Human Capital Disclosure and Workforce Turnover

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Abstract

Human capital is a key driver of firm value, yet little is known about the timeliness and informativeness of workforce turnover disclosures. Using a proprietary dataset of over 8.6 million career histories combined with textual analysis of SEC filings, we examine how turnover disclosures reflect actual workforce dynamics. Firms adjust the intensity and tone of turnover disclosures in response to changes in employee flows, especially when they have predominantly high-skilled employees. This responsiveness suggests that the informative benefits of transparency often outweigh disclosure costs. We further analyze two SEC rule changes, a prescriptive 2005 risk-factor mandate and a principles-based 2020 human-capital amendment, and find both significantly increase turnover-related disclosures, especially among prior under-disclosers. However, the tone of disclosures diverges, becoming more cautionary under the 2005 rule and more positive under the 2020 rule. This highlights how regulatory design influences not just what firms disclose, but how they frame it. Overall, our findings offer new evidence on the informativeness of human capital disclosures and the role of disclosure policy in shaping workforce-related transparency.

Keywords: Human capital disclosure, employee turnover, textual analysis, SEC regulation, workforce transparency

JEL Classification: G38, J60, M41, M48

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1 Introduction

Workforce turnover is a key driver of firm performance and value. Indeed, research shows that employee inflows and outflows predict stock returns (Agrawal et al., 2021) and operating performance (Li et al., 2022). At the same time, investors and policymakers have long questioned whether corporate reporting provides sufficient insights into firms' human capital dynamics.[1] Underlying these concerns is an implicit assumption that has received limited empirical scrutiny: firms may downplay, obscure, or selectively frame workforce changes to avoid negative stakeholder scrutiny. Accordingly, recent surveys find a majority of institutional investors identify human capital management as an area in need of additional disclosure (Morrow Sodali, 2019, 2021).

In this paper, we directly test whether firms' human capital disclosures reflect the underlying reality of workforce turnover. Using a proprietary, large-scale dataset of actual workforce transitions, we link employee flows to textual discussions in annual reports. This "answer key" design enables us to benchmark the content, volume, and tone of turnover disclosures against actual employee movements. Our goal is to evaluate the extent to which firms are transparent about their human capital dynamics, or whether disclosure practices fall short of the informational needs of investors.

While firms may have strong incentives to be transparent —particularly in response to growing investor demand for insight into human capital practices —it is not clear that they are. A substantial literature points to proprietary costs as a key reason why managers may withhold value-relevant information (e.g., Verrecchia, 1983; Ellis et al., 2012; Li et al., 2018), especially when disclosure could expose internal vulnerabilities to various stakeholders. These competing pressures between the desire to build investor trust and the impulse to protect strategic interests create uncertainty about whether public filings accurately reflect underlying human capital dynamics. For example, Baker et al. (2022) show that firms engage in "diversity washing" by selectively framing diversity disclosure to improve ESG scores without substantive changes, highlighting how firms may manage perceptions even in areas of high investor scrutiny.

We first establish that workforce dynamics are economically important. We confirm prior research that employee separation rates predict changes in profitability and growth (Agrawal et al.,

[1]The U.S. Securities and Exchange Commission (SEC) has attempted to enhance human capital disclosures by promulgating two major regulatory rules, which we also examine in this study.

2021; Li et al., 2022). We then extend these findings to show that separation rates, and other workforce dynamic measures, significantly predict future investments in research and development (R&D) and capital expenditures (CapEx). These relations highlight the critical role of human capital in creating value from tangible (e.g., equipment) and intangible assets (e.g., patents).

In our main analyses, we explore the responsiveness of disclosures to actual workforce turnover. Our primary disclosure measure is the intensity (sentence counts) of discussions on attracting and retaining ("A&R") employees in 10-K filings. We focus on A&R disclosures because they are objective, reproducible, and should by definition capture discussions of workforce turnover. Following prior work that measures disclosure through sentence counts (e.g., Kravet and Muslu, 2013; Qiu and Wang, 2021), we interpret higher A&R disclosure intensity as an indication of greater transparency on workforce dynamics.[2]

Our results indicate that workforce turnover disclosures tend to reflect the underlying workforce dynamics. We find a robust positive relation between within-firm increases in employee turnover—such as higher separation and hiring rates—and subsequent A&R disclosure intensity, while longer employee tenure (a sign of workforce stability) leads to reduced disclosure intensity. Additionally, our analysis indicates that disclosure adjustments are driven primarily by unexpected firm-specific workforce changes rather than broader macroeconomic or industry-wide trends.

