the same month and then aggregated to the firm-quarter-skill level.[16] *Job Creation* is the quarterly change in number of job postings scaled by total assets. Firms in our sample are large (the mean total assets is $12,065 million), and most are profitable (median *ROA* = 0.009) and growing (median *Sales Growth* = 0.057). Average R&D and capital expenditures account for 1% of total assets (mean *Capex* and *R&D* both = 0.010), and sample firms on average have 4.3 employees per million of total assets (mean *Labor Intensity* = 4.328). Finally,

[16] In terms of the raw values, the average vacancy duration for low-salary jobs is 33 days, which is shorter than that for high-salary jobs (40 days) and consistent with high-skill positions taking longer to fill.

summary statistics of analyst and management forecast news are similar to prior studies (e.g., Huang et al., 2020).

4.2 Main results

We begin our analysis by examining whether vacancy duration is related to future profitability. We predict a negative (positive) relationship between vacancy duration of low-skill (high-skill) jobs and future firm profitability. Table 4 presents the results from estimating equation (1). The model exhibits satisfactory explanatory power, with the adjusted R-Squared at 0.524. We find that the coefficient on $Duration\ Low\ Skill$ is significantly negative at the 1% level while the coefficient on $Duration\ High\ Skill$ is significantly positive at the 1% level, supporting our prediction that vacancy duration of low-skill (high-skill) jobs is negatively (positively) associated with future ROA. The coefficients suggest that a one-standard-deviation increase in $Duration\ Low\ Skill$ ($Duration\ High\ Skill$) is related to a decrease (increase) of 0.04% (0.05%) in quarterly ROA. Considering that the average quarterly ROA in our sample is 0.8%, the effect of vacancy duration (between 5% and 6% of the average quarterly ROA) is economically significant.

To further gauge the magnitude of this effect, we calculate the economic significance of analyst forecast news ($AF\ News$) for the next quarter's ROA. The coefficient on $AF\ News$ suggests that a one-standard-deviation increase in analyst forecast news is associated with an increase of 0.17% in quarterly ROA, which is equivalent to 21% of the average quarterly ROA in our sample. The relation of vacancy duration thus amounts to 25% to 29% of the relation of analyst forecast news with future ROA. Considering that security analysts are sophisticated participants in the equity market and that their forecasts generally include the most timely and

relevant information, the effect of job vacancy duration on future firm profitability is economically meaningful.

Turning to control variables, the coefficient on $Job\ Creation_{i,t}$ is positive and significant, consistent with Gutiérrez et al. (2020), who show that changes in the number of job postings indicate future sales and earnings growth. Largely consistent with prior studies (e.g., Li et al. 2022; Huang et al. 2020), we also find that $Size_{i,t}$, $ROA_{i,t}$, $ROA_{i,t-3}$, $Labor\ Intensity_{i,t}$, $Return_{i,t}$, $Altman\ Z_{i,t}$, and $AF\ News_{i,t}$ are positively related to future ROA, while $Sales\ Growth_{i,t}$, $CAPEX_{i,t}$, and $R\&D_{i,t}$ are negatively related to it. Overall, the results in Table 4 support our conjecture that filling low-skill jobs quickly and investing more time in selecting high-skill workers are signals for higher future firm profitability.

4.3 Cross-sectional tests

In this section, we perform cross-sectional analyses to test the underlying mechanisms through which vacancy duration predicts future firm profitability. We posit that the informativeness of vacancy duration comes from its reflection of firms' hiring strategies, which are formed based on firms' expected future profitability and the tradeoffs between costs and benefits in candidate selection in different market conditions. Specifically, we examine how the duration–profitability relationship varies with the benefits and costs of spending time on candidate selection and with the persistence and accuracy of profitability expectations.

4.3.1 The benefits of spending time on candidate selection

4.3.1.1 The sufficiency of labor supply

For high-skill labor, the sufficiency of the labor supply affects the benefit of spending time on candidate selection. When the labor supply is limited relative to demand, high-profitability firms no longer have a large candidate pool to screen and interview. Spending more

time on a limited number of candidates provides few additional benefits; thus, high-profitability firms' vacancy duration should drop during a tight labor market. At the same time, low-profitability firms now may have to wait longer for a qualified candidate to apply and accept their offer, which suggests a longer vacancy duration. These forces reduce the difference in vacancy duration for high-skill jobs between high- and low-profitability firms. Thus, we expect the positive duration–profitability relationship for high-skill jobs to be more prominent when labor supply is abundant (i.e., when the benefits of candidate selection are greater).

In contrast, for low-skill jobs, when labor supply is abundant, both high- and low-profitability firms can hire qualified candidates quickly. When labor supply is limited, only high-profitability firms are able to attract candidates and fill positions quickly; low-profitability firms must spend more time waiting for qualified candidates. Following this line of reasoning, we predict that the negative duration–profitability relationship for low-skill jobs is more pronounced when labor supply is limited.

To test our conjectures, we use the unemployment rate at the state-quarter level to measure the sufficiency of the labor supply. We rank our sample into terciles using this variable and designate the top and bottom terciles of unemployment rate as high and low labor supply, respectively. Panel A of Table 5 reports the results. In columns 1 and 2, we find that the negative (positive) association between $Duration\ Low\ Skill$ ($Duration\ High\ Skill$) and future ROA is stronger when labor supply is more limited (abundant) relative to demand.

4.3.1.2 Hiring competition

When predicting that high-profitability firms spend more time on candidate selection for high-skill jobs, we argue that high-profitability firms are less worried about losing candidates to competitors (i.e., losing the benefits of careful candidate selection) than low-profitability firms

because the high-profitability firms offer better wages and non-wage benefits. However, this argument would only hold when the hiring competition is reasonably low. When hiring competition is high, even high-profitability firms may fear losing candidates to other firms and therefore may not take as long on candidate selection as they otherwise would, reducing the gap in vacancy duration with low-profitability firms. Therefore, we predict that the positive duration–profitability relationship for high-skill jobs is more prominent when hiring competition is low. For low-skill jobs, both high- and low-profitability firms strive to hire quickly to avoid opportunity cost. When hiring competition is more intense, we expect that high-profitability firms' advantage in attracting and acquiring low-skill labor is more prominent. Therefore, we predict that the negative duration–profitability relationship for low-skill jobs is more significant when hiring competition is high.

To test our prediction through the channel of hiring competition, we restrict our analyses to the subsample in which labor supply is abundant (high unemployment rate) and conduct cross-sectional analyses across industry-quarters with high versus low hiring competition. As hiring competition varies across jobs, we measure it separately for high- versus low-skill jobs. Specifically, a firm quarter faces high hiring competition for high-skill (low-skill) jobs if the number of firms (in an industry) hiring high-skill (low-skill) positions is in the upper (lower) quartile of our sample. The results, reported in Panel B of Table 5, largely support our predictions.[17] We find that the positive duration–profitability relationship for high-skill jobs is *only* significant in the subsample in which hiring competition for high-skill jobs is low. Also consistent with our predictions, the coefficient on $Duration\ Low\ Skill$ is negative (but only significant at one tail) in the subsample in which hiring competition for such laborers is high.

[17] We restrict this analysis to a subsample with high unemployment rates to test the impact of hiring competition. Because of this restriction, the sample size is smaller in Panel B of Table 5.

Overall, this set of results supports our main hypotheses and demonstrates that the variation in the benefits of spending time on candidate selection across high- versus low-profitability firms is an underlying mechanism explaining the documented relationship between vacancy duration and future firm profitability.

4.3.2 The opportunity costs of candidate selection

The opportunity costs of vacancy play an important role in our predictions regarding duration and future profitability. To provide evidence on the effect of opportunity cost, we compare firms with stable-sized operations and firms experiencing operational expansions. For firms with stable-sized operations, job vacancy is most likely created by turnover, and unfilled vacancy reduces the productivity of all existing capital and human resources. In contrast, firms during expansion are more likely hiring for the newly created operations, and the recruiting of labor can be planned to synchronize with other capital investments for the new operation. In this case, spending time on candidate selection might carry few opportunity costs.

