Employee Turnover and Firm Performance: Large-Sample Archival Evidence*

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December 8, 2020

Abstract

Employee turnover is a significant cost for businesses and a key human capital metric, but firms do not disclose this measure. We examine whether turnover is informative about future firm performance using a large panel of turnover data extracted from employees' online profiles. We find that turnover is negatively associated with future financial performance (one-quarter ahead ROA and sales growth). The negative association between turnover and future performance is stronger for small firms, for young firms, for firms with low labor intensity, when the local labor market is tight, and when the firm is trying to replace departing employees. The negative association disappears when turnover is very low, suggesting that a certain amount of turnover can be beneficial. Consistent with the concern that turnover increases operational uncertainty, we find a positive association between turnover and the uncertainty of future financial performance. Finally, we find a significant association between turnover and future stock returns, suggesting that investors do not fully incorporate turnover information. Our findings answer the call from the SEC to determine the importance of turnover disclosure.

* We thank Revelio Labs for providing us the data. We also thank Judson Caskey, Henry Friedman, Elizabeth Chuk, David Hirshleifer, Chuchu Liang, Mort Pincus, Devin Shanthikumar, Richard Sloan, Siew Hong Teoh, Brett Trueman, Chenqi Zhu, and seminar participants at the University of California-Irvine and the University of California Los Angeles for their helpful comments. We gratefully acknowledge the financial support provided by Hong Kong Polytechnic University, the Paul Merage School of Business at the University of California-Irvine and the University of Illinois at Chicago.

Keywords: human capital, employee turnover, retention, employee disclosure, firm performance, uncertainty, stock returns

1. Introduction

We examine whether employee turnover is informative about future firm performance using employees' online disclosures.[1] Firms report very little information related to human capital, but the rise of the Internet and networking platforms has led to new types of decentralized disclosures. Many employees reveal online information that outsiders can use to glean insight into the human capital of a firm. In particular, individuals often disclose their employment information in their online profiles and resumes on job-related websites such as LinkedIn. We use this information to measure the employee turnover of a firm and examine its informativeness about future firm financial performance.

Employee turnover is a matter of concern for many firms. Difficulty in hiring and retaining qualified employees is the most-cited concern among CFOs polled by the Duke CFO Survey (2019). Many consulting firms, including the Big 4, advise businesses on how to increase employee retention. Firms often indicate that employee turnover is a significant risk factor in their filings with the SEC. Some firms even tie managers' compensation to maintaining turnover below a specified level (Tuna 2008).[2]

Many investors have called for the disclosure of turnover and other human capital measures (see Section 2). In response to this growing investor demand, the SEC has recently proposed an updating of corporate disclosures by including a more expansive principle-based description of

[1] Employee turnover represents the number of employees, or the percentage of employees, who left the firm during a specified period. Turnover reflects both quits (voluntary turnover) and firings (involuntary turnover).

[2] The popularity of the subject is at such a high level that a search of Amazon.com yields more than 600 book titles dealing with or relating to "employee retention."

human capital resources (SEC 2019a). In this proposal, the SEC is seeking comments and advice from the public on whether encouraging firms to disclose employee turnover and other specific metrics would help elicit material information or instead result in immaterial disclosures. Our investigation on the informativeness of turnover should be relevant to understanding whether the proposed disclosure would be useful.[3]

Turnover involves both costs and benefits to a firm. Survey evidence indicates that most job separations are quits rather than firings.[4] The voluntary departure of productive employees is costly, especially when their talent and proprietary knowledge move to a competitor. Many other costs are associated with both voluntary and involuntary turnover.[5,6] Turnover also has benefits, including the replacement of underperforming employees, providing incentives to perform, and bringing new ideas (Hausknecht and Trevor 2011; Hancock et al. 2013). Thus, the relationship between turnover and performance likely depends on the costs and benefits of turnover. Since the majority of turnover is voluntary, which presumably does not provide net benefits to the firm, the turnover–performance relationship is likely to be mostly negative. In addition, employees are more

[3] In a comment letter to the SEC rule making petition (2017), Larcker (2017) states that our knowledge of human capital measures is modest and that "it would be highly desirable for firms and regulators to collaborate with researchers to develop comparable measures based on institutional knowledge and rigorous statistical testing."

[4] According to the *Job Openings and Labor Turnover Survey*, nonfarm quit rates exceed firing rates in 163 out of 181 months between January 2004 and July 2019 (https://www.bls.gov/jlt/).

[5] PricewaterhouseCoopers (2006) estimates that turnover costs represent more than 12% of pretax earnings for the average firm and almost 40% at the 75th percentile of turnover rate. Other estimates range from 25–150% of the annual employee salary (e.g., Cascio 2015; Work Institute 2017; Professional Advantage 2019).

[6] Turnover costs include separations costs (e.g., HR staff and manager time, cost of temporary coverage, loss of organizational memory, loss of clients, teamwork disruption) and replacement costs (e.g., job advertising costs, headhunter fees, HR staff and manager time, travel expenses, relocation costs, decreased sales and productivity during recruiting, training, and the initial lower productivity of new hires).

likely to leave the firm and firms are more likely to fire employees when performance is expected to be poor, which further suggests a negative relationship between turnover and performance. Firm and labor market factors also are likely to affect this relationship (as discussed later). Furthermore, because a certain amount of turnover might be beneficial due to the replacement of underperforming employees, and new employees bringing new ideas, the turnover–performance relationship may not be negative when turnover is very low.

So far, there is little evidence in the literature that turnover predicts future financial performance. Because firms do not report employee turnover, studies rely on turnover information obtained by surveying firms at a single point in time. A comprehensive meta-analysis of results from these survey-based studies by Hancock et al. (2013) finds an *insignificant* association between turnover and future financial performance.[7] This failure to detect a significant relationship likely stems from the limitations of the survey method, which include the lack of time-series data, low response rates, and small sample sizes. In this study, we take a different approach by using disclosures by *employees*. Employee disclosures are available for many firms, and this allows us to provide the first archival evidence from a large sample of cross-sectional and time-series data. Also, we show that turnover predicts lower future stock returns. These findings are new to the literature.

It is important to note that we do not examine whether employee turnover causes lower

[7] In contrast to financial performance, the review finds that turnover is negatively associated with certain operating indicators, such as customer service (e.g., wait times, customer satisfaction, service quality), safety, and quality (e.g., accidence rates, time lost, waste).

performance. Establishing causality is difficult because turnover is inherently endogenous. Factors such as job security, advancement opportunities, and investment in employee training may be related to both turnover and firm performance. Instead, we examine whether turnover is informative about future performance incremental to various other information sources, factors that influence the informativeness of turnover, and whether investors fully incorporate turnover into stock prices.

We obtain turnover data from a leading labor market analytics company that continuously tracks and compiles data from the online profiles and resumes of employees. Our sample spans 2008–2018 and includes 3,612 distinct firms and 85,334 firm–quarter observations. Our employee turnover measure is the ratio of the number of employees who left the firm during the quarter and the average number of employees during the quarter.

We begin our analysis by examining whether turnover contains information about future financial performance. Our primary measure of firm performance is the return on assets in the next quarter. Consistent with turnover predicting lower financial performance, we find a negative association between turnover and next-quarter return on assets. The negative association is incremental to various controls, including analyst forecast news, management forecast news, employee stock option cancellations, and firm fixed effects. We corroborate this finding using sales growth in the next quarter to gauge future financial performance, and we find evidence consistent with the results derived from using return on assets.

Next, we examine factors that affect the association between turnover and performance. Owing to their greater resources, it is likely that large firms can manage employee separations and

the hiring of replacements more effectively than small firms (Hancock et al. 2013). In addition, organizational knowledge in large firms is less likely to be concentrated among a few employees, making turnover less damaging. Therefore, we expect the negative association between turnover and performance, i.e., turnover effects, to be stronger for small firms than for large firms.

Second, mature firms have more experience and more developed procedures, helping them mitigate the loss of organizational knowledge by more effectively transferring this knowledge to new hires (Baron, Hannan, and Burton 2001). Mature firms also likely have greater recognition in the labor market, which increases their applicant pool and facilitates the hiring of qualified replacements. Thus, we expect turnover effects to be stronger for young firms than for mature firms.

Third, in a typical production function, the marginal productivity of labor is high when labor intensity is low (Imrohoroglu and Tuzel 2014; Gutiérrez, Lourie, Nekrasov, and Shevlin 2019). Since high-productivity employees are likely to possess superior knowledge and skills, they are more difficult to replace. Therefore, turnover effects should be stronger when labor intensity is low. We proxy for labor intensity using the ratio of the number of employees to total assets.

Fourth, hiring replacements is more difficult and costly when the labor supply is low (Wasmer and Weil 2004). Thus, we expect the negative association between turnover and performance to be stronger when the local labor market is tight. We proxy for the local labor supply using the unemployment rate in the state where the firm's headquarters is located.