Beyond disclosure intensity, we also examine the sentiment of workforce turnover disclosures using the FinBERT sentiment classification model from Huang et al. (2023), which is a language model that summarizes contextual information such as positive and negative tones in financial disclosures. Consistent with turnover disclosures conveying meaningful information, the sentiment of workforce turnover disclosures align with underlying workforce dynamics. Specifically, firms experiencing higher separation rates or lower hiring rates tilt A&R discussions to include more negative sentiment.

To further assess informativeness, we examine explicit quantitative workforce turnover disclosures, such as separation rates or turnover percentages. Though only a minority of firms

[2]Similar count-based methods are used in studies of SEC filings, including prospectuses (Hanley and Hoberg, 2010) and 8-Ks (Bao et al., 2019), where higher disclosure counts are associated with increased transparency. Lopez-Lira (2021) develops a theoretical model showing that managers allocate disclosure space in proportion to the significance of risks, leading to more frequent mentions of issues that are critical to the firm. Additionally, prior research links the number of disclosure sentences to improved disclosure quality (Hooks and van Staden, 2011). Studies also connect A&R disclosure intensity to workforce attributes such as skilled labor compensation (Qiu and Wang, 2021).

provide these metrics, we find that among those that do, the level of quantitative disclosure is significantly positively associated with actual turnover activity. This further indicates that firms' human capital disclosures reflect meaningful workforce dynamics.

Prior work finds that high-skill employee turnover has a larger effect on stock and operating performance than that of lower-skilled employees (Agrawal et al., 2021; Li et al., 2022). Consistent with this, we find that firms employing predominantly high-skilled workers ("high-skill firms") exhibit stronger disclosure sensitivity to turnover events. Specifically, high-skill firms increase turnover disclosure intensity more substantially following increases in separation rates or decreases in employee tenure. Likewise, shifts in negative disclosure sentiment related to turnover are more pronounced among high-skilled firms. These results suggest that workforce turnover disclosures are particularly informative when turnover has greater implications for firm performance.

Collectively, our findings suggest that human capital disclosures in 10-K filings generally reflect meaningful changes in firms' underlying workforce dynamics. Managers adjust the intensity and sentiment of their workforce-related disclosures in response to actual changes in employee turnover. Given this evidence that firms are, in general, forthcoming in discussing workforce changes, a natural policy question arises: should regulators mandate standardized workforce turnover disclosures? If so, what form should these requirements take—prescriptive, rules-based approaches, or flexible principles-based standards—and how might these approaches influence disclosure behavior?

To explore these policy considerations, we analyze two major SEC rule changes that adopt fundamentally different regulatory approaches. The first rule, a 2005 risk-factor mandate, took a relatively more prescriptive approach by requiring firms to disclose "material risk factors" in a specific section of their 10-Ks. Although the rule did not explicitly focus on workforce issues, we find a significant increase in the quantity of turnover-related disclosures following the mandate, with notably larger increases among firms that previously disclosed less about workforce turnover risks than predicted by our model. Consistent with the rule's risk-oriented intent, the tone of these turnover disclosures also became more cautionary and reflects a shift toward negative sentiment.

The second rule, a 2020 disclosure amendment, focused on human capital disclosure but adopted a more flexible, principles-based approach, requiring firms to discuss human-capital information only if deemed material by managers, and without prescribing specific metrics or dimensions of disclosure. We find that the 2020 rule prompted an even larger increase in workforce turnover

disclosure intensity, especially among firms that previously disclosed less than predicted. However, in contrast to the 2005 rule, the principles-based approach led firms to shift their disclosure tone toward more positive and less cautionary narratives, particularly for those that had previously under-disclosed. Thus, while the prescriptive 2005 mandate sharpened discussions about turnover risks, the principles-based 2020 rule broadened disclosure but permitted firms to frame turnover dynamics more optimistically.