For high-skill jobs, the lowered opportunity costs of vacancy incentivize both low- and high-productivity firms to spend more time on candidate selection. However, the impact on high-productivity firms will be stronger. We use Figure 2 to illustrate the intuitions. The solid lines represent high opportunity costs for firms with stable-sized operations, while the dotted lines represent the low opportunity costs for firms in business expansion. As shown in the High-Skill Labor graph, for firms in business expansion, the equilibrium duration moves further to the right for the high- than for the low-profitability firms. This is because (1) the marginal benefit from candidate selection is higher and declines much more slowly for high-profitability firms due to their larger applicant pools and lower likelihood of losing candidates (higher and flatter marginal benefit line in black than in grey), and (2) the drop of opportunity cost is larger for high-

profitability firms due to their much higher beginning opportunity costs. In summary, when the opportunity cost is not a major concern (i.e., in business expansion), high-profitability firms spend even more time on candidate selection relative to low-profitability firms.

The drop of opportunity costs during business expansion also applies to low-skill jobs. When high-profitability firms' higher opportunity cost is less significant, they no longer have the same strong incentive to fill the positions quickly, suggesting that the negative duration–profitability relationship for low-skill labor will be less significant during business expansion. However, given the fast-declining marginal benefit of spending time on candidate selection, a further reduction of opportunity cost may not lead to a significant change in the difference in equilibrium duration between high- and low-productivity firms (see the Low-Skill Labor graph in Figure 2).

To test these conjectures, we classify a firm as having a high (low) likelihood of hiring for expansion when its increase in capital expenditure is in the top (bottom) tercile of the sample distribution. The results, reported in Table 6, largely support our predictions. The coefficient on $Duration\ High\ Skill$ is positive and significant in column 2 but not significant in column 1, indicating that the positive duration–profitability relationship for high-skill jobs is more prominent when the hiring is for business expansion and much weaker when the hiring is for turnover replacement. In contrast, the coefficient on $Duration\ Low\ Skill$ is negative and significant in column 1 but not significant in column 2, indicating that the negative duration–profitability relationship for low-skill jobs is more prominent when hiring is for turnover replacement.

4.3.3 Expectations of future performance

We hypothesize that firms anticipate future profitability and form their hiring strategies (e.g., how hard to recruit, how many wage and non-wage benefits to offer, etc.) accordingly, and that vacancy duration reflects firms' hiring strategies and therefore is informative of future profitability. To test this "anticipation" channel, we examine whether the duration–profitability relationships are stronger when firms' expectations are likely to be more accurate. Specifically, we examine whether the vacancy duration for jobs that filled closer to the future quarter is more informative of the future quarter's profitability. When jobs fill closer to the future quarter, firms' expectation of the future quarter's profitability should be more accurate. If vacancy duration reflects firms' expectation, the vacancy duration for jobs that filled closer to the future quarter should be more informative of the future quarter's profitability.

To conduct this test, we separate jobs that closed in a quarter into two groups: the first contains jobs closed in the first half of the quarter, and the second contains jobs closed in the second half. Panel A in Table 7 shows that only durations measured using jobs that closed in the *second* half of the quarter are related to future profitability (column 2). These results support our prediction that vacancy duration is more informative of future profitability when it reflects hiring strategies that are based on firms' more accurate anticipations.

To provide further evidence for the anticipation channel, we examine the duration–profitability relationship across firms anticipating persistent versus temporary changes in profitability. Because persistent change in profitability is more likely to impact hiring practices than temporary change, we expect duration's informativeness to be stronger when firms anticipate more persistent changes in profitability. To test this conjecture, we use the persistence in actual performance change to proxy for the persistence in anticipated performance changes. We partition our sample into two subsamples. When a firm's next quarter's ROA (ROA_{t+1}) and

next rolling four quarters' ROA ($ROA_{t+1,t+4}$) are consistently higher or lower than the current quarter's ROA (ROA_t), we classify this firm as anticipating a persistent change in profitability. Other firms are classified as anticipating a transitory change in profitability.

We estimate equation (1) using these two subsamples and report the results in Panel B of Table 7. The coefficient on $Duration\ Low\ Skill$ ($Duration\ High\ Skill$) is negative (positive) and significant for firms experiencing persistent change in profitability (column 2) but not significant for other firms (column 1). These results suggest that job vacancy duration is informative for future ROA only for firms anticipating a persistent change in profitability, supporting the proposition that vacancy duration reflects a firm's hiring strategy based on the firm's anticipation of future profitability.

4.4 Analyst forecast error and earnings announcement return

If vacancy duration is informative of future firm performance, it is logical to examine whether capital market participants incorporate such information into their expectations in a timely fashion. On the one hand, job vacancy information is publicly available on companies' websites, and market participants have incentives to use all relevant information to form accurate expectations. On the other hand, the comprehensive tracing and compiling of job posting information for firms across industries involves significant information acquisition and processing costs. Therefore, there might be delays in incorporating the implications of job vacancy duration into the expectations of future firm profitability. If this is the case, we expect vacancy duration to be able to predict the market's earnings expectation errors.

We use (1) analyst earnings forecast error for the future two quarters and (2) stock returns around the future two quarters' earnings announcements to test whether market participants fully incorporate the current quarter's vacancy duration information. Following prior literature on

testing analyst forecast error and earnings announcement returns, we modify equation (1) and estimate the following regression:

$$FE_{i,t+j} \text{ or } CAR_{i,t+j} = \alpha_1 + \beta_1 Duration\ Low\ Skill_{i,t} + \beta_2 Duration\ High\ Skill_{i,t} + \beta_3 Job\ Creation_{i,t} + Firm\ Controls_{i,t} + Additional\ Controls_{i,t} + Ind\ FE + Year \times Quarter\ FE + \varepsilon_{it} \quad (2)$$

where $FE_{i,t+j}$ is the analyst forecast error for quarter *t*+1 or *t*+2 and $CAR_{i,t+j}$ is the three-day cumulative abnormal return around the earnings announcement for quarter *t*+1 or *t*+2. We calculate $FE_{i,t+j}$as the actual EPS for quarter *t*+j minus the analyst consensus obtained after quarter *t*'s earnings announcement, divided by the stock price at the beginning of quarter *t*+1. $CAR_{i,t+j}$ is the three-day cumulative abnormal return around quarter *t*+j's earnings announcement. In addition to the control variables in equation (1), we add additional variables ($Analyst\ Following$, $Forecast\ Dispersion$, $Return\ Volatility$, and $Share\ Turnover$) to control for analyst properties and stock market activities (e.g., Chang et al. 2016; Green et al. 2019).

Table 8 reports the results from estimating equation (2). When analyst forecast error is the dependent variable in columns 1 and 2, the coefficient on $Duration\ Low\ Skill$ is negative and significant, while the coefficient on $Duration\ High\ Skill$ is positive and significant. In columns 3 and 4, $Duration\ High\ Skill$ is positively and significantly related to the next two quarters' earnings announcement returns, while the coefficient on $Duration\ Low\ Skill$ is negative but insignificant in both columns. Together, these results suggest that financial analysts and investors do not seem to fully incorporate the information contained in vacancy duration in a

timely fashion, further supporting the informativeness of job vacancy duration on future firm profitability.