Finally, turnover effects are likely to be stronger when a firm needs to find and recruit replacements for departing employees as opposed to when a firm does not need to find a

replacement. In the former case, there are search and replacement costs. Also, when a firm does not need a replacement, the employee separation is likely to be the choice of the firm (involuntary turnover) and therefore less likely to harm performance. We use changes in job postings on the firm's career website (Gutiérrez et al. 2019) to proxy for the firm's need to find replacements.

Our empirical results are consistent with these predictions. The negative association between turnover and future financial performance is significantly stronger for small firms, for young firms, for firms with lower labor intensity, when the local labor supply is tight, and when the firm is trying to find replacements.

However, very low turnover may not be associated with better performance, because turnover has both costs and benefits, as discussed above. We examine this issue by testing the association between turnover and performance for low- and high-turnover sample partitions. We investigate various thresholds because theory does not specify a threshold cutoff. These results strongly support the prediction that the association between turnover and performance is less negative when turnover is low.

One of the concerns regarding employee turnover is that it increases operational uncertainty. It is difficult to predict the timing of separations, the number of employees who leave the firm, and the specific positions of these employees. There is also uncertainty as to whether the firm will find and recruit qualified replacements quickly and whether these replacements will be productive and stay with the firm.[8] Thus, we expect firm performance to be more uncertain when employee

[8] Indeed, CEOs view "availability of key skills" as one of the most worrying risks (PricewaterhouseCoopers 2019).

turnover is high. We proxy uncertainty of future performance with the standard deviation of the return on asset over the next four quarters. In line with our prediction, we find that turnover is associated with greater future ROA variability.

The finding that turnover is informative about future performance leads to the question of whether investors fully incorporate turnover into stock prices. Turnover disclosures by employees are publicly available, and investors have incentives to use all publicly available information. However, turnover disclosures are distributed across many employee profiles, leading to high information processing costs. This raises the possibility that investors do not fully incorporate turnover information. Consistent with this expectation, we find a significant association between employee turnover and next-quarter earnings announcement returns. We also find that a hedge portfolio that takes a long (short) position in stocks in the bottom (top) decile of turnover at the end of each month and holds these positions in the subsequent month earns positive alpha.

We contribute to the research on the relationship between human capital and firm outcomes. Most prior work examines the human capital of top executives. (For reviews, see Murphy 2013, Laux 2014, and Edmans, Gabaix, and Jenter 2017.) Several studies expand the focus beyond top management, examining how investment in human capital is affected by reported losses (Pinnuck and Lillis 2007), fraudulent accounting (Kedia and Philippon 2009), and financial reporting quality (Jung, Lee, and Weber 2014). Gutiérrez et al. (2019) find that job postings represent growth and contain positive information for the market. Carter and Lynch (2004) and Erkens (2011) find that firms reduce employee turnover using unvested stock-based compensation. Dou, Khan, and Zou (2016) and Gao, Zhang, and Zhang (2018) find that firms manage earnings upwards to attract and

retain employees. However, there is little evidence on whether turnover is associated with poorer future financial performance. We contribute to this literature by studying the implications of employee turnover for future financial performance and studying how firm and labor market factors affect the turnover–performance relationship.

Our paper also contributes to the disclosure literature. (For reviews, see Beyer, Cohen, Lys, and Walther 2010; Leuz and Wysocki 2016.) New information technologies allow firms to broaden disclosure dissemination and change how investors access information (e.g., Bushee, Matsumoto, and Miller 2003; Drake, Roulstone, and Thornock 2012; Blankespoor, Miller, and White 2014). This literature generally models disclosure as a decision made by top management. Managers provide very little information about human capital resources, despite the apparent demand for this information. This lack of disclosure is perhaps due to proprietary, information processing, or agency costs. We extend this literature by examining the human capital disclosures made by firm employees.[9]

With the advent of new technologies and social media, these disclosures are becoming increasingly important. Employee disclosures qualitatively change the disclosure landscape by reducing management control over the firm's information flow. Our evidence on the informativeness of employee disclosures of turnover and the factors that affect this informativeness is pertinent to the current debate on how to regulate the disclosure of human capital metrics. By

[9] Recent work by Hales, Moon, and Swenson (2018); Green, Huang, Wen, and Zhou (2019); and Huang, Li, and Markov (2020) uses employee reviews of their respective firms on Glassdoor.com to examine whether employee job satisfaction and employer outlook predict future performance. In contrast to employee turnover, the SEC is not considering whether firms should disclose employee reviews.

examining the issue relevant to regulators and investors, this paper responds to Rajgopal's (2019) call for work that is useful to practitioners and policy makers.

2. Investor and Regulatory Interest and Prior Research

2.1 Investor and Regulatory Interest in Turnover Disclosure

Many investors view employee turnover as an essential human capital metric that matters to their decision-making process. In a rulemaking petition to the SEC (SEC 2017), a large group of institutional investors requested that the Commission expand its current limited requirements for human capital disclosure.[10] This petition affirms the broad consensus in the investment community that certain aspects of human capital, including employee turnover, are fundamental to human capital analysis. Several other organizations, both in the US and abroad, have also called for the disclosure of employee turnover.[11]

The growing demand from the investment community for human capital measures has drawn attention from regulators (SEC 2016, 2019a, 2019b). In its Concept Release (SEC 2016), the Commission solicited input from the public on whether registrants should be required to disclose additional information about employees and what this information should be. Many responders advocated for expanding the requirement to report the number of employees to include

[10] At present, firms must disclose only the number of their employees at the end of the year in 10-K filings and their median employee compensation in the proxy statement. This limited human capital disclosure "… dates back to a time when companies relied significantly on plant, property, and equipment to drive value" (SEC 2019a, p. 48)

[11] Organizations that advocate for turnover disclosure include the International Integrated Reporting Council (http://integratedreporting.org/wp-content/uploads/2015/12/CreatingValueHumanCapitalReporting_IIRC06_16.pdf), the Global Reporting Initiative (https://www.globalreporting.org/standards/gri-standards-download-center/), and Cornerstone Capital (https://www.sec.gov/comments/s7-06-16/s70616-308.pdf).

information about the composition and changes in the company's workforce. Several commenters specifically recommended the disclosure of employee turnover.[12]

The Investor Advisory Committee (SEC 2019b) recently recommended the SEC improve the disclosure of registrants' human capital, including the suggestion of voluntary but standardized disclosure of employee turnover. In line with this recommendation, the SEC is now proposing to amend disclosure rules to include human capital resources as a separate disclosure topic (SEC 2019a). Specifically, the SEC is proposing replacing the disclosure of the number of employees with a description of human capital resources, including human capital measures that management uses to manage the business and that are important to investor understanding of the firm's business. The SEC believes that this principle-based requirement should result in disclosures that allow investors to better evaluate the firm's human capital resources and see these resources through the eyes of management.

In this proposal, the SEC requested public comments on whether the proposed principle-based rule would elicit information that is material to investor decisions. The SEC specifically asked whether it should include employee turnover as an example of potentially useful disclosure about the stability of the registrant's workforce. The commission is interested in learning whether providing examples of specific metrics would result in disclosure that is immaterial and not

[12] For example, Ernst and Young (https://www.sec.gov/comments/s7-06-16/s70616-223.pdf), Douglas Hileman Consulting (https://www.sec.gov/comments/s7-06-16/s70616-134.pdf), and California Public Employees' Retirement System (https://www.sec.gov/comments/s7-06-16/s70616-267.pdf).

tailored to a registrant's specific business, or whether not including such examples would result in a failure to elicit information that is material and comparable across firms.

The majority of comment letter writers supported the SEC's proposal to expand human capital disclosures. Many respondents recommended that the SEC complement the principle-based approach with the prescriptive rule-based approach. These respondents argue that although human capital priorities can vary by industries, certain core metrics, including turnover, are universally applicable and that mandated disclosure of these metrics would provide the advantage of consistency and comparability.[13,14]

2.2 Prior Research

Our study relates to the literature on the importance of human capital in the modern firm. Lev and Schwartz (1971) are among the first studies that call attention to the large disparity between the prominence of human capital in modern economic theory and management statements that employees are the company's most valuable asset, on the one hand, and the lack of meaningful human capital disclosures on the other. The authors propose a measurement of human capital asset and liability based on expected future employee compensation. Edmans (2011) argues that an important aspect of a firm's human capital is employee satisfaction and finds that employee

[13] There has also been congressional support for the disclosure of turnover (https://www.sec.gov/comments/s7-11-19/s71119-6323056-194575.pdf). Other measures recommended by respondents include full-time versus part-time employees, employee costs, and spending on employee training.