Taken together, our study makes two broad contributions to the literature on human capital and corporate disclosure. First, we provide the first large-scale examination of human capital turnover disclosures against direct, granular measures of workforce dynamics. While prior research emphasizes the importance of human capital for firm performance and valuation (e.g., Agrawal et al., 2021; Li et al., 2022; Regier and Rouen, 2023), empirical studies have been constrained by limited availability of large-scale, workforce-level turnover data (Demers et al., 2024b). By integrating over 8.6 million employee resumes with textual disclosures from firms' 10-K filings over a long time period, we offer novel evidence on whether and how effectively managers' narratives reflect actual employee inflows, outflows, and tenure changes. We document that both the intensity and sentiment of A&R disclosures systematically align with underlying workforce dynamics. Disclosure sensitivity to turnover events is greater for firms whose workforce predominantly consists of high-skilled employees, which is consistent with human capital turnover being more economically consequential in such settings. These findings suggest that, even in the absence of strict mandates, workforce turnover discussions can convey meaningful information about firms' internal workforce dynamics, despite concerns over selective or strategic reporting.

Second, we advance the policy debate on disclosure regulation by examining how regulation design shapes the quantity and tone of human capital disclosures. We study two contrasting SEC interventions: the prescriptive 2005 risk-factor requirement and the principles-based 2020 human capital amendment. Both rules increase the intensity of turnover discussions, especially among firms that previously disclosed less than expected. However, these mandates produce different effects on disclosure tone. The prescriptive 2005 rule prompts firms to adopt a more cautionary narrative. By contrast, the 2020 principles-based rule prompts more positively framed narratives, with managers emphasizing favorable workforce dynamics. These findings reveal a key trade-off in disclosure design: more prescriptive mandates sharpen firm's focus on risk, while principles-based

rules broaden the scope of coverage but many invite more favorable or strategic framing. In doing so, our study complements and extends research on the general effects of the 2005 risk-factor rule (e.g., Kravet and Muslu, 2013; Campbell et al., 2014; Nelson and Pritchard, 2016; Dyer et al., 2017) and the 2020 human capital management rule (e.g., Demers et al., 2024a; Bourveau et al., 2025).

The rest of the paper is organized as follows. Section 2 provides background information and our hypotheses. Sections 3 describes our data and measures of human capital. Section 4 and 5 presents the results. We conclude in Section 6.

2 Background and Hypotheses

2.1 Institutional Background

Most publicly traded firms in the U.S. are required to file annual reports on Form 10-K, which provide a standardized and comprehensive view of their business operations and financial status. These reports are filed with the SEC and made publicly available through the SEC's EDGAR system. Given their legal status, 10-Ks are subject to high liability standards for material misstatements, omissions, or misleading disclosures and are reviewed by the SEC, making them a particularly credible source of firm-provided information compared to non-SEC disclosure channels.

While firms could voluntarily disclose human capital related data through alternative means, the SEC has not established formal guidelines for these disclosures. As such, these outlets are typically unregulated and less standardized. Thus, we expect more reliable discussions about attracting and retaining human capital in 10-K reports, given these are less likely to be influenced by marketing strategies or prone to "greenwashing" due to SEC oversight and legal liability (Baker et al., 2022).

Human capital information appears in multiple sections of the 10-K. First, in "Item 1: Business," firms must disclose their employee count. However, because firms are not required to report workforce turnover explicitly, investors cannot directly determine specific turnover or hiring rates from employee count disclosures alone.

Second, Item 7 in the 10-K ("Management's Discussion and Analysis" or MD&A), as required by Item 303 of Regulation S-K, provides management's narrative on operational and financial changes. The SEC encourages firms to include key performance indicators important to investors, which can include both financial and non-financial metrics such as workforce turnover. As a result, some firms present both financial and non-financial metrics in the MD&A (Mayew et al., 2015). Thus,

management can voluntarily disclose employee-related information, such as collective bargaining agreements, employee relations, or employee turnover risk.