5 Additional analyses

5.1 Longer horizons

In our main analyses, we focus on firm profitability (ROA) in the next quarter (i.e., quarter *t*+1). However, vacancy duration could be informative for future profitability beyond one quarter. We examine this conjecture by regressing future quarterly ROAs on the vacancy duration measures ($Duration\ Low\ Skill$ and $Duration\ High\ Skill$) and control variables listed in equation (1). We include ROA for up to eight quarters (i.e., quarter *t*+2 to quarter *t*+8) following the quarter when vacancy duration is measured. The results, reported in Table 9, show that vacancy duration of high-skill jobs is positively related to future ROA for up to five quarters, while vacancy duration of low-skill jobs loses its significance beyond quarter *t*+1. These results suggest that vacancy duration for high-skill jobs has longer-term informativeness than vacancy duration for low-skill jobs.[18]

The short-term informativeness of vacancy duration for low-skill jobs indicates that the hiring strategy for low-skill laborers is likely based on short-term expectations and that the timely hiring of low-skill laborers successfully reduces the loss of productivity. The relative longer-term informativeness of vacancy duration for high-skill jobs indicates that the hiring strategy for high-skill laborers is likely based on longer-term expectations. However, the immediately present but fast-declining informativeness for high-skill jobs suggests that the duration–profitability relationship is not primarily driven by impact of the higher-quality labor

[18] We repeat the longer horizon tests for analyst forecast error and abnormal returns around earnings announcements. We do not find a statistically significant relation between our job vacancy duration measures and forecast error (and abnormal returns) beyond quarter *t*+2.

on firm performance, which should take time to realize (it is unlikely in the quarter immediately after job postings are deleted) and be more long-lasting (more than four or five quarters).

5.2 Confounding factors

In this section, we consider several confounding factors that may explain the relationship between vacancy duration and future profitability. We first consider the effect of employee turnover, which represents the percentage of employees who left the firm during a specific period. Prior research and our validation show that firms with higher employee turnover tend to have shorter vacancy duration (Davis et al. 2013). In addition, Li et al. (2022) show that employee turnover is negatively related to future ROA. Therefore, although employee turnover and vacancy duration are different theoretical constructs, we acknowledge that our results could be confounded by employee turnover. We mitigate this concern empirically by directly controlling for employee turnover ($Empoyee\ Turnover$) in our regressions.[19] Column 1 in Panel A of Table 10 shows that $Duration\ Low\ Skill$ ($Duration\ High\ Skill$) remains negative (positive) and statistically significant after we include $Empoyee\ Turnover$ as an additional control variable, suggesting that our main conclusion cannot be explained solely by employee turnover. We also find that the coefficient on turnover is negative (with *t*-stat = 1.44), consistent with Li et al. (2022).

Next, we consider employee satisfaction. Edmans et al. (2023) and Green et al. (2019) show that employee satisfaction is positively related to future firm performance. Given that employee satisfaction is likely related to job vacancy duration, it could be a confounding factor that drives our results. To address this concern, we follow prior studies (e.g., Bae et al. 2011;

[19] $Empoyee\ Turnover$ is an annual measure because we rely on the Compustat variable *emp* to estimate the number of employees who departed. The sample size is smaller because we delete observations with a negative number of departed employees. The negative number is likely caused by understatement in the number of new hires. We use the number of jobs postings deleted in a year to proxy for the number of new hires. One job posting can result in multiple hires, and new hires can also occur without job postings.

Green et al. 2019) and use data from MSCI's ESG KLD to calculate a measure for employee satisfaction. We calculate $Employee\ Satisfaction\ Score$ as the number of strengths in employee relations minus the number of concerns in employee relations and re-estimate equation (1) after adding $Employee\ Satisfaction\ Score$ as a control variable. Column 2 in Panel A of Table 10 shows that the coefficient on $Duration\ High\ Skill$ remains positive and statistically significant.[20] We also find a positive relation between $Employee\ Satisfaction\ Score$ and the next quarter's ROA, consistent with Green et al. (2019).

5.3 Evergreen jobs

Our vacancy duration is measured based on job creation and deletion dates. Some firms may have a demand for certain job titles for multiple positions or anticipate an ongoing demand due to regular turnover. It is possible that firms might keep one job posting open over an extended period in order to fill multiple positions (i.e., evergreen jobs). Campello et al. (2020) compares job postings from Linkup with administrative data on employment (i.e., data from the BLS JOLTS and from the US Census Bureau's Quarterly Workforce Indicators). They find that LinkUp job posting numbers are highly consistent with the number of new hires recorded in administrative data. Their finding suggests that using one posting to hire multiple positions over an extended period is not a widespread labor market practice.

In the case of evergreen jobs, our vacancy duration measure no longer accurately captures the time spent on filling one position. When constructing our main sample, we delete job postings with a duration longer than 180 days. To further mitigate this concern, we rerun our main analysis after deleting job postings with a vacancy duration exceeding the 95th percentile duration of postings with the same job title and in the same industry-month, as postings with

[20] The sample size is significantly smaller due to the data availability of the Employee Relation Score in MSCI's ESG KLD.

abnormally long durations are more likely to be evergreen job postings. In addition, we repeat our analyses in a subsample in which the practice of using one posting to hire multiple positions is unlikely. Specifically, we restrict our sample to job postings for which at least one posting by the same firm with the same job title in the same state was closed during the last six months, which suggests that the firm does not use an evergreen posting for this specific job title.[21] The results, reported in Panel B of Table 10, are qualitatively similar to the main results.

5.4 Firm fixed effects and change analysis

Our main results suggest that job vacancy duration is informative for future firm profitability. Although our goal is not to establish a casual relation between job vacancy duration and future firm profitability, we acknowledge that job vacancy duration may be sticky over time and, hence, correlated with certain time-invariant firm characteristics for which we do not control. To address this concern, we first check the correlation between current and lagged job vacancy duration and find that the correlation is 0.43. This positive and moderate correlation suggests that hiring practice does have a certain level of continuation but demonstrates significant variations quarter over quarter. Next, we add firm fixed effects to equation (1) and estimate an alternative change model. Table 10, Panel C reports the results. Column 1 shows that our main results are robust to adding firm fixed effects. The coefficients on our job vacancy duration measures remain significant at the 5% level or better. In column 2, we regress the change in ROA in quarter t+1 on changes in our job vacancy duration measures and changes in the control variables listed in equation (1). In this change specification, the coefficient on $Duration\ High\ Skill$ continues to be positive and significant, while the coefficient on $Duration\ Low\ Skill$ is insignificant. Overall, these results alleviate the omitted variable concern.

[21] Our results remain similar when we use a three-month window in this analysis.

6 Conclusion

We examine whether job vacancy duration is informative for future firm profitability. Measuring vacancy duration directly using the creation and deletion dates of job postings sourced from firms' career webpages, we find that, for low-skill jobs, firms that fill a vacancy quickly (i.e., that have a shorter vacancy duration) have higher future firm profitability. In contrast, for high-skill jobs, firms that spend more time selecting candidates (i.e., that have a longer vacancy duration) exhibit higher future firm profitability. Our cross-sectional analyses across the benefits and costs of candidate selection and performance expectations suggest that the informativeness of vacancy duration comes from its reflection of firms' hiring strategies. That is, firms with higher expected profitability recruit more intensively to avoid the opportunity cost associated with vacancies for low-skill jobs and to ensure the selection of high-quality workers for high-skill jobs. We also show that the implication of job vacancy duration for future profitability is not fully incorporated in the capital market, as evidenced by significantly pessimistic analyst forecasts and positive earnings announcement returns in the following quarter for firms with shorter durations for low-skill jobs or longer durations for high-skill jobs. These results demonstrate the informativeness of job vacancy duration for future firm profitability.

One of the limitations of our study is that the informativeness of vacancy duration for firm profitability may come from an alternative source: job applicants having private information about the firm's future that is not reflected in the capital market. While this argument is unlikely to apply to low-skill workers, it may apply to high-skill workers, who have general insights on technology development and industry competition. Firms favored by high-skill workers receive more applications and spend more time on screening and selection. Although our study cannot rule out this alternative, our cross-sectional evidence suggests that vacancy duration reflects a

firm's hiring strategy and, thus, to some extent, management's expectations of future performance.

Our findings add to the understanding of the implications of labor market information for firm performance. In contrast to the extensive research on how capital market movement and non-human capital investment reveal firm performance, research on labor market information and human capital acquisition is limited. Our study extends the research in this area by documenting the informativeness of job vacancy duration for future firm profitability and how the relationship varies with job skill requirements, labor market conditions, and firm characteristics. Our finding that firms that spend more time filling high-skill positions tend to have higher future profitability contradicts the traditional assumption that firms with higher productivity hire faster to avoid opportunity cost of the vacancy; therefore, it should be of interest to the emerging archival research on firms' recruiting and hiring decisions.