[14] While the majority of respondents supported the proposal, several commenters expressed concerns that the new rule may be costly or burdensome to implement (e.g., NASDAQ (https://www.sec.gov/comments/s7-11-19/s71119-6363798-196412.pdf) and American Securities Association (https://www.sec.gov/comments/s7-11-19/s71119-6332002-194901.pdf)).

satisfaction, proxied by the firm's inclusion on the *Fortune* magazine's list of the "100 Best Companies to Work for in America," is positively associated with long-run returns.

Several studies examine the acquisition of human capital through hiring (e.g., Belo, Lin, and Bazdresch 2014; Liu 2019; Gutiérrez et al. 2019). Belo et al. (2014) find that annual growth in employee count is associated with lower cost of capital, as proxied by returns over the next year, and argue that the finding is consistent with an equilibrium where firms' need to adjust their labor—i.e., hiring and firing—make them less risky. Liu (2019) finds that firms' search for labor, as proxied by quarterly levels of firms' job postings, is high when the cost of capital is low, as indicated by low implied cost of capital and low long-term returns. Gutiérrez et al. (2019) examine daily job postings on companies' websites and find that job postings are a leading indicator of hiring and growth and that investors react positively to job postings. We extend this research by examining a different aspect of human capital (i.e., employee turnover) and providing evidence that it contains negative information about future firm performance.

Several studies investigate how employee turnover affects firm behavior. Specifically, studies examine ways in which firms mitigate the risk of employee turnover. Carter and Lynch (2004) find that firms reprice employee's underwater stock options to motivate employees to stay with the firm. Erkens (2011) find that firms that rely more on R&D secrecy use more time-vested stock-based pay, consistent with these firms' attempt to reduce the leakage of proprietary information to competitors through employee mobility. Agrawal and Matsa (2013) find that firms increase financial leverage following increases in unemployment benefits, suggesting that firms choose conservative financing policies to mitigate employees' exposure to unemployment risk.

Dou et al. (2016) find that firms unwind upward earnings manage when unemployment benefits increase, which is consistent with these firms trying to appear safe in order to attract and retain employees who bear unemployment risk. Gao et al. (2018) find that firms manage earnings upward when employees with access to trade secrets are not restricted from moving to competitors by the inevitable disclosure doctrine, which suggests that these firms try to appear more profitable in order to retain key employees.[15]

There is little empirical evidence that employee turnover is informative about future financial performance. We examine this question by exploiting novel data that allows us to obtain employee turnover hitherto not observable by researchers. We provide evidence that turnover contains information about future firm performance, and we further examine how the level of turnover, firm factors, and labor market factors influence the information embedded in turnover.

2. Sample Data and Variable Measurement

2.1 Data

We obtain turnover data from a leading provider of labor market analytics. This company continuously gathers unstructured data containing employees' online profiles and resumes from various websites and social media platforms such as LinkedIn. These raw labor data include more than 380 million online profiles and resumes. The company uses proprietary algorithms to extract employment data from these profiles and resumes. Reliable data do not begin until the early 2000s

[15] The inevitable disclosure doctrine allows firms in certain circumstances to restrict a former employee who had access to trade secrets from working in a job that would inevitably lead to the use of those trade secrets, without the need to show evidence of actual wrongdoing.

with the dawn of digital profiles. To ensure reliable data are available for a large panel of firms, the company begins the dataset in 2008.

The turnover data are aggregated at the firm-month level. The data contain the number of employees who left a specific firm in a particular month and the average number of employees for that firm and month. Not all employees share their employment information online. The resulting measurement error may attenuate our estimates of turnover effects. White collar occupations are the largest represented group in the data. So, our analysis is likely to capture turnover effects for white collar employees, which may be larger than turnover effects for the general employee population. Also, employees who are fired and do not find a new job within a short time might be less likely to update their online profiles, which may reduce our ability to detect the effects of involuntary turnover. Although the reason for job separations (e.g., quits versus firings) would be useful for our study, we do not have this information.

Table 1 Panel A presents the sample construction. We begin with the sample of US firms that appears on COMPUSTAT and CRSP and have turnover data between January 1, 2008 (the date when the turnover data commences), and December 31, 2018 (the last date of the turnover data we obtained from the provider). The initial sample includes 3,868 firms. We then eliminate observations that lack the necessary financial data and stock returns. The final sample consists of 3,612 distinct firms and 85,334 firm–quarter observations.

Table 1 Panel B reports the distribution of the sample by industry, using the 12 Fama–

French industry classifications.[16] The industries with the most firm–quarter observations are Finance, Business Equipment, and Healthcare. The industries with the highest employee turnover are Consumer Non-Durable, Business Equipment, and Wholesale and Retail. The industries with the lowest employee turnover rates are Utilities and Finance. There is significant variation in the distribution of the sample across industries, but no single industry dominates the sample.

2.2 Turnover Measure

We calculate employee turnover for a quarter by aggregating monthly employee separations over the quarter then scaling the total separations by the average monthly employee count for that quarter.[17] Specifically, $TURNOVER_{jt}$ for firm j in quarter t is the sum of the number of employees who left the firm in each of the three months of the quarter, divided by the average of the employee count across the three months of the quarter. Employee separations and average employee counts are based on employees' online profiles and resumes.

There is a positive and high correlation between turnover in our data and the Bureau of Labor Statistics (BLS) turnover data. This correlation is 0.51 at the market level and 0.34 at the industry level (untabulated). It is important to note that we do not expect a perfect correlation because there are significant differences between our sample and the BLS sample. In particular, the BLS survey includes various organizations, establishments, and private firms, whereas we our

[16] Available from Ken French at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[17] We examine quarterly rather than annual turnover because it is more timely and thus more relevant to decision makers. In line with this logic, we find that the association between annual turnover and performance in the next year is negative and significant only when performance is gauged by sale growth and the association is negative but insignificant when performance is measured by return on assets (untabulated).

sample comprises relatively large public firms. The BLS also includes seasonal, short-term, and part-time employees, whereas our sample is likely to have few of these employees.

3. Empirical Results

3.1 Descriptive Statistics

Table 2 reports the descriptive statistics. The mean of 0.0333 for the employee turnover variable, *TURNOVER*, indicates that, on average, 3.33% of employees leave a firm in a given quarter (i.e., 13.32% employees leave annually).[18] Turnover exhibits significant variation, with a standard deviation of 0.0261 and an interquartile range of 0.0169–0.0450. Most firms in the sample are profitable (the median *ROA* is 0.0071) and growing (the median sales *GROWTH* is 0.0537). In the Internet Appendix, we report a correlation table for key variables (Table IA.1). The results from this table show that the correlation between turnover and next-quarter return on assets is negative at −0.0476.

3.2 Future Firm Performance

We begin our analysis by examining whether employee turnover is informative about future performance. As discussed earlier, we conjecture that, on average, turnover is negatively associated with performance because turnover is costly and because employees are more likely to leave the firm and firms are more likely to fire employees when expected future performance is

[18] In comparison, the average annual turnover rate is 18.36% per year in Huselid's (1995) study that is based on a survey of firms' HR officers. Turnover is likely to be higher for blue collar employees and seasonal workers than turnover for white collar employees who are more likely to have online profiles and thus have a higher representation in our data.

poor. Following prior research (e.g., Huang, Li, and Markov 2020), we proxy for firm performance using return on assets. We estimate the following regression:

$$ROA_{jt+1} = \alpha_1 + \beta_1 TURNOVER_{jt} + \beta_2 ROA_{jt} + \beta_3 ROA_{jt-3} + \beta_4 GROWTH_{jt} + \beta_5 SIZE_{jt} + \beta_6 BTM_{jt} + \beta_7 LEVERAGE_{jt} + \beta_8 CAPEX_{jt} + \beta_9 R\&D_{jt} + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \quad (1)$$

where ROA_{t+1} is the return on assets for the next quarter. We examine ROA in future quarters beyond the next quarter in Section 3.3. We include the ROA for the current quarter, ROA_t, to control for current performance. We include the ROA for the same quarter of the previous year (ROA_{t-3}) to control for seasonality. We include sales growth (*GROWTH*) to control for current growth and the book-to-market ratio (*BTM*) to control for future growth opportunities. We include firm size (*SIZE*) and financial leverage (*LEVERAGE*) to control for operating risk and financing risk. To control for investments in tangible and intangible capital, we include capital expenditures (*CAPEX*) and R&D expense (*R&D*). The regression includes Fama–French 48-industry fixed effects and year–quarter fixed effects. Appendix A contains detailed definitions of all variables.

To corroborate the evidence from ROA, we estimate the association between turnover and sales growth. We use the following regression:

$$GROWTH_{jt+1} = \alpha_1 + \beta_1 TURNOVER_{jt} + \beta_2 GROWTH_{jt} + \beta_3 GROWTH_{jt-3} + \beta_4 ROA_{jt} + \beta_5 SIZE_{jt} + \beta_6 BTM_{jt} + \beta_7 LEVERAGE_{jt} + \beta_8 CAPEX_{jt} + \beta_9 R\&D_{jt} + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \quad (2)$$

where $GROWTH_{t+1}$ is the percentage change in quarterly revenue in quarter *t+1* from the same quarter of the previous year. Similar to Regression 1, we use sales growth in the current quarter,

$GROWTH_t$, and in the same quarter of the previous year, $GROWTH_{t-3}$, to control for the seasonality in growth.