In 2005, the SEC introduced a new 10-K section, "Item 1A: Risk Factors," requiring firms to outline key factors contributing to the firm risk, as stipulated by Item 305(c) of Regulation S-K.[3] Before this change, risk factor disclosures were mandatory only in registration statements for debt and equity offerings. As Campbell et al. (2014) argue, this change reflected the SEC's view that risk disclosures should be part of regular reporting to investors and not limited to capital-raising filings. Consequently, if human capital turnover represents a material risk to a firm's operations, firms would have been expected to start including such information in their 10-K filings beginning in 2005.

More recently, in August 2020, the SEC promulgated human capital disclosure regulations under Regulation S-K, with the changes taking effect in November 2020.[4] Firms must now disclose human capital management measures and objectives, but only if they are materially relevant to their operations. Importantly, the 2020 rule adopts a principles-based approach that affords managers significant discretion in determining what human capital information to report and how. As a result, managers have substantial flexibility both in selecting the content of human capital disclosures and in framing their narratives.

2.2 Hypotheses

2.2.1 Workforce Dynamics and Enhanced A&R Disclosures

Capital-market demand for information on workforce dynamics is likely high, given turnover affects operating performance and firm value (Agrawal et al., 2021; Li et al., 2022). However, accounting rules constrain the recognition of investments in people on the balance sheet (Lev and Schwartz, 1971). Consequently, investors and analysts must rely on non-financial and narrative disclosures or external proxies (such as job-posting data), which are costly, difficult to process, and potentially noisy substitutes (Dhaliwal et al., 2012; Gutiérrez et al., 2020). Surveys report that more than 80% of institutional investors want more extensive human-capital information (Morrow Sodali, 2019), and prior work shows that managers often respond to their demands for transparency (Boone and White, 2015).

[3]See SEC, Securities Offering Reform, (Jul. 2005), https://www.sec.gov/rules/final/33-8591.pdf.
[4]See Modernization of Regulation S-K (Aug. 2020), https://www.sec.gov/rules/final/2020/33-10825.pdf.

We build on these insights to develop two complementary hypotheses regarding how managers disclose workforce turnover information in 10-K filings. Specifically, we focus on the intensity (i.e., volume) and sentiment (i.e., tone) of A&R disclosures, which together provide a more comprehensive understanding of firms' narrative treatment of human capital dynamics.

We begin by considering the volume of turnover-related disclosures in response to actual workforce changes. We expect firms experiencing higher workforce turnover to face stronger capital-market pressure to enhance their disclosures. In response, firms are likely to choose to increase the intensity of A&R disclosures to signal responsiveness, reduce uncertainty, and provide greater clarity about evolving workforce dynamics.

For deeper analysis, we differentiate between two dimensions of workforce change: flows, captured by separation and hiring rates, and stock, represented by employee tenure. Flow measures reflect near-term changes in the workforce, while tenure captures the accumulation of firm-specific human capital over time. Declines in average tenure, especially due to the departure of long-serving employees, can indicate losses of institutional knowledge or disruptions to management stability, raising red flags for investors. Consequently, we expect both increases in workforce turnover and reductions in employee tenure to prompt increases in turnover disclosure intensity.

Accordingly, our first hypothesis is stated as follows:

Hypothesis 1: *Firms experiencing higher workforce turnover or shorter average employee tenure will subsequently increase the intensity of their workforce turnover disclosures.*

Managers not only choose how much to disclose about workforce turnover, but also how to frame these disclosures. Thus, the tone of A&R discussions may carry incremental information beyond disclosure intensity. Prior work shows that the narrative tone in SEC filings typically reflects underlying economic conditions and that investors use sentiment as a signal of risk and opportunities (Huang et al., 2023).