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References

Abowd, J., F. Kramarz, P. Lengermann, and S. Perez-Duarte. 2004. Are good workers employed by good firms? A test of a simple assortative matching model for France and the United States. *http://cep.lse.ac.uk/seminarpapers/28-02-03-KRA.pdf*. Accessed April 28, 2023.

Abraham, K. 1987. Help wanted advertising, job vacancies, and unemployment. *Brookings Papers on Economic Activity* 207–243.

Albrecht, J., and S. Vroman. 2002. A matching model with endogenous skill requirements. *International Economic Review* 43: 283–305.

Albrecht, J., B. Decreuse, and S. Vroman. 2023. Directed search with phantom vacancies. *International Economic Review* 64: 837–869.

Bae, K-H., J-K. Kang, and J. Wang. 2011. Employee treatment and firm leverage: a test of stakeholder theory of capital structure. *Journal of Financial Economics* 100: 130–153.

Banfi, S., and B. Villena-Roldán. 2019. Do high-wage jobs attract more applicants? Directed search evidence from the online labor market. *Journal of Labor Economics* 37: 715–746.

Barth, E., A. Bryson, J. C. Davis, and R. Freeman. 2016. It's where you work: increases in the dispersion of earnings across establishments and individuals in the United States. *Journal of Labor Economics* 34: S67–S97.

Belo, F., X. Lin, and S. Bazdresch. 2014. Labor hiring, investment, and stock return predictability in the cross section. *Journal of Political Economy* 122: 129–177.

Belo, F., J. Li , X. Lin, and X. Zhao. 2017. Labor-force heterogeneity and asset prices: the importance of skilled labor. *Review of Financial Studies* 30: 3669–3709.

Blanchard, O. J., and P. Diamond. 1989. The Beveridge curve. *Brookings Papers on Economic Activity*: 1–60.

Brown, J., and D. A. Matsa. 2016. Boarding a sinking ship? An investigation of job applications to distressed firms. *Journal of Finance* 71: 507–550.

Campello, M., G. Kankanhalli, and P. Muthukrishnan. 2020. Corporate hiring under COVID-19: labor market concentration, downskilling, and income inequality. https://www.nber.org/papers/w27208. Accessed April 28, 2023.

Card, D. 2011. The return of the firm to labor economics. https://davidcard.berkeley.edu/lectures/SOLE-2011.pdf. Accessed April 28. Accessed April 28, 2023.

Card, D., and A. R. Cardoso. 2012. Can compulsory military service raise civilian wages? Evidence from the peacetime draft in Portugal. *American Economic Journal: Applied Economics* 4(4): 57–93.

Card, D., A. R. Cardoso, and P. Kline. 2016. Bargaining, sorting, and the gender wage gap: Quantifying the impact of firms on the relative pay of women. *Quarterly Journal of Economics* 131: 633–686.

Card, D., F. Devicienti, and A. Maida. 2014. Rent-sharing, holdup, and wages: evidence from matched panel data. *Review of Economic Studies* 81: 84–111.

Card, D., A. R. Cardoso, J. Heining, and P. Kline. 2018. Firms and labor market inequality: evidence and some theory. *Journal of Labor Economics* 36: 13–70.

Chang, H. S., M. Donohoe, and T. Sougiannis. 2016. Do analysts understand the economics and reporting complexities of derivatives? *Journal of Accounting and Economics* 61: 584–604.

Choi, B-G., J-H Choi, and S. Malik. 2023a. Not just for investors: the role of earnings announcements in guiding job seekers. *Journal of Accounting and Economics*, forthcoming.

Choi, J-H., B. Gipper. And S Malik. 2023b. Financial reporting quality and wage differentials: evidence from worker-level data. *Journal of Accounting Research*, forthcoming.

Dal Bó, E., F. Finan, and M. A. Rossi. 2013. Strengthening state capabilities: the role of financial incentives in the call to public service. *Quarterly Journal of Economics* 128 (3): 1169–1218.

Davis, S. J. 2001. The quality distribution of jobs and the structure of wages in search equilibrium. https://www.nber.org/papers/w8434. Accessed April 28, 2023.

Davis, S. J., R. J. Faberman, , J. C. Haltiwanger, and I. Rucker. 2008. Adjusted estimates of worker flows and job openings in JOLTS. http://www.nber.org/chapters/c10820. Accessed April 28, 2023.

Davis, S. J., R. J. Faberman, and J. C. Haltiwanger. 2013. The establishment-level behavior of vacancies and hiring. *Quarterly Journal of Economics* 518–622.

Davis, S. J., and B. Samaneigo de la Parra. 2020. Application flows. https://static1.squarespace.com/static/5e2ea3a8097ed30c779bd707/t/5fee5dc218d44937a9a6e420/1609457094394/Application+Flows%2C+August+2020.pdf. Accessed April 28, 2023

deHaan, E., L. Nan, and F. Zhou. 2023. Financial reporting and employee job search. *Journal of Accounting Research* 61: 571-617.

Donangelo, A. 2014. Labor mobility: implications for asset pricing. *Journal of Finance* 69: 1321–1346.

Donangelo, A., F. Gourio, M. Kehrig, and M. Palacios. 2019. The cross-section of labor leverage and equity returns. *Journal of Financial Economics* 132: 497–518.

Edmans, A. 2011. Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics* 101: 621–640.

Edmans, A., L. Li, and C. Zhang. 2023. Employee satisfaction, labor market flexibility, and stock returns around the World. *Management Science,* forthcoming.

Eisfeldt A. L., and D. Papanikolaou. 2013. Organization capital and the cross-section of expected returns. *Journal of Finance* 68: 1365–1406.

Faberman, R. J., and G. Menzio. 2018. Evidence on the relationship between recruiting and the starting wage. *Labour Economics* 50: 67–79.

Gavazza, A., S. Mongey, and G. L. Violante. 2018. Aggregate recruiting intensity. *American Economic Review* 108: 2088–2127.

Green, T. C., R. Huang, Q. Wen, and D. Zhou. 2019 Crowdsourced employer reviews and stock returns. *Journal of Financial Economics* 134: 236–251.

Gutiérrez E., B. Lourie, A. Nekrasov, and T. Shevlin. 2020. Are online job postings informative to investors? *Management Science* 66: 3133–3141.

Hall, R. E. 2005. Job loss, job finding, and unemployment in the U.S. economy over the past fifty years. *NBER Microeconomics Annual* 20: 101–137.

Hong, H., and J. C. Stein. 1999. A united theory of underreaction, momentum trading, and overreaction in asset markets. *Journal of Finance* 54: 2143–2184.

Hou, K., and T. J. Moskowitz. 2005. Market frictions, price delay, and the cross-section of expected returns. *Review of Financial Studies* 18: 981–1020.

Huang, K., M. Li, and S. Markov. 2020 What do employees know? Evidence from social media platform. *The Accounting Review* 95: 199-226.

Huselid, M. A. 1995. The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal* 38: 635–872.

Jiang, K, D. P. Lepak, , J. Hu, and J. C. Baer. 2012. How does human resource management influence organizational outcomes? A meta-analytic investigation of mediating mechanisms. *Academy of Management Journal* 55: 1264–1294.

Kalay, A., S. Nallareddy, and G. Sadka. 2018. Uncertainty and sectoral shifts: the interaction between firm-level and aggregate-level shocks, and macroeconomic activity. *Management Science* 64: 198-214.

Kaas, L., and P. Kircher. 2015. Efficient firm dynamics in a frictional labor market. *American Economic Review*, 105: 3030-3060.

Kuehn, L-A, M. Simutin, and J. J. Wang. 2017. A labor capital asset pricing model. *Journal of Finance* 72: 2131–2178.

Li, C., R. Hann, and M. Ogneva. 2021. Another look at the macroeconomic information content of aggregate earnings: evidence from the labor market. *The Accounting Review* 96: 365-390.

Li, Q., B. Lourie, A. Nekrasov, and T. Shevlin. 2022. Employee turnover and firm performance: large-sample archival evidence. *Management Science* 68: 5567–5583.