Table 3 presents the results. The first two columns show findings from estimating Regression 1. These results show that the model exhibits satisfactory explanatory power (i.e., the adjusted R^2 is 0.572). The negative coefficient estimate on *TURNOVER* indicates that turnover is negatively associated with future ROA. Regarding the magnitude of the turnover effect, a one standard deviation increase in *TURNOVER* is associated with a decrease in next-quarter ROA of 1.59% of its standard deviation or 10.70% of its median.[19] The last two columns present findings from estimating Regression 2. Consistent with the evidence on the negative association between turnover and future ROA, the results show a negative association between turnover and future sales growth. The findings are consistent with employee turnover containing negative information about future financial performance.

3.3 Robustness Tests and Additional Analyses

We conduct several robustness tests and additional analyses. In Table 4, we examine whether turnover is incremental to various sources of public information. In Panel A, we include a control for the change in the number of employees in the most recent fiscal year.[20] In Panel B, we include a control for analyst earnings forecast news (Huang, Li, and Markov 2020). In Panel C,

[19] For comparison, the estimated coefficient on leverage indicates that the magnitude of the turnover effect is around 54% of that of leverage, a prominent financial statement metric.

[20] The correlation between the change in the number of employees and employee turnover in the same year is low, at 0.0309. The low correlation is expected because the two variables reflect different constructs. For example, a company could have 100% turnover and still have a zero change in the number of employees.

we include a control for management earnings forecast news. In Panel D, we include a control for a turnover proxy based on employee stock option cancellations (e.g., Carter and Lynch 2004; Babenko and Sen 2014; Phua, Tham, and Wei 2018). In Panel E, we include controls for ROA for each of the previous four quarters.

In Panel F, we include a control for current stock returns to test whether turnover is incremental to the forward-looking information contained in current stock returns. This test is likely to be conservative because some sophisticated investors can obtain turnover information from employee profiles and partially incorporate it into current stock prices.

In Panel G, we include firm fixed effects to examine the effect of within-firm variation in employee turnover. Firm fixed effects also help mitigate the effect of unobservable firm characteristics, including the firm's average turnover rate. In Panel H, we include all additional control variables and firm fixed effects from Panels A–G. The results in Table 4 are similar to the results in Table 3. The coefficient on turnover is negative and significant in all regressions.

We examine the association between turnover and performance in future quarters beyond the next quarter. The results, reported in Table IA.2 in the Internet Appendix, show that turnover is negatively associated with performance, both ROA and sales growth, in each of the next four quarters.

We examine the association between turnover and future expenses. Ex ante, the turnover effect on expenses is not obvious. On the one hand, turnover may lead to higher expenses because the firm incurs search and training costs. On the other hand, turnover may lead to lower expenses in the near term because the firm saves on salaries of departing employees until it finds

replacements. The results, reported in Table IA.3 in the Internet Appendix, show that the association between turnover and future expenses is insignificant. Combined with the finding that turnover is associated with lower future sales growth, the results suggest that the negative turnover-performance relationship is driven by poorer sales rather than higher expenses.

3.4 Factors Affecting the Turnover–Performance Relationship

The evidence presented so far indicates that, on average, greater employee turnover is associated with lower future financial performance. However, the effect of turnover is likely to differ across firms. In this section, we investigate factors that likely affect the relationship between turnover and performance.

Large firms have more resources, which allows them to manage turnover better than small firms (Hancock et al. 2013). For example, large firms have more financial resources, which provide them greater flexibility in hiring new employees, managing replacement costs, and handling losses of human capital. Large firms also have more personnel, allowing them to fill gaps more easily by shifting tasks between employees within the organization. Furthermore, in small firms, organizational knowledge about a specific aspect of the business is more likely to be concentrated among a few employees, which makes turnover more costly. For these reasons, we expect that the negative association between turnover and performance will be more pronounced for small firms than for large firms. We use the market value of equity to proxy for firm size.

Mature firms have more experience in handling job separations and hiring, which may allow them to manage turnover better than young firms (Baron et al. 2001). For example, mature

firms have more structured organizational knowledge and more developed procedures, which helps them preserve organizational knowledge when employees leave the firm and helps them transfer this knowledge to new hires. Moreover, due to their greater recognition in the labor market, mature firms likely have a larger applicant pool, which makes it easier to recruit qualified replacements. Thus, we expect that the association between turnover and performance will be more pronounced for young firms than for mature firms. We use the number of years in which the firm appears on CRSP to proxy for firm age.

The turnover–performance relationship likely depends on labor intensity. In a typical production function, where a firm's output is a function of its labor and nonhuman capital, the marginal productivity of labor increases with the amount of nonhuman capital used by the firm (e.g., Imrohoroglu and Tuzel 2014; Gutiérrez et al. 2019).[21] Because high-productivity employees likely have superior knowledge and skills, they are more difficult to replace. Therefore, we expect the association between turnover and performance to be more pronounced when nonhuman capital is high, which means that labor intensity is low. We proxy for labor intensity using the ratio of the number of employees to total assets.

The turnover–performance relationship likely depends on labor market conditions as well. Finding replacements is more difficult and costly when the labor supply is low (Wasmer and Weil 2004). Also, employees have better job market opportunities when the labor market is tight,

[21] For example, the Cobb–Douglas production function describes the output (Q) as a function of labor (L) and capital (K): $Q = AL^{\alpha}K^{\beta}$. The marginal productivity of labor is an increasing (decreasing) function of capital (labor): $\partial Q/\partial L = \alpha AK^{\beta}/L^{1-\alpha}$.

making them more likely to move to competitors. Thus, we expect the association between turnover and performance to be more negative when the labor supply is low. We proxy for the local labor supply using the unemployment rate in the state where the firm's headquarters is located. We obtain data on state unemployment rates from the BLS (https://www.bls.gov/lau/) and data on headquarters states from the Compustat/CRSP merged database.

The turnover–performance relationship likely depends on whether or not the firm needs to replace a departing employee. We expect turnover to be more detrimental when the firm needs a replacement for two reasons. The first reason is that the firm incurs search and replacement costs. The second reason is that employee separation is often suboptimal for the firm when it needs to find a replacement. For example, the most harmful and most common type of employee turnover is when an employee makes the separation decision, and the firm cannot substitute the departing employee's expertise and responsibilities using other employees in the organization. Thus, the firm needs to find and recruit a replacement. This type of turnover is suboptimal for the firm and likely harms performance.[22] In contrast, a firm does not need a replacement if the job is outsourced to another firm, or innovation renders the position redundant, or the firm closes an unprofitable line of business. In these cases, the employee separation is the firm's choice and therefore less likely to hurt performance. Overall, we expect the relationship between turnover and performance to be

[22] A firm may also need a replacement when it fires an underperforming employee. This type of turnover is optimal for the firm, although replacement costs may still worsen performance in the short term. The effect of this type of turnover may attenuate the negative effect of turnover due to voluntary quits described above. Ideally, we would like to examine quits and firings separately. However, the reason for employee departures is not available.

more negative when the firm needs to find replacements. We proxy for the firm's need to find and recruit replacements using changes in job postings on the firm's career website (Gutiérrez et al. 2019). Specifically, we use the percentage change in the average number of job postings from the previous quarter.[23,24]

We test the effect of the factors discussed above by estimating Regression 1 within subsamples based on these factors. We allocate observations above (below) the median into the high (low) subsample. We report the respective coefficients on turnover for the high and low subsamples, and we report the significance of the difference between these two subsamples.

The results, shown in Table 5, are consistent with our predictions. The association between turnover and performance is stronger for small firms, for young firms, for firms with low labor intensity, when the local labor supply is tight, and when the firm likely needs to replace departing employees. The difference in coefficients between the subsamples is significant, as indicated by the F-test.

3.5 Nonlinearity of the Turnover–Performance Relationship

Our evidence on the negative association between turnover and financial performance is

[23] Gutiérrez et al. (2019) find that job postings convey positive news to the market but less so when job postings appear to represent replacements (i.e., when recent growth in sales or recent growth in employee count is low). Here, we examine and find that high levels of replacements when many employees depart from the firm (i.e., high employee turnover followed by subsequent job postings) are associated with poorer future performance. Our analysis of the joint effect of employee turnover and a firm's job postings extends and is consistent with the evidence in Gutiérrez et al. (2019).