Specifically, we expect that higher separation rates will likely correspond with increases in negative tone in A&R disclosures, emphasizing potential instability, operational disruptions, or retention issues. Conversely, managers are likely to frame hiring rate increases in a more positive tone in A&R disclosures, highlighting growth opportunities or strategic investments in human capital. Similarly, reductions in employee tenure might signal a deterioration of firm-specific human

capital, prompting more negative (or less positive) language. More formally:

Hypothesis 2: *The sentiment of workforce turnover disclosures aligns with recent workforce dynamics, becoming more negative (or less positive) following higher separation rates, lower hiring rates, or reduced employee tenure.*

We recognize, however, that several factors may weaken or distort the link between workforce changes and disclosure, preventing us from finding empirical support for H1 or H2. Prior studies highlight the persistent use of boilerplate language in SEC 10-K disclosures, which tends to remain unchanged even when underlying firm conditions change in a meaningful way (e.g., Brown and Tucker, 2011; Dyer et al., 2017; Cohen et al., 2020; Cazier et al., 2021). Thus, workforce-turnover disclosures may exhibit stickiness as managers limit their responsiveness to actual changes in workforce dynamics. Boilerplate language that infrequently updates would yield insignificant relations between workforce dynamics and disclosure.

Additionally, regulatory requirements and litigation risks incentivize firms to emphasize risks over opportunities in disclosures to limit liability exposure (Campbell et al., 2014; Gaulin, 2017; Lopez-Lira, 2023). This could lead firms to emphasize negative workforce developments more than positive ones. As a result, managers may be more willing to adjust their disclosure intensity or sentiment only in response to negative turnover events compared to positive workforce developments.

Other potential impediments to finding a relationship between disclosure and workforce dynamics include proprietary and bargaining costs. Prior literature documents that detailed public disclosure can reveal sensitive information to competitors (Verrecchia, 1983; Beyer et al., 2010; Ellis et al., 2012; Hope et al., 2016; Li et al., 2018) and provide unions with leverage in negotiations (Bova, 2013; Arslan-Ayaydin et al., 2021). In the context of workforce dynamics, increasing turnover transparency could expose operational vulnerabilities, reveal strategic weaknesses, or signal difficulties in retaining key talent. As a result, managers may strategically limit adjustments in turnover disclosures despite investor demand.

2.2.2 Sensitivity of Disclosures to High-Skill Workforce Turnover

The economic consequences of workforce turnover likely depend on employee skill levels. Departures of high-skill workers may pose greater risks to innovation, productivity, and retention

of valuable firm-specific knowledge, which suggests that turnover information carries higher value for firms with predominantly high-skill workforces. Indeed, prior research shows that high-skill employee separations lead to stronger stock-price reactions and larger effects on operating performance (Agrawal et al., 2021; Li et al., 2022). Thus, capital-market pressure for transparency around turnover dynamics is likely greater for firms employing predominantly high-skilled workers.

If firms alter their disclosures to reflect underlying workforce changes, then we expect the effects to be concentrated among firms more reliant on high-skilled employees, as compared to firms employing predominantly lower-skilled workers. Because high-skilled employees contribute disproportionately to productivity, innovation, and firm-specific knowledge, investors likely value detailed disclosures on their turnover more highly. Therefore, we expect higher-skilled firms to exhibit more pronounced changes in disclosure intensity and larger shifts in disclosure sentiment following changes in their workforce dynamics. Thus, we state:

Hypothesis 3a:

Firms with predominantly high-skilled workforces will exhibit greater responsiveness in turnover disclosure intensity to workforce dynamics.

Hypothesis 3b:

Firms with predominantly high-skilled workforces will exhibit greater responsiveness in turnover disclosure sentiment to workforce dynamics.

These hypotheses would lend support to the notion that firms are adjusting their disclosure in response to changes in workforce dynamics on average. However, any of the previously discussed alternative hypotheses would suggest no differential response or a muted effect.

3 Data and Empirical Specification

3.1 Data Sources

We use a confidential dataset from Emsi (now Lightcast) covering anonymized employment and educational histories for over 45 million U.S. individuals from 2001-2017 to assess workforce fluctuations. The data, sourced from online profiles and third-party aggregators, includes firm identifiers and public information.[5] The dataset represents about 30% of the U.S. workforce at any

[5]Lightcast provides labor market analytics using both public and proprietary data. See https://www.lightcast.io.

time, with a slight bias toward highly skilled individuals. Appendix A provides further details.