Marinescu, I., and R. Wolthoff. 2020. Opening the black box of the matching function: the power of words. *Journal of Labor Economics* 38: 535–568.

Mongey, S., and G. Violante. 2019. Macro recruiting intensity from micro data. https://www.nber.org/papers/w26231. Accessed April 28, 2023.

Nallareddy, S., and M. Ogneva. 2017. Predicting restatements in macroeconomic indicators using accounting information. *The Accounting Review* 92: 151-182

Peng, L., and W. Xiong, W. 2006. Investor attention, overconfidence and category learnings. *Journal of Financial Economics* 80: 563–602.

Rouxelin, F., W. Wongsunwai, and N. Yehuda. 2018. Aggregate cost stickiness in GAAP financial statements and future unemployment rate. *The Accounting Review* 93(3): 299-325.

Shimer, R. 2005. The cyclical behavior of equilibrium unemployment and vacancies. *American Economic Review* 95: 25–49.

Shimer, R. 2007. Mismatch. *American Economic Review* 97: 1074–1101.

Valetta, R. G. 2005. Why has the U.S. Beveridge curve shifted back? New evidence using regional data. http://www.frbsf.org/publications/economics/papers/2005/wp05-25bk.pdf. Accessed April 28,2023.

Wolthoff, R. 2018. Applications and interviews: firms' recruiting decisions in a frictional labour market. *Review of Economic Studies* 85: 1314–1351.

Zhang, M. 2019. Labor-technology substitution: implications for asset pricing. *Journal of Finance* 74: 1793–1839.

Appendix A
Variable Definitions

Variable	Description
Duration Low Skill	The natural logarithm of vacancy duration of low-salary jobs deleted in the quarter, adjusted by the mean duration of vacancies for the same job title in the same industry and closed in the same month, and then aggregated to the quarter
Duration High Skill	The natural logarithm of vacancy duration of high-salary jobs deleted in the quarter, adjusted by the mean duration of vacancies for the same job title in the same industry and closed in the same month, and then aggregated to the quarter
Job Creation	Change in the number of job postings from the previous quarter scaled by the average total assets
ROA	Earnings before extraordinary items for the quarter, scaled by the average total assets for the quarter
Size	The natural logarithm of the firm's total assets at the end the quarter
Sales Growth	The percentage change in quarterly revenue from the same quarter in the previous year
BTM	The book-to-market ratio at the end of the quarter
Leverage	The ratio of long-term debt to total assets at the end of the quarter
Capex	Capital expenditure for the quarter, scaled by the average total assets for the quarter
R&D	R&D expense for the quarter, scaled by the average total assets for the quarter
Labor Intensity	Number of employees, scaled by total assets in millions
Return	Firm's stock return over the past year ending in the quarter.
Altman Z	Firm's Altman Z score, calculated as 1.2(working capital/total assets) + 1.4(retained earnings/total assets) + 3.3(earnings before interest and taxes/total assets) + 0.6(market value of equity/book value of total liabilities) + 0.99(sales/total assets)
AF News	The average of one- and two-quarter ahead consensus EPS forecasts minus the most recent EPS actual, scaled by stock price

	at the end of the current quarter
MF News	The most recent annual EPS forecast for the current year minus the sum of the four most recent quarterly EPS actuals, scaled by stock price at the end of the current quarter. We use annual management earnings forecasts because quarterly management forecasts, unlike analyst forecasts, are not consistently available for most of our sample firms.
FE	Analyst forecast error, measured as ([actual earnings for the future quarter – the consensus forecast after the current quarter's earnings announcement] / price at the beginning of the quarter) × 100
CAR	Three-day cumulative abnormal returns around the quarter's earnings announcement date, in percentage. Abnormal returns are market adjusted.
Analyst Following	Number of analysts following in the quarter
Analyst Dispersion	The standard deviation of analyst forecasts
Return Volatility	Stock return volatility for the quarter
Share Turnover	Total shares traded, divided by average shares outstanding for the quarter
Employee Turnover	Number of employees left in the year divided by total number of employees at the beginning of the year. Number of employees left is calculated as number of employees at the beginning of the year + jobs filled during the year – number of employees at the end of the year.
Employee Satisfaction Score	Employee relations score calculated as number of strengths in employee relations minus number of concerns in employee relations from MSCI's ESG KLD data