[24] The correlation between turnover and job postings is modest, at 0.0664. This low correlation is likely because the two variables reflect different constructs. For example, a company could have no employee separations (a zero turnover rate) and still have a high hiring rate due to growth.

consistent with the common view that turnover is detrimental. However, turnover also has benefits that may outweigh turnover costs, especially when turnover is sufficiently small (Hausknecht and Trevor 2011; Hancock et al. 2013). A certain level of turnover can reduce stagnation, mitigate the entrenchment problem, infuse the firm with new ideas, help acquire employees with desired skills and experience, motivate employees to increase productivity, and reduce costs by hiring less experienced and less expensive employees. The fact that turnover has benefits suggests that very low turnover may not be optimal, it might even be beneficial. If this is the case, the association between turnover and performance may not be negative when turnover is sufficiently low.

We test for nonlinearity using the following piecewise linear regression of future performance on turnover and control variables:

$$\begin{aligned} ROA_{jt+1} = {} & \alpha_1 + \beta_1 TURNOVER\_HIGH_{jt} + \beta_2 TURNOVER\_LOW_{jt} + \beta_3 ROA_{jt} + \beta_4 ROA_{jt-3} \\ & + \beta_5 GROWTH_{jt} + \beta_6 SIZE_{jt} + \beta_7 BTM_{jt} + \beta_8 LEVERAGE_{jt} + \beta_9 CAPEX_{jt} + \beta_{10} R\&D_{jt} \\ & + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}. \end{aligned} \quad (3)$$

We define the low and high variables following prior research (e.g., Lennox 2005). *TURNOVER_LOW* equals *TURNOVER* if $TURNOVER < X$ and equals X if $TURNOVER \geq X$; *TURNOVER_HIGH* equals 0 if $TURNOVER < X$ and equals $TURNOVER - X$ if $TURNOVER \geq X$; and the threshold X is the Xth percentile of the distribution of turnover in a particular Fama–French 12 industry in that particular year. Because theory does not determine where the threshold is, we report results for alternative thresholds.

Table 6 presents the results. Panels A, B, C, D, and E show the results when the threshold equals the 10th, 20th, 30th, 40th, and 50th percentiles of turnover, respectively. These results show

that turnover is not associated with lower future performance when turnover is sufficiently low. The coefficient for the low-turnover region is positive but insignificant when using the 10th, 20th, 30th, and 40th percentile thresholds and negative and insignificant when using the 50th percentile threshold. The difference in the coefficients between the low- and high-turnover regions is significant, as indicated by the F-test. The coefficient for the high-turnover region is negative and highly significant for all threshold levels. This is consistent with the evidence shown in Table 3, which demonstrates that the turnover–performance relationship is mostly negative.

3.6 Uncertainty of Future Firm Performance

In addition to containing information about the level of performance, turnover is likely to be informative about the uncertainty of performance. The relationship between turnover and uncertainty is highlighted by the fact that a firm's turnover rate is often referred to as its *workforce stability* (e.g., SEC 2017). Fundamentally, any change in personnel creates instability in the organization.

Turnover creates uncertainty about the size and composition of the workforce available to the firm at any given time. For example, it is difficult to predict which specific employees will leave the firm and when they will leave. There is also a risk that the firm cannot quickly find and recruit qualified replacements. Even after the firm hires replacements, uncertainty remains as to whether the new hires will integrate into the firm's culture and what their productivity will be. This uncertainty is exacerbated by the fact that new hires pose the highest risk of leaving the firm (Work

Institute 2017). For these reasons, we expect greater uncertainty of future firm performance when employee turnover is high.

We use the standard deviation of future ROA to proxy for uncertainty of future performance. We estimate the following regression:

$$\begin{aligned} SD(ROA_{jt+1,t+4}) = {} & \alpha_1 + \beta_1 TURNOVER_{jt} + \beta_2 SD(ROA_{jt-3,t}) + \beta_3 ROA_{jt} + \beta_4 ROA_{jt-3} \\ & + \beta_5 GROWTH_{jt} + \beta_6 SIZE_{jt} + \beta_7 BTM_{jt} + \beta_8 LEVERAGE_{jt} + \beta_9 CAPEX_{jt} + \beta_{10} R\&D_{jt} \\ & + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \end{aligned} \quad (4)$$

where $SD(ROA_{jt+1,t+4})$, is the standard deviation of ROA over the next four quarters, with a minimum of three quarters required. All other variables are defined as in Regression 1.

Table 7 presents the results from estimating Regression 4. The results show that turnover is positively associated with future ROA variability. The coefficient on *TURNOVER* is positive and highly significant. These findings are consistent with employee turnover containing information about the uncertainty of future firm performance.

3.7 Returns around Next Earnings Announcement

If employee turnover predicts future performance, it is logical to ask whether investors fully incorporate turnover into stock prices. On the one hand, turnover disclosures by employees are publicly available, and investors have incentives to use all publicly available information. On the other hand, unlike centralized disclosures made by management, turnover disclosures made by employees are spread across many employee online profiles and resumes. Higher acquisition and processing costs may lead to incomplete investor incorporation of turnover information. If this is

the case, we expect turnover to be negatively associated with future stock returns.

We use returns around the next quarter earnings announcement to test whether investors fully incorporate turnover information. We estimate the following regression:

$$\begin{aligned} CAR(-1,+1)_{jt+1} = {} & \alpha_1 + \beta_1 TURNOVER_{jt} + \beta_2 ROA_{jt} + \beta_3 ROA_{jt-3} + \beta_4 GROWTH_{jt} \\ & + \beta_5 SIZE_{jt} + \beta_6 BTM_{jt} + \beta_7 LEVERAGE_{jt} + \beta_8 CAPEX_{jt} + \beta_9 R\&D_{jt} + Industry\ FE \\ & + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \end{aligned} \tag{5}$$

where $CAR(-1,+1)_{t+1}$ is the cumulative abnormal return around the earnings announcement for quarter $t+1$. All other variables are the same as in Regression 1.

Table 8 presents the results. The results show that turnover is negatively associated with future earnings announcement returns. The coefficient on *TURNOVER* is negative and significant. This finding is consistent with investors not fully incorporating the information contained in employee turnover.

We conduct two additional tests for future stock returns. First, we include earnings announcement returns for each of the previous four quarters to control for potential patterns in earnings announcement returns (Bernard and Thomas 1990; Ball and Bartov 1996; Chang, Hartzmark, Solomon, and Soltes 2017). Table IA.4 in the Internet Appendix reports the results. Consistent with the results in Table 8, the coefficient on turnover is negative and significant.

Second, we conduct a hedge portfolio analysis to examine the investment value of turnover information. Each month, we sort firms into deciles based on turnover in that month. We then form hedge portfolios that take long positions in firms in the bottom decile of turnover and short positions in firms in the top decile of turnover. We estimate the regressions of hedge portfolio

returns in the subsequent month on the three Fama-French (1993) factors (*MKT*, *HML*, and *SMB*) or the four Carhart (1997) factors (*MKT*, *HML*, *SMB*, and *MOM*). Table IA.5 in the Internet Appendix reports the results. These results show that the hedge portfolio generates a positive and significant alpha. The magnitude of the alpha is 39 basis points per month for the Fama-French (1993) three factor model and 37 basis points per month for the Carhart (1997) four factor model.

4. Conclusion

Employee turnover is a key human capital metric. However, firms do not disclose this important measure, and this omission makes it difficult to assess the information contained in employee turnover. In this study, we use disclosures by firm employees to assess employee turnover and whether it is informative about future firm performance.

We find that turnover is associated with lower future financial performance. Our cross-sectional analyses show that the negative association between turnover and performance is stronger for small firms, for young firms, for firms with low labor intensity, when the local labor supply is tight, and when the firm likely needs to replace the departing employees. We also find that the association between turnover and performance is non-negative when turnover is sufficiently low. This suggests that a certain amount of turnover might be beneficial. Consistent with the concern that turnover creates workforce uncertainty, our results show that future performance is more uncertain when turnover is high. Finally, we find a significant association between employee turnover and future earnings announcement returns, which suggests that investors do not fully incorporate the information contained in employee turnover.

Our evidence on the information contained in employee turnover is relevant to the debate about the expansion of requirements regarding the disclosure of human capital metrics. Our evidence is consistent with the alleged importance of turnover. Our findings are relevant to policymakers who are considering whether proposed regulations should encourage firms to disclose employee turnover. Our findings should also be of interest to investor relation departments and other managers who are responsible for communicating key aspects of firm resources and operations to the investment community.

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Appendix A
Variable Definitions

Variable	Description
BTM	The book-to-market ratio at the end of the quarter.
CAPEX	Capital expenditure for the quarter, scaled by the average total assets for the quarter.
CAR(−1,+1)	Cumulative abnormal return over the 3-day window centered on the announcement of earnings for the next quarter, where daily abnormal returns are raw returns minus the market value-weighted return.
GROWTH	Sales growth, calculated as the percentage change in quarterly revenue from the same quarter in the previous year.
LEVERAGE	Leverage ratio calculated as the ratio of long-term debt to total assets at the end of the quarter.
R&D	R&D expense for the quarter, scaled by the average total assets for the quarter.
ROA	Earnings before extraordinary items for the quarter, scaled by the average total assets for the quarter.
$SD(ROA_{jt+1,t+4})$	Standard deviation of ROA over the next four quarters, with a minimum of three quarters required.
SIZE	Firm size calculated as the natural logarithm of the market value of equity at the end of the quarter.
TURNOVER	Employee turnover rate, calculated as the ratio of the number of employees who left the firm during the quarter to the average number of employees, based on employee online profiles and resumes.