To generate firm-level metrics, we aggregate individual occupational data at the firm level and compute various human capital and workforce turnover measures (see Subsection 3.2). We match individual employment records to public firms based on company name, industry, and geographic location, then aggregate these records to create firm-level workforce metrics. To ensure data reliability, we include only firm-years with at least 25 employee records, resulting in a final sample of over 1,800 public firms from 2001 to 2021, with an average of 900 matched firms per year. Our primary human capital metrics span 2001–2016, resulting in a final dataset comprising over 8.6 million individuals across 13,882 firm-year observations.

The Emsi dataset enables long-term tracking of individuals' employment paths and precise role identification at each firm. Compared to alternative datasets, such as the Current Population Survey, Panel Study on Income Dynamics, or the Census Bureau's Longitudinal Employer-Household Dynamics, our dataset uniquely enables detailed, firm-level aggregation of individual career trajectories, improving accuracy and depth of workforce turnover and human capital measurement. We validate our workforce turnover figures against prior research and public labor market data in Subsection 4.1.

We match firm-level employee data with external datasets: financial and stock price data from Compustat and CRSP, analyst coverage and management forecasts from I/B/E/S, and institutional ownership from the Thomson Reuters 13-F database. Product market competition metrics come from Hoberg et al. (2014), while 10-K readability measures are sourced from WRDS SEC Analytics Suite. As detailed in Subsection 3.3, we extract employee-related discussions from 10-K filings using a Python script, and hand-collect some data, such as quantitative turnover metrics.

3.2 Measures of Workforce Dynamics

3.2.1 Primary Measures

We measure human capital and workforce turnover using key metrics that capture employee flow and stock. We measure workforce flow using annual hiring and separation rates, while the stock of human capital is captured through average employee tenure and the proportion of high-skilled workers, classified using individual occupation codes from the Emsi dataset.

To assess workforce turnover, we compute annual firm-level separation and hiring rates by

dividing the number of hires and separations by the total number of employees in our database at the end of the prior year. These measures, labeled as the firm's *hiring rate* and *separation rate*, follow methodologies from prior studies using employee-level data (e.g., Agrawal et al., 2021).

We also assess the stock of human capital, as employee flow alone does not indicate *which* employees are leaving or joining. To capture this, we estimate *employee tenure*, measured as the number of years an employee has been with the firm. Longer employee tenure indicates greater accumulation of occupation- and firm-specific human capital, reflecting workforce stability.

Our data includes detailed occupation codes, which we use to classify workers' skill levels based on the U.S. Department of Labor's O*NET Job Zone scale. This scale ranges from 1 (low skill, e.g., dishwasher) to 5 (high skill, e.g., attorney). Following Belo et al. (2017), we define high-skill workers as those in Job Zone 4 or 5. We then calculate the annual firm-level proportion of *high-skill workers* and use this measure to construct cross-sectional tests.

3.2.2 Additional Measures

To provide additional insights, we further decompose employee flow rates into expected and unexpected components by estimating individual-year equations for hiring and separation. This allows us to distinguish between workforce changes driven by firm-specific factors and broader labor market trends. We estimate the following:

$$Flow_{i,o,k,c} = \alpha + \delta_{o,k} + \gamma_{k,c} + \rho_{o,c} + \varepsilon_{i,o,k,c}, \tag{1}$$

where *flow* equals 1 if an employee departs (separation) or joins (hiring) the firm in a given year and 0 otherwise. The notations i, o, k, and c denote individual, occupation, industry, and location, respectively. Fixed effects (FEs) (δ, γ, ρ) control for occupation-industry, industry-location, and occupation-location. The error term is ε. Occupation codes follow O*NET, industry classification uses two-digit North American Industry Classification System (NAICS) codes, and location is based on core-based statistical areas (CBSA) definitions from the U.S. Census.