Figure 1
Marginal Costs and Benefits of Candidate Selection

Figure 1.1 Marginal Costs

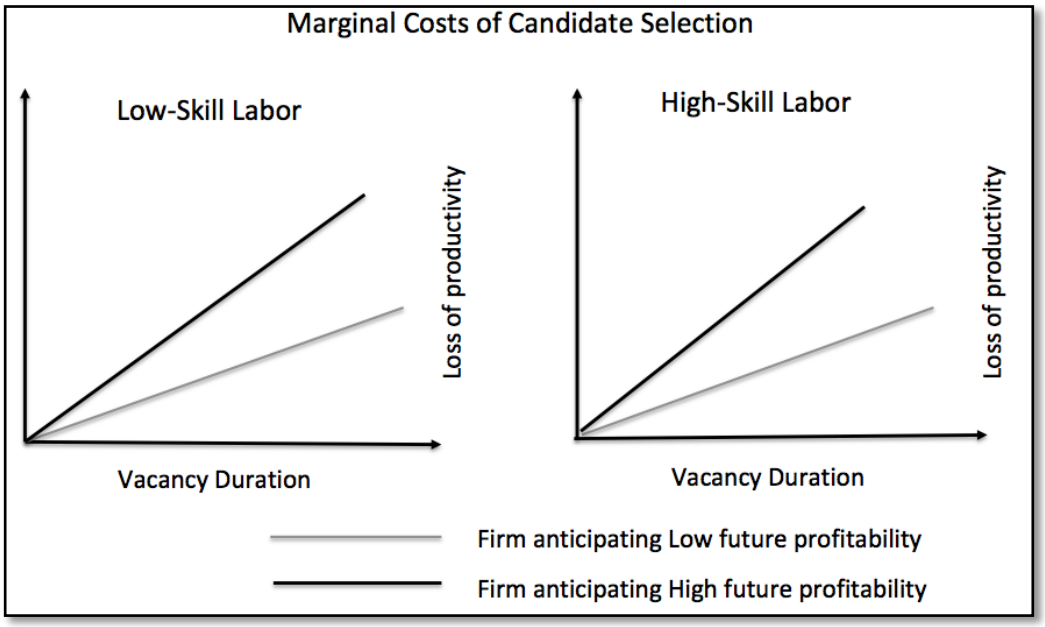

Figure 1.2 Marginal Benefits and Equilibrium Vacancy Duration

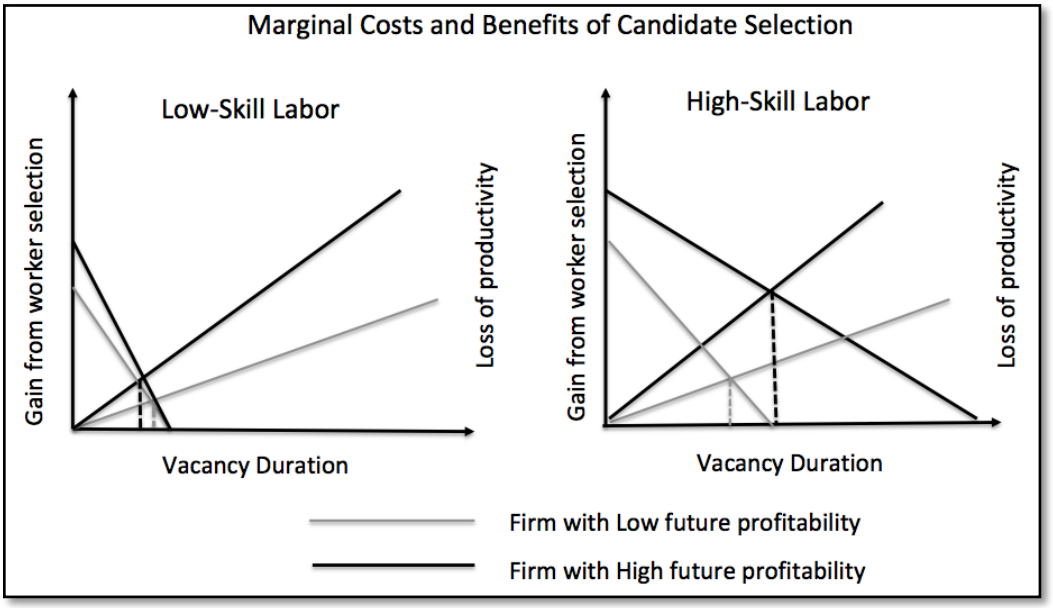

Figure 2
Opportunity Costs and Vacancy Duration

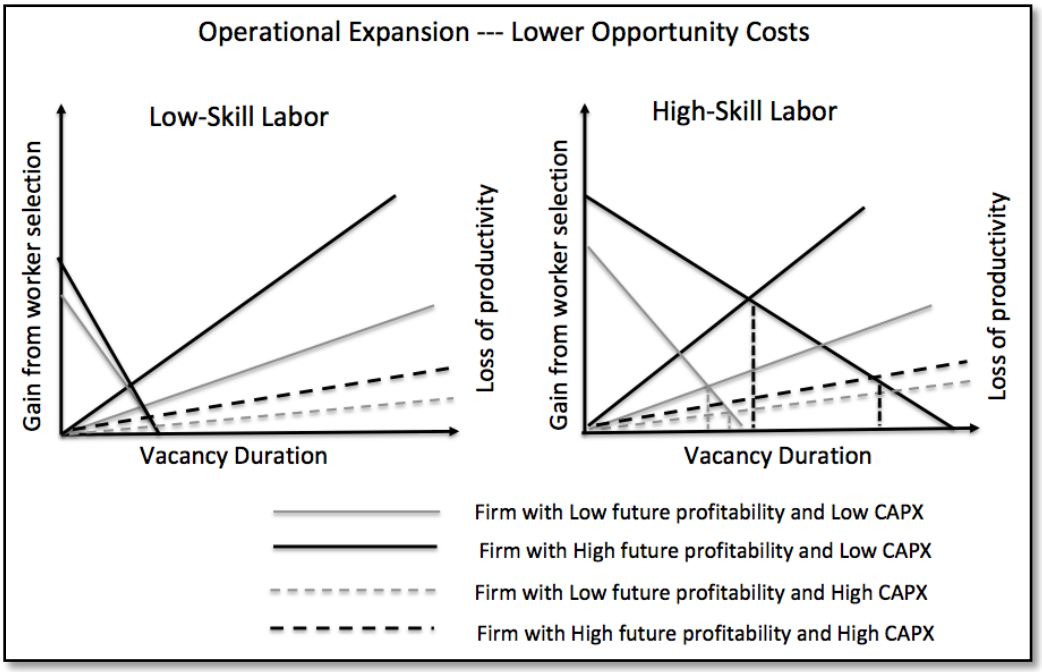

Table 1
Sample description

Panel A: Sample construction

Total job postings by US firms appearing in COMPUSTAT/CRSP	32,159,194
Less:	
Vacancy duration greater than 180 days	2,120,674
Number of jobs	**30,038,520**
Number of firm quarters	**59,779**
Less:	
Firm quarters without both vacancy duration measures	11,642
Firm quarters without necessary financial and stock return data	10,022
Number of firm quarters in final sample	**38,115**

Panel B: Sample distribution by year

Year	# of Unique Firms	# of Jobs	Percent	Median Vacancy Duration
2007	416	137,888	0.46%	29
2008	970	1,700,700	5.66%	6
2009	1,042	1,263,790	4.21%	9
2010	992	1,559,857	5.19%	14
2011	1,124	1,757,237	5.85%	23
2012	1,327	2,175,236	7.24%	23
2013	1,731	2,221,680	7.40%	27
2014	1,881	2,987,220	9.94%	26
2015	1,958	3,686,364	12.27%	28
2016	1,855	3,774,997	12.57%	25
2017	2,472	4,236,440	14.10%	27
2018	2,541	4,537,111	15.10%	22
Total	3,540	30,038,520	100.00%	23

Panel C: Sample distribution by industry

	Two-Digit NAICS	No. of Firms	No. of Jobs	Percent	Median Vacancy Duration
Agriculture, Forestry, Fishing and Hunting	11	5	4,090	0.01%	47
Mining	21	126	165,693	0.55%	20
Utilities	22	91	251,816	0.84%	14
Construction	23	48	242,672	0.81%	28
Manufacturing	31-33	1,384	6,137,296	20.43%	23
Wholesale Trade	42	101	649,184	2.16%	17
Retail Trade	44-45	158	7,300,926	24.31%	22
Transportation and Warehousing	48-49	79	638,525	2.13%	14
Information	51	439	2,950,389	9.82%	22
Finance and Insurance	52	585	3,881,341	12.92%	24
Real Estate Rental and Leasing	53	143	938,832	3.13%	26
Professional, Scientific, and Technical Services	54	134	1,392,124	4.63%	30
Administrative and Support and Waste Management and Remediation Services	56	67	625,586	2.08%	25
Educational Services	61	10	64,404	0.21%	35
Health Care and Social Assistance	62	64	2,361,574	7.86%	29
Arts, Entertainment, and Recreation	71	22	156,241	0.52%	31
Accommodation and Food Services	72	66	1,733,394	5.77%	17
Other Services	81	8	124,507	0.41%	26
Public Administration	92	10	419,926	1.40%	15
Total		3,540	30,038,520	100%	23

The table reports the description of the sample. Panel A depicts the sample construction procedure. Panel B reports the distribution of the sample by year. Panel C provides the distribution of the sample by NAICS two-digit industry classification. In Panels B and C, we also report the median vacancy duration, calculated as the number of days between the job creation and job deletion dates.

Table 2
Validation of vacancy duration

	(1) Job Salary	(2) Employee Turnover	(3) Unemployment Rate
First quintile (lowest)	20	29	24
Second quintile	21	29	24
Third quintile	23	26	24
Fourth quintile	26	20	21
Fifth quintile (highest)	28	10	18

The table reports the variations in vacancy duration across job salary, employee turnover, and unemployment rate. Median vacancy duration is reported for each quintile. Job salary is the average salary estimate by industry and occupation (O*NET) code obtained from the Occupational Employment Statistics program of the US Bureau of Labor Economics. Employee turnover is calculated as the number of employees departed during a year divided by the total number of employees at the beginning of the year. The number of employees departed is equal to the number of jobs added minus the change in the number of employees. Unemployment rate is the monthly unemployment rates by state from the Bureau of Labor Statistics.

Table 3
Descriptive statistics

	N	Mean	S.D.	P25	Median	p75
Duration Low Skill	38,115	0.117	0.521	−0.128	0.042	0.372
Duration High Skill	38,115	0.123	0.525	−0.122	0.061	0.391
Job Creation	38,115	0.000	0.104	−0.010	0.000	0.010
ROA	38,115	0.009	0.030	0.002	0.012	0.022
Size (millions)	38,115	12,065.81	29,857.72	811.544	2,666.3	9,218.3
Growth	38,115	0.093	0.248	−0.016	0.057	0.154
BTM	38,115	0.472	0.364	0.228	0.383	0.610
Leverage	38,115	0.233	0.174	0.084	0.227	0.349
Capex	38,115	0.010	0.011	0.004	0.007	0.014
R&D	38,115	0.010	0.018	0.000	0.000	0.014
Labor Intensity	38,115	4.328	5.400	1.317	2.609	4.991
Return	38,115	0.138	0.393	−0.102	0.107	0.326
Altman Z	38,115	4.216	4.045	2.016	3.330	5.096
AF News	38,115	0.002	0.013	−0.001	0.000	0.004
MF News	38,115	−0.000	0.013	0.000	0.000	0.000

The table reports descriptive statistics of key variables used in our analyses. All continuous variables are winsorized at the 1st and 99th percentiles. Variables are defined in Appendix A.