Table 1
Sample Description

Panel A: Sample Selection

	No. of firms	No. of firm–quarters
Available employee turnover data	3,868	91,946
Less:		
Missing necessary financial data and stock returns	186	5,840
Missing industry code	70	772
Final sample	3,612	85,334

Panel B: Distribution by Industry

	No. of firms	No. of firm–quarters	Mean employee turnover rate
Consumer Non-Durables	167	3,938	0.0395
Consumer Durables	98	2,423	0.0342
Manufacturing	327	8,567	0.0301
Energy	181	4,227	0.0326
Chemicals	98	2,471	0.0301
Business Equipment	700	14,822	0.0383
Telecommunications	90	1,817	0.0369
Utilities	73	2,455	0.0225
Wholesales and Retails	324	8,138	0.0381
Healthcare	538	9,342	0.0356
Finance	678	15,477	0.0273
Other	494	11,657	0.0325
Total	3,768	85,334	0.0333

The table reports the description of the sample. Panel A reports the sample selection procedure. Panel B reports the distribution of the sample by the 12 Fama–French industries.

Table 2
Descriptive Statistics

Variable	Mean	StdDev	P25	Median	P75
TURNOVER	0.0333	0.0261	0.0169	0.0302	0.0450
ROA_{t+1}	−0.0008	0.0477	−0.0014	0.0071	0.0188
GROWTH	0.1159	0.4109	−0.0441	0.0537	0.1754
SIZE	7.1399	1.8442	5.8212	7.0722	8.3584
BTM	0.5772	0.5157	0.2534	0.4725	0.7824
LEVERAGE	0.1959	0.2005	0.0173	0.1477	0.3064
CAPEX	0.0110	0.0149	0.0019	0.0060	0.0137
R&D	0.0105	0.0239	0.0000	0.0000	0.0092
$SD(ROA_{t+1,t+4})$	0.0174	0.0300	0.0030	0.0072	0.0173
$CAR(-1,+1)$	0.0003	0.0829	−0.0411	0.0000	0.0426
Partitioning variables					
Market Cap	6752.41	18786.72	336.89	1161.23	4186.75
Firm Age	23.3249	16.9055	11	19	31
Labor Intensity	0.0038	0.0059	0.0005	0.0020	0.0043
Local Unemployment Rate	0.0635	0.0246	0.0445	0.0600	0.0790
Growth in Job Postings	0.1183	0.6321	−0.1046	0.0000	0.1637

The table reports descriptive statistics. *TURNOVER* is the quarterly employee turnover rate based on employee online profiles and resumes. *ROA* is the return on assets. *GROWTH* is sales growth. *SIZE* is the natural logarithm of the market value of equity. *BTM* is the book-to-market ratio. *LEVERAGE* is the leverage ratio. *CAPEX* is capital expenditure. *R&D* is R&D expense. $SD(ROA_{jt+1,t+4})$ is the standard deviation of ROA over the next four quarters. $CAR(-1,+1)$ is the cumulative abnormal return around the next-quarter earnings announcement date. *Market Cap* is market capitalization. *Firm Age* is the number of years the firm has appeared on Compustat. *Labor Intensity* is the ratio of the number of employees to total assets. *Local Unemployment Rate* is the unemployment rate in the state where the firm's headquarters is located. *Growth in Job Postings* is the percentage change in the average number of job postings from the previous quarter.

Table 3
Future Firm Performance

	Dependent Variable: ROA_{t+1}		Dependent Variable: $GROWTH_{t+1}$	
	Coeff.	*Std.Error*	*Coeff.*	*Std.Error*
$TURNOVER_t$	−0.0291***	(0.0060)	−0.2340***	(0.0581)
ROA_t	0.4229***	(0.0094)	−0.6128***	(0.0658)
ROA_{t-3}	0.2557***	(0.0081)		
$GROWTH_t$	0.0006	(0.0005)	0.5953***	(0.0117)
$GROWTH_{t-3}$			−0.1276***	(0.0063)
$SIZE_t$	0.0019***	(0.0001)	0.0000	(0.0008)
BTM_t	−0.0082***	(0.0004)	−0.0531***	(0.0032)
$LEVERAGE_t$	−0.0070***	(0.0009)	−0.0346***	(0.0085)
$CAPEX_t$	0.0147	(0.0112)	1.0360***	(0.1398)
$R\&D_t$	−0.3123***	(0.0172)	−0.0590	(0.1333)
Industry fixed effects	Yes		Yes	
Year–quarter fixed effects	Yes		Yes	
Observations	85,334		82,840	
Adjusted R^2	0.572		0.421	

This table reports the results of estimating Regressions 1 and 2. In the first (last) two columns, the dependent variable ROA_{t+1} ($GROWTH_{t+1}$) is the return on assets (growth in sales) for quarter $t+1$. *SIZE* is the natural logarithm of the market value of equity. *BTM* is the book-to-market ratio. *LEVERAGE* is the leverage ratio. *CAPEX* is capital expenditure. *R&D* is R&D expense. The regressions include Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 4
Additional Analysis: Incremental Effect of Turnover

	Dependent Variable: ROA_{t+1}	
	Coeff.	*Std.Error*
Panel A: Controlling for Change in the Number of Employees		
$TURNOVER_t$	−0.0254***	(0.0061)
$\Delta Employees_t$	−0.0049***	(0.0007)
Panel B: Controlling for Analyst Earnings Forecast News		
$TURNOVER_t$	−0.0314***	(0.0060)
$AF\ News_t$	0.2263***	(0.0132)
Panel C: Controlling for Management Earnings Forecast News		
$TURNOVER_t$	−0.0467***	(0.0143)
$MF\ News_t$	0.2706***	(0.0335)
Panel D: Controlling for the Turnover Proxy Based on Employee Stock Option Cancellations		
$TURNOVER_t$	−0.0240***	(0.0074)
$Option\text{-}Based\ Turnover_t$	−0.0009	(0.0010)
Panel E: Controlling for ROA for Each of the Previous Four Quarters		
$TURNOVER_t$	−0.0188***	(0.0057)
ROA_t	0.3313***	(0.0089)
ROA_{t-1}	0.1438***	(0.0079)
ROA_{t-2}	0.1177***	(0.0082)
ROA_{t-3}	0.1713***	(0.0086)
Panel F: Controlling for Current Stock Returns		
$TURNOVER_t$	−0.0216***	(0.0066)
$Return_t$	0.0117***	(0.0008)
Panel G: Controlling for Firm Fixed Effects		
$TURNOVER_t$	−0.0179***	(0.0069)
Panel H: Including All Additional Controls and Firm Fixed Effects from Panels A−G		
$TURNOVER_t$	−0.0379**	(0.0176)

All regressions include the base set of control variables and additional control variables when indicated. *RETURN* is the stock return for the current quarter. In Panel A, Δ*Employees* is the change in the number of employees in the most recent fiscal year scaled by the beginning number of employees. In Panel B, *AF News* is the one-quarter ahead analyst consensus EPS forecast minus the current quarter EPS, scaled by the stock

price at the end of current quarter. In Panel C, *MF News* is the one-quarter ahead management EPS forecast minus the current quarter EPS, scaled by the stock price at the end of the current quarter. In Panel D, *Option-Based Turnover* is the turnover proxy based on employee stock option cancellations, calculated following Phua, Tham, and Wei (2018). In Panel F, *Return* is the stock return for the current quarter. In Panel G, regression includes firm fixed effects and year–quarter fixed effects. In Panel H, the regression includes all additional control variables from Panels A–F and firm fixed effects and year–quarter fixed effects. In Panels A–F, the regressions include Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 5
Factors that Influence Turnover Informativeness about Future Performance

$$ROA_{jt+1} = \alpha_1 + \beta_1 TURNOVER_{jt} + \beta_2 ROA_{jt} + \beta_3 ROA_{jt-3} + \beta_4 GROWTH_{jt} + \beta_5 SIZE_{jt} + \beta_6 BTM_{jt} + \beta_7 LEVERAGE_{jt} + \beta_8 CAPEX_{jt} + \beta_9 R\&D_{jt} + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \quad (1)$$