Table 4
Vacancy duration and future profitability

	(1) ROA_{t+1}
Duration Low Skill	**−0.0008*** **
	(-2.62)
Duration High Skill	**0.0010*** **
	(3.26)
Job Creation	0.0039***
	(3.07)
Size	0.0013***
	(11.15)
ROA	0.3262***
	(22.55)
ROA_{t-3}	0.3017***
	(23.54)
Leverage	0.0018**
	(2.11)
Sales Growth	−0.0087***
	(−13.73)
BTM	0.0017
	(1.44)
Capex	−0.0366**
	(-2.49)
R&D	−0.2224***
	(−10.80)
Labor Intensity	0.0001***
	(2.86)
Return	0.0046***
	(10.29)
Altman Z	0.0009***
	(10.48)
AF News	0.1384***
	(6.89)
MF News	−0.0083
	(−0.79)
Industry FE	Yes
Year – Quarter FE	Yes
Observations	38,115
Adjusted R-squared	0.524

The table reports the results of estimating equation (1). The dependent variable ROA_{t+1} is the return on assets for quarter t+1. *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter *t*. Low- (high-) salary jobs are jobs with salary below (above) the industry-year median. All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix A for variable definitions. The regressions include NAICS four-digit industry fixed effects and year-quarter fixed effects. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 5
Benefits of candidate selection

Panel A: Labor market tightness

	Unemployment Rate		
	Low	High	
	(1)	(2)	p-value for
	ROA_{t+1}	ROA_{t+1}	coeff. diff.
Duration Low Skill	**−0.0012****	**−0.0005**	0.23
	(−2.05)	**(−0.94)**	
Duration High Skill	**0.0002**	**0.0017*****	0.01
	(0.33)	**(3.35)**	
Control Variables	Yes	Yes	
Industry FE	Yes	Yes	
Year − Quarter FE	Yes	Yes	
Observations	11,446	13,027	
Adjusted R-squared	0.559	0.470	

Panel B: Hiring competition

	Low-Skill Jobs Competition			High-Skill Jobs Competition		
	Low	High		Low	High	
	(1)	(2)	p-value for	(3)	(4)	p-value for
	ROA_{t+1}	ROA_{t+1}	coeff. diff.	ROA_{t+1}	ROA_{t+1}	coeff. diff.
Duration Low Skill	**0.0006**	**−0.0015**	0.10	**0.0006**	**−0.0011**	
	(0.46)	**(−1.50)**		**(0.53)**	**(−1.09)**	
Duration High Skill	**0.0021***	**0.0015**		**0.0024****	**0.0012**	0.15
	(1.94)	**(1.61)**		**(2.30)**	**(1.23)**	
Control Variables	Yes	Yes		Yes	Yes	
Industry FE	Yes	Yes		Yes	Yes	
Year − Quarter FE	Yes	Yes		Yes	Yes	
Observations	3,270	2,926		3,409	2,974	
Adjusted R-squared	0.434	0.612		0.448	0.611	

The table reports the results from examining how the relationship between vacancy duration and future firm profitability varies with the benefits of candidate selection. The dependent variable ROA_{t+1} is the return on assets for quarter t+1. In Panel A, labor market tightness is proxied by state-quarter unemployment rate. We rank the sample into terciles using this measure and designate the top (bottom) tercile as the subsample for high (low) labor supply relative to demand. In Panel B, we restrict the sample to the top tercile of unemployment rate and measure hiring competition as the number of firms hiring in the same industry in quarter *t*. *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter *t*. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. The control variables are included in the regressions but omitted from the table for brevity. All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix A for variable definitions. The regressions include NAICS four-digit industry fixed effects and year-quarter fixed effects. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 6
Opportunity costs from candidate selection

	CAPEX Growth		
	Low	High	
	(1)	(2)	p-value for
	ROA_{t+1}	ROA_{t+1}	coeff. diff.
Duration Low Skill	**−0.0009***	**−0.0008**	0.47
	(−1.73)	**(−1.37)**	
Duration High Skill	**−0.0001**	**0.0020*****	0.03
	(−0.10)	**(3.33)**	
Control Variables	Yes	Yes	
Industry FE	Yes	Yes	
Year − Quarter FE	Yes	Yes	
Observations	11,670	11,655	
Adjusted R-squared	0.5088	0.5363	

This table reports the results from examining how the relationship between vacancy duration and future firm profitability varies with the opportunity costs from candidate selection. The dependent variable is *ROA* in quarter *t*+1 in all columns. Column 1 includes firms in the bottom tercile of capital expenditure growth, while column 2 includes firms in the top tercile of capital expenditure growth. *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter *t*. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. The control variables are included in the regressions but omitted from the table for brevity. All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix A for variable definitions. The regressions include NAICS four-digit industry fixed effects and year-quarter fixed effects. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 7
Performance expectation

Panel A: The accuracy of expectation

	First Half of the Quarter	Second Half of the Quarter
	(1)	(2)
	ROA_{t+1}	ROA_{t+1}
Duration Low Skill	**−0.0001**	
	(−0.44)	
Duration High Skill	**0.0003**	
	(0.96)	
Duration Low Skill		**−0.0008*** **
		(−2.93)
Duration High Skill		**0.0011*** **
		(3.85)
Control Variables	Yes	Yes
Industry FE	Yes	Yes
Year − Quarter FE	Yes	Yes
Observations	32,099	31,022
Adjusted R-squared	0.514	0.513

Panel B: The persistence of profitability change

	Transitory	Persistent	
	(1)	(2)	p-value for
	ROA_{t+1}	ROA_{t+1}	coeff. diff.
Duration Low Skill	**−0.0000**	**−0.0011****	0.01
	(−0.06)	**(−2.37)**	
Duration High Skill	**−0.0002**	**0.0017*** **	0.00
	(−0.81)	**(3.56)**	
Control Variables	Yes	Yes	
Industry FE	Yes	Yes	
Year – Quarter FE	Yes	Yes	
Observations	10,989	24,818	
Adjusted R-squared	0.611	0.533	

This table reports the results from examining how the relationship between vacancy duration and future firm profitability varies with the accuracy of expectations on future profitability in Panel A and with persistence of the change in profitability in Panel B. The dependent variable is *ROA* in quarter *t*+1 in all the columns. In column 1 of Panel A, *Duration Low Skill* (*Duration High Skill*) is vacancy duration for jobs closed in the first half of quarter *t*, adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs. In column 2 of Panel A, *Duration Low Skill* (*Duration High Skill*) is vacancy duration for jobs closed in the second half of quarter *t*, adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. In Panel B, firms are partitioned into transitory and persistent change in profitability in columns 1 and 2, respectively. Persistent change in profitability is defined as when a firm's next quarter's ROA (ROA_{t+1}) and next four rolling quarters' ROA ($ROA_{t+1,t+4}$) are consistently higher or lower than the current quarter's ROA (ROA_t). *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter t. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. The control variables are included in the regressions but omitted from the table for brevity. All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix A for variable definitions. The regressions include NAICS four-digit industry fixed effects and year-quarter fixed effects. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 8
Analyst forecast error and earnings announcement returns