Panel A – Small Versus Large Firms			
Small	−0.0360***	Large	−0.0129
	(0.0082)		(0.0073)
	F-test (*p*-value): [0.0349]		
Panel B – Young Versus Mature Firms			
Young	−0.0375***	Mature	−0.0123
	(0.0080)		(0.0089)
	F-test (*p*-value): [0.0332]		
Panel C – Low Versus High Labor Intensity			
Low Labor Intensity	−0.0383***	High Labor Intensity	−0.0174*
	(0.0082)		(0.0089)
	F-test (*p*-value): [0.0824]		
Panel D – Low Versus High Local Unemployment Rate			
Low Local Unemployment Rate	−0.0392***	High Local Unemployment Rate	−0.0168**
	(0.0108)		(0.0083)
	F-test (*p*-value): [0.0958]		
Panel E – Low Versus High Change in Job Postings			
Low Change in Job Postings	−0.0032	High Change in Job Postings	−0.0534***
	(0.0196)		(0.0150)
	F-test (*p*-value): [0.0297]		

This table reports the results of estimating future performance Regression 1 in the indicated subsamples. In Panel A, the subsamples are based on the market value of equity. In Panel B, the subsamples are based on the number of years the firm appears on CRSP. In Panel C, the subsamples are based on the ratio of the number of employees to the total assets. In Panel D, the subsamples are based on the unemployment rate in the state where the firm's headquarters is located. In Panel E, the subsamples are based on the percentage change in the average number of job postings from the previous quarter. The table reports the coefficient estimates on employee turnover, *TURNOVER*. Standard errors, clustered by firm, are reported in parentheses. The *p*-values, reported in square brackets, are for the two-tailed F-tests of the difference in the

coefficients between the indicated subsamples. The regressions include Fama–French 48-industry fixed effects and year–quarter fixed effects. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 6
Nonlinearity of Turnover–Performance Relationship

$$ROA_{jt+1} = \alpha_1 + \beta_1 TURNOVER\_HIGH_{jt} + \beta_2 TURNOVER\_LOW_{jt} + \beta_3 ROA_{jt} + \beta_4 ROA_{jt-3} + \beta_5 GROWTH_{jt} + \beta_6 SIZE_{jt} + \beta_7 BTM_{jt} + \beta_8 LEVERAGE_{jt} + \beta_9 CAPEX_{jt} + \beta_{10} R\&D_{jt} + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \quad (3)$$

Panel A – 10th Percentile Threshold			
TURNOVER_HIGH	−0.0305***	*TURNOVER_LOW*	0.0240
	(0.0061)		(0.0339)
	F-test (*p*-value): [0.1057]		
Panel B – 20th Percentile Threshold			
TURNOVER_HIGH	−0.0351***	*TURNOVER_LOW*	0.0244
	(0.0064)		(0.0270)
	F-test (*p*-value): [0.0348]		
Panel C – 30th Percentile Threshold			
TURNOVER_HIGH	−0.0386***	*TURNOVER_LOW*	0.0131
	(0.0073)		(0.0222)
	F-test (*p*-value): [0.0416]		
Panel D – 40th Percentile Threshold			
TURNOVER_HIGH	−0.0411***	*TURNOVER_LOW*	0.0064
	(0.0080)		(0.0179)
	F-test (*p*-value): [0.0299]		
Panel E – 50th Percentile Threshold			
TURNOVER_HIGH	−0.0417***	*TURNOVER_LOW*	−0.0028
	(0.0086)		(0.0149)
	F-test (*p*-value): [0.0483]		

This table reports the results of estimating Regression 3. The dependent variable ROA_{t+1} is the return on assets for quarter *t+1*. The table reports the coefficients for the low- and high-turnover regions. The low-turnover (high-turnover) region is below (above) the Xth percentile of the distribution of turnover in the Fama–French 12-industry category and the year. In Panels A, B, C, D, and E, X is 10%, 20%, 30%, 40%,

and 50%, respectively. The *p*-values, reported in square brackets, are for the two-tailed F-tests of the difference in the coefficients between the low- and high-turnover regions. The regressions include Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 7
Uncertainty of Future Performance

$$SD(ROA_{jt+1,t+4}) = \alpha_1 + \beta_1 TURNOVER_{jt} + \beta_2 SD(ROA_{jt-3,t}) + \beta_3 ROA_{jt} + \beta_4 ROA_{jt-3} + \beta_5 GROWTH_{jt} + \beta_6 SIZE_{jt} + \beta_7 BTM_{jt} + \beta_8 LEVERAGE_{jt} + \beta_9 CAPEX_{jt} + \beta_{10} R\&D_{jt} + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \quad (4)$$

	Dependent Variable: $SD(ROA_{jt+1,t+4})$	
	Coeff.	*Std.Error*
$TURNOVER_t$	0.0369***	(0.0060)
$SD(ROA_{jt-3,t})$	0.2163***	(0.0135)
ROA_t	−0.0829***	(0.0067)
ROA_{t-3}	−0.0203***	(0.0056)
$GROWTH_t$	−0.0005	(0.0005)
$SIZE_t$	−0.0022***	(0.0001)
BTM_t	0.0003	(0.0005)
$LEVERAGE_t$	0.0030**	(0.0012)
$CAPEX_t$	0.0129	(0.0147)
$R\&D_t$	0.1639***	(0.0192)
Industry fixed effects	Yes	
Year–quarter fixed effects	Yes	
Observations	84,437	
Adjusted R^2	0.291	

This table reports the results of estimating Regression 4. The dependent variable $SD(ROA_{jt+1,t+4})$ is the standard deviation of ROA over the next four quarters. *TURNOVER* is employee turnover. *ROA* is return on assets. *GROWTH* is sales growth. *SIZE* is the natural logarithm of the market value of equity. *BTM* is the book-to-market ratio. *LEVERAGE* is the leverage ratio. *CAPEX* is capital expenditure. *R&D* is R&D expense. The regression includes Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table 8
Future Earnings Announcement Returns

$$CAR(-1,+1)_{jt+1} = \alpha_1 + \beta_1 TURNOVER_{jt} + \beta_2 ROA_{jt} + \beta_3 ROA_{jt-3} + \beta_4 GROWTH_{jt} + \beta_5 SIZE_{jt} + \beta_6 BTM_{jt} + \beta_7 LEVERAGE_{jt} + \beta_8 CAPEX_{jt} + \beta_9 R\&D_{jt} + Industry\ FE + Year\text{–}Quarter\ FE + \varepsilon_{jt}, \quad (5)$$

	Dependent Variable: $CAR(-1,+1)_{t+1}$	
	Coeff.	*Std.Error*
$TURNOVER_t$	−0.0324**	(0.0151)
ROA_t	−0.0159	(0.0160)
ROA_{t-3}	0.0455***	(0.0125)
$GROWTH_t$	−0.0000	(0.0008)
$SIZE_t$	0.0003	(0.0003)
BTM_t	−0.0008	(0.0011)
$LEVERAGE_t$	0.0041	(0.0032)
$CAPEX_t$	−0.0298	(0.0279)
$R\&D_t$	−0.0289	(0.0287)
Industry fixed effects	Yes	
Year–quarter fixed effects	Yes	
Observations	74,333	
Adjusted R^2	0.004	

This table reports the results of estimating Regression 4. The dependent variable, $CAR(-1,+1)_{t+1}$, is the cumulative abnormal return around the earnings announcement for quarter $t+1$. *TURNOVER* is employee turnover. *ROA* is return on assets. *GROWTH* is sales growth. *SIZE* is the natural logarithm of the market value of equity. *BTM* is the book-to-market ratio. *LEVERAGE* is the leverage ratio. *CAPEX* is capital expenditure. *R&D* is R&D expense. The regression includes Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Internet Appendix for "Employee Turnover and Firm Performance: Large-Sample Archival Evidence"

This Appendix provides the results of additional analyses and robustness tests.

Table IA.1 presents a correlation table.

Table IA.2 presents the results of the regressions of future performance (return on assets and sales growth) in each of the next four quarters, separately.

Table IA.3 presents the results of the regression of future expenses on turnover and control variables.

Table IA.4 re-estimates future return Regression 5 including controls for earnings announcement returns for the previous four quarters.

Table IA.5 reports the results of a hedge portfolio analysis, where we form monthly hedge portfolios that take long positions in firms with low turnover and short positions in firms with high turnover. We estimate the regressions of hedge portfolio returns on the three Fama-French (1993) factors or the four Carhart (1997) factors.

Table IA.1
Correlation Table

	TURNOVER	ROA_{t+1}	$GROWTH_{t+1}$	$SD(ROA_{t+1,t+4})$	*CAR(−1,+1)*	*SIZE*	*BTM*	*LEVERAGE*	*CAPEX*
ROA_{t+1}	-0.0476								
$GROWTH_{t+1}$	-0.0114	-0.0056							
$SD(ROA_{t+1,t+4})$	0.0708	-0.4482	0.077						
CAR(−1,+1)	-0.0046	0.1112	0.0517	-0.0654					
SIZE	0.0723	0.3343	-0.0149	-0.2251	0.0086				
BTM	-0.0739	-0.0589	-0.1449	-0.0435	-0.0003	-0.2928			
LEVERAGE	0.0139	-0.0277	-0.0104	0.028	0.0049	0.1127	-0.1704		
CAPEX	-0.0102	0.0461	0.0646	0.0562	-0.0131	0.0585	-0.0737	0.1402	
R&D	0.0703	-0.5044	0.1537	0.3469	-0.0196	-0.1787	-0.2362	-0.1252	-0.0919

This table reports correlations among key variables. *TURNOVER* is the quarterly employee turnover rate based on employee online profiles and resumes. *ROA* is the return on assets. *GROWTH* is sales growth. *SIZE* is the natural logarithm of the market value of equity. *BTM* is the book-to-market ratio. *LEVERAGE* is the leverage ratio. *CAPEX* is capital expenditure. *R&D* is research and development expense. $SD(ROA_{jt+1,t+4})$ is the standard deviation of ROA over the next four quarters. *CAR(−1,+1)* is the cumulative abnormal return around the next-quarter earnings announcement date.

Table IA.2
Performance in the Next Four Quarters

Panel A: Return on Assets

	Dependent Variable:			
	ROA_{t+1}	ROA_{t+2}	ROA_{t+3}	ROA_{t+4}
$TURNOVER_t$	-0.0291***	-0.0227***	-0.0189**	-0.0275***
	(0.0060)	(0.0069)	(0.0074)	(0.0074)
ROA_t	0.4229***	0.3546***	0.3093***	0.4758***
	(0.0094)	(0.0092)	(0.0089)	(0.0122)
ROA_{t-3}	0.2557***			
	(0.0081)			
ROA_{t-2}		0.2934***		
		(0.0095)		
ROA_{t-1}			0.2984***	
			(0.0095)	
$GROWTH_t$	0.0006	-0.0018***	-0.0029***	-0.0056***
	(0.0005)	(0.0006)	(0.0006)	(0.0007)
$SIZE_t$	0.0019***	0.0021***	0.0022***	0.0029***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
BTM_t	-0.0082***	-0.0074***	-0.0064***	-0.0059***
	(0.0004)	(0.0005)	(0.0005)	(0.0005)
$LEVERAGE_t$	-0.0070***	-0.0051***	-0.0037***	-0.0063***
	(0.0009)	(0.0011)	(0.0012)	(0.0014)
$CAPEX_t$	0.0147	-0.0154	-0.0369**	-0.0252
	(0.0112)	(0.0131)	(0.0150)	(0.0170)
$R\&D_t$	-0.3123***	-0.2997***	-0.2920***	-0.3921***
	(0.0172)	(0.0206)	(0.0220)	(0.0261)
Industry fixed effects	Yes	Yes	Yes	Yes
Year–quarter fixed effects	Yes	Yes	Yes	Yes
Observations	85,334	84,957	84,434	81,908
Adjusted R^2	0.572	0.530	0.504	0.490

Panel B: Sales Growth

	Dependent Variable:			
	$GROWTH_{t+1}$	$GROWTH_{t+2}$	$GROWTH_{t+3}$	$GROWTH_{t+4}$
$TURNOVER_t$	-0.2340***	-0.2868***	-0.2178***	-0.2487***
	(0.0581)	(0.0695)	(0.0750)	(0.0837)
ROA_t	-0.6128***	-0.6919***	-0.9231***	-1.3756***
	(0.0658)	(0.0782)	(0.0850)	(0.0970)
$GROWTH_t$	0.5953***	0.4455***	0.3187***	-0.0012
	(0.0117)	(0.0112)	(0.0108)	(0.0109)
$GROWTH_{t-3}$	-0.1276***			
	(0.0063)			
$GROWTH_{t-2}$		-0.1775***		
		(0.0076)		
$GROWTH_{t-1}$			-0.1925***	
			(0.0089)	
$SIZE_t$	0.0000	-0.0019*	-0.0019	-0.0005
	(0.0008)	(0.0010)	(0.0012)	(0.0013)
BTM_t	-0.0531***	-0.0675***	-0.0738***	-0.0773***
	(0.0032)	(0.0039)	(0.0046)	(0.0051)
$LEVERAGE_t$	-0.0346***	-0.0477***	-0.0683***	-0.0983***
	(0.0085)	(0.0108)	(0.0127)	(0.0143)
$CAPEX_t$	1.0360***	1.0067***	1.0742***	1.2789***
	(0.1398)	(0.1794)	(0.2114)	(0.2279)
$R\&D_t$	-0.0590	0.2311	0.2618	-0.0965
	(0.1333)	(0.1612)	(0.1913)	(0.2168)
Industry fixed effects	Yes	Yes	Yes	Yes
Year–quarter fixed effects	Yes	Yes	Yes	Yes
Observations	82,840	83,350	83,681	81,830
Adjusted R^2	0.421	0.256	0.152	0.083

Panel A reports the results of re-estimating Regression 1 for return on assets in the next four quarters. Panel B reports the results of re-estimating Regression 2 for sales growth in the next four quarters. The regressions include Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table IA.3
Future Expenses

	Dependent Variable: $EXP\ GROWTH_{t+1}$	
	Coeff.	*Std.Error*
$TURNOVER_t$	-0.0707	(0.0629)
ROA_t	0.5842***	(0.0554)
$GROWTH_t$	0.1705***	(0.0101)
$SIZE_t$	-0.0014*	(0.0009)
BTM_t	0.0189***	(0.0038)
$LEVERAGE_t$	0.0022	(0.0082)
$CAPEX_t$	1.3448***	(0.1537)
$R\&D_t$	0.4951***	(0.1130)
$EXP\ GROWTH_t$	0.3585***	(0.0114)
$EXP\ GROWTH_{t-3}$	-0.1509***	(0.0054)
Industry fixed effects	Yes	
Year–quarter fixed effects	Yes	
Observations	82,838	
Adjusted R^2	0.248	

This table reports the results of estimating the regression of future expenses on turnover and control variables. $EXP\ GROWTH_{t+1}$ is the percentage change in expenses from the same quarter in the previous year. The regressions include Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table IA.4
Future Earnings Announcement Returns—Including Controls for Earnings Announcement Returns for the Previous Four Quarters

	Dependent Variable: $CAR(-1,+1)_{t+1}$	
	Coeff.	*Std.Error*
$TURNOVER_t$	-0.0378**	(0.0163)
ROA_t	-0.0363*	(0.0183)
ROA_{t-3}	0.0546***	(0.0141)
$GROWTH_t$	0.0009	(0.0010)
$SIZE_t$	0.0001	(0.0003)
BTM_t	-0.0007	(0.0013)
$LEVERAGE_t$	0.0024	(0.0033)
$CAPEX_t$	-0.0281	(0.0313)
$R\&D_t$	-0.0305	(0.0289)
$CAR(-1,+1)_t$	-0.0035	(0.0057)
$CAR(-1,+1)_{t-1}$	0.0113*	(0.0060)
$CAR(-1,+1)_{t-2}$	0.0183***	(0.0053)
$CAR(-1,+1)_{t-3}$	-0.0008	(0.0057)
Industry fixed effects	Yes	
Year–quarter fixed effects	Yes	
Observations	58,366	
Adjusted R^2	0.005	

This table reports the results of re-estimating Regression 5 including controls for earnings announcement returns for the previous four quarters. The dependent variable, $CAR(-1,+1)_{t+1}$, is the cumulative abnormal return around the earnings announcement for quarter *t+1*. *TURNOVER* is employee turnover. *ROA* is return on assets. *GROWTH* is sales growth. *SIZE* is the natural logarithm of the market value of equity. *BTM* is the book-to-market ratio. *LEVERAGE* is the leverage ratio. *CAPEX* is capital expenditure. *R&D* is R&D expense. The regression includes Fama–French 48-industry fixed effects and year–quarter fixed effects. Standard errors, clustered by firm, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

Table IA.5
Hedge Portfolio Analysis

	Dependent Variable: *Monthly Hedge Portfolio Return*$_{t+1}$	
α	-0.0039**	-0.0037**
	(0.0016)	(0.0016)
β_{MKT}	0.1870***	0.1643***
	(0.0413)	(0.0429)
β_{SMB}	-0.1019	-0.0908
	(0.0617)	(0.0604)
β_{HML}	0.0750	0.0171
	(0.0678)	(0.0784)
β_{MOM}		-0.0958**
		(0.0469)
Monthly Observations	129	129
Adjusted R^2	0.161	0.182

This table reports the results of a hedge portfolio analysis, where we form monthly hedge portfolios that take long positions in firms in the bottom decile of turnover and short positions in firms in the top decile of turnover formed at the end of month *t*. We estimate the regressions of hedge portfolio returns in month *t+1* on the three Fama-French (1993) factors (*MKT*, *HML*, and *SMB*) or the four Carhart (1997) factors (*MKT*, *HML*, *SMB*, and *MOM*). Standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.