	(1) FE_{t+1}	(2) FE_{t+2}	(3) CAR_{t+1}	(4) CAR_{t+2}
Duration Low Skill	**−0.0235****	**−0.0236****	**−0.0895**	**−0.1849**
	(−2.31)	**(−2.29)**	**(−0.80)**	**(−1.51)**
Duration High Skill	**0.0204****	**0.0332*****	**0.2301****	**0.2073***
	(2.13)	**(3.20)**	**(2.02)**	**(1.85)**
Job Creation	−0.0264	−0.0176	0.2918	−0.7606
	(−0.64)	(−0.45)	(0.59)	(−1.33)
Size	0.0174***	0.0204***	0.0291	−0.0538
	(3.50)	(4.00)	(0.60)	(−1.07)
ROA	−0.6068**	−0.2310	−7.4320***	−5.4163*
	(−2.02)	(−0.76)	(−2.86)	(−1.71)
ROA_{t-3}	0.4401	−0.2141	−1.5387	−0.1048
	(1.64)	(−0.79)	(−0.62)	(−0.04)
Leverage	0.0156	0.0235	−0.1053	−0.2630
	(0.66)	(1.03)	(−0.50)	(−1.08)
Sales Growth	−0.0284	−0.0151	0.2481	0.6189**
	(−0.84)	(−0.44)	(1.12)	(2.26)
BTM	−0.0449	−0.0564	1.4860***	0.9718**
	(−1.05)	(−1.24)	(3.83)	(2.20)
Capex	−1.9386***	−1.0886	−7.3424	−4.7574
	(−3.03)	(−1.61)	(−1.24)	(−0.73)
R&D	1.1557**	0.7796	1.1011	5.9204
	(2.45)	(1.59)	(0.23)	(1.11)
Labor Intensity	0.0014	0.0012	−0.0008	0.0010
	(0.87)	(0.72)	(−0.05)	(0.07)
Return	−0.0027	−0.0332**	−0.5327***	0.0860
	(−0.18)	(−2.05)	(−3.30)	(0.50)
Altman Z	−0.0005	−0.0010	0.0907***	0.0135
	(−0.31)	(−0.63)	(4.99)	(0.73)
AF News	−5.3542***	−3.7841***	9.7083*	11.5020*
	(−5.81)	(−4.62)	(1.65)	(1.71)
MF News	−0.6037	−0.5992	−0.0984	0.2097
	(−1.49)	(−1.15)	(−0.03)	(0.05)
Analyst Following	−0.0034***	−0.0023**	−0.0086	0.0044
	(−3.52)	(−2.44)	(−0.90)	(0.43)
Forecast Dispersion	−0.0655	−0.0920**	−0.1275	−0.4372

	(−1.58)	(−2.05)	(−0.58)	(−1.53)
Return Volatility	−0.0404	1.5462*	2.2208	1.2808
	(−0.05)	(1.74)	(0.28)	(0.14)
Share Turnover	0.0506***	0.0263	−0.3126**	−0.1258
	(2.77)	(1.39)	(−2.04)	(−0.73)
Industry FE	Yes	Yes	Yes	Yes
Year × Quarter FE	Yes	Yes	Yes	Yes
Observations	35,757	35,565	33,030	32,886
Adjusted R-squared	0.031	0.028	0.006	0.006

The table reports the results from examining whether current vacancy duration predicts analyst forecast error and earnings announcement returns of future quarters. The dependent variables in columns 1 and 2 are analyst forecast error at quarter t+1 (FE_{t+1}) and quarter t+2 (FE_{t+2}), respectively. Analyst forecast error is calculated as the actual EPS number minus the consensus forecast after quarter t's earnings announcement, scaled by the stock price at the beginning of the quarter and times 100. The dependent variable in columns 3 and 4 are the three-day cumulative abnormal return around the earnings announcement for quarter t+1 (CAR_{t+1}) and quarter t+2 (CAR_{t+2}), respectively. *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter *t*. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix A for variable definitions. The regressions include NAICS four-digit industry fixed effects and year-quarter fixed effects. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 9
Longer horizons

	(1) ROA_{t+2}	(2) ROA_{t+3}	(3) ROA_{t+4}	(4) ROA_{t+5}	(5) ROA_{t+6}	(6) ROA_{t+7}	(7) ROA_{t+8}
Duration Low Skill	**−0.0005**	**−0.0000**	**−0.0000**	**−0.0003**	**−0.0005**	**−0.0001**	**−0.0004**
	(−1.64)	**(−0.02)**	**(−0.06)**	**(−0.92)**	**(−1.25)**	**(−0.28)**	**(−1.07)**
Duration High Skill	**0.0012*** **	**0.0007** **	**0.0004**	**0.0007***	**0.0002**	**0.0005**	**0.0002**
	(3.64)	**(2.18)**	**(1.31)**	**(1.87)**	**(0.52)**	**(1.26)**	**(0.40)**
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year − Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,019	37,592	36,849	35,131	33,377	31,651	29,966
Adjusted R-squared	0.456	0.421	0.448	0.371	0.345	0.317	0.339

The table reports results from estimating the informativeness of vacancy duration on long-term firm profitability. The dependent variable is return on assets from quarter *t*+2 (ROA_{t+2}) to quarter *t*+8 (ROA_{t+8}). *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter *t*. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. The control variables are included in the regressions but omitted from the table for brevity. All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix A for variable definitions. The regressions include NAICS four-digit industry fixed effects and year-quarter fixed effects. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 10
Robustness analyses

Panel A: Confounding factors

	(1) ROA_{t+1}	(2) ROA_{t+1}
Duration Low Skill	**−0.0009****	**−0.0006**
	(−2.35)	**(−1.02)**
Duration High Skill	**0.0010****	**0.0016*****
	(2.37)	**(3.21)**
Employee Turnover	−0.0010	
	(−1.44)	
Employee Satisfaction Score		0.0002
		(1.62)
Control Variables	Yes	Yes
Industry FE	Yes	Yes
Year − Quarter FE	Yes	Yes
Observations	26,370	11,977
Adjusted R-squared	0.510	0.495

Panel B: Evergreen job postings

	Remove Jobs With Abnormally Long Duration	Remove Job Titles Without Closing Records
	(1) ROA_{t+1}	(2) ROA_{t+1}
Duration Low Skill	**−0.0010*****	**−0.0008****
	(−3.09)	**(−2.48)**
Duration High Skill	**0.0011*****	**0.0010*****
	(3.38)	**(3.01)**
Control Variables	Yes	Yes
Industry FE	Yes	Yes
Year − Quarter FE	Yes	Yes
Observations	37,668	33,997
Adjusted R-squared	0.521	0.519

Panel C: Firm-fixed effects and change analysis

	(1) ROA_{t+1}	(2) Chg ROA_{t+1}
Duration Low Skill	**−0.0008****	
	(−2.51)	
Duration High Skill	**0.0007****	
	(2.08)	
Chg Duration Low Skill		**−0.0002**
		(−0.98)
Chg Duration High Skill		**0.0006****
		(2.33)
Control Variables	Yes	Yes
Firm FE	Yes	Yes
Industry FE	Yes	Yes
Year × Quarter FE	Yes	Yes
Observations	38,115	30,491
Adjusted R-squared	0.591	0.448

This table reports results from robustness analyses. Panel A reports the results from controlling for confounding factors. In column 1, *Employee Turnover* is calculated as the number of employees departed in a year divided by the number of total employees at the beginning of the year. In column 2, *Employee Satisfaction Score* is calculated as the number of strengths in employee relations minus the number of concerns in employee relations provided by MSCI's ESG KDL data. In column 3, we include closing the gap for low- and high-salary jobs (*Closing Gap Low Skill* and *Closing Gap High Skill*), calculated as the average number of days between the job deletion date and the quarter-end. The dependent variable ROA_{t+1} is the return on assets for quarter t+1. *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter *t*. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. In Panel B, we conduct robustness tests regarding evergreen job postings. In column 1, we delete job postings with vacancy duration exceeding the 95th percentile of durations from postings with the same job title and in the same industry-month. In column 2, we restrict our sample to job postings for which at least one posting by the same firm with the same job title in the same location was closed during the last six months. Panel C reports the results of estimating equation (1) adding firm fixed effects and the results from the change analysis. The dependent variable ROA_{t+1} in column 1 is the return on assets for quarter t+1. *Duration Low Skill* (*Duration High Skill*) is vacancy duration adjusted by the mean of the job-industry-month group and aggregated at the firm-quarter level for low- (high-) salary jobs for quarter *t*. High- (low-) salary jobs are jobs with salary above (below) the industry-year median. In column 2, the dependent variable *Chg* ROA_{t+1} is the change in return on assets from quarter t to quarter t+1. The key independent variables are the changes in *Duration High* and *Duration Low* (*Chg Duration High* and *Chg Duration Low*, respectively) from quarter t-1 to quarter t. In the changes analysis, we include changes in all control variables. All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix A for variable definitions. The regressions include NAICS four-digit industry fixed effects and year-quarter fixed effects. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.