We estimate Equation 1 annually at the individual level, capturing local and national trends in hiring and separations by occupation and industry. These regressions include all workers—not just those at public firms—to improve labor market predictions. The year-by-year approach allows for time-varying outcomes, while FEs adjust for yearly local and national employment trends. Thus, our regressions account for labor demand shocks at the occupation, industry, and local levels.

We use predicted values from these regressions to calculate a firm-year *expected hiring rate*

and *expected separation rate*. The *unexpected hiring rate* and *unexpected separation rate* are then obtained by averaging regression residuals at the firm-year level.

This approach predicts employee turnover without firm-level attributes, capturing workforce shifts driven by labor demand based on location and occupational composition. The residuals isolate firm-specific variations in human capital flow, allowing us to assess whether managers adjust A&R disclosures in response to firm-specific risks or broader occupation or economic trends. To our knowledge, these employee flow measures are novel.

3.3 Measures of Workforce Turnover Disclosure

We measure firms' workforce turnover disclosures by analyzing the intensity of statements about attracting and retaining employees in 10-K filings, following the methodology of Qiu and Wang (2021). We use A&R sentence counts rather than word counts as our primary unit of analysis, which is consistent with prior textual disclosure studies (Kravet and Muslu, 2013; Qiu and Wang, 2021). This approach is supported by theoretical (Lopez-Lira, 2021) and empirical (Campbell et al., 2014) arguments that managers will allocate more disclosure space to topics they view as economically significant, resulting in a higher frequency of mentions for important issues. Similar sentence-based measures are common in research on IPO disclosures (Hanley and Hoberg, 2010), management forecasts (Balakrishnan et al., 2014), and SEC filings (Bao et al., 2019). Prior literature also links sentence-based disclosure measures to increased transparency and disclosure quality (Hooks and van Staden, 2011).

Because over 80% of firms discuss A&R, examining the mere presence of disclosures (extensive margin) would not capture meaningful variation. Therefore, we focus on A&R sentence counts (intensive margin) to better reflect incremental adjustments to workforce disclosures. Indeed, prior research shows that once firms introduce disclosure topics in 10-K filings, they rarely remove them (Campbell et al., 2014).

We identify A&R disclosures by extracting 10-K filings from the SEC's EDGAR database. Using a Python script, we isolate paragraphs discussing efforts to attract and retain employees based on predefined keyword lists. We split these paragraphs into sentences to improve text verification (Kravet and Muslu, 2013) and remove exact duplicates to reduce boilerplate content.[6]

[6]We also exclude sentences referring to attracting or retaining suppliers, clients, customers, contracts, creditors, business, segments, rights, or subscribers.

Our disclosure measure (*A&R sentences*) counts sentences containing at least one word from each of the following lists:[7]

List 1: employee, worker, team member, personnel, talent, labor, workforce

List 2: retain, attract, recruit, turnover, hire, hiring, hired

After identifying A&R sentences, we assess their sentiment using the FinBERT classification model from Huang et al. (2023), which improves sentiment accuracy in financial disclosures. FinBERT assigns each sentence a *positive*, *negative*, or *neutral* score. To assess the overall tone of A&R disclosure, we collapse the sentence-level sentiment scores by averaging across all A&R sentences.[8] Since neutral sentiment is the complement of positive and negative rates, we exclude it from our main analysis. Illustrative examples of A&R sentences that include negative statements include "we also experienced significant labor turnover" and "difficulty hiring, training, and retaining labor." Examples of positive statements are "able to retain qualified personnel as demonstrated by our low turnover rate" and "we accelerated hiring to ensure that we are well-positioned."

3.4 Research Design

3.4.1 Empirical Specification for H1

To empirically test whether firms adjust A&R disclosure intensity in response to workforce dynamics, we employ the following firm fixed effect (FE) Poisson specification:

$$\begin{aligned}\text{A\&R sentences}_{i,t} = \textit{Poisson}(\alpha + \beta_1 \text{Separation rate}_{i,t-1} + \beta_2 \text{Hiring rate}_{i,t-1} + \\ \beta_3 \text{Employee tenure}_{i,t-1} + \omega \text{Controls}_{i,t-1} + \text{FEs} + \varepsilon_{i,t}),\end{aligned} \tag{2}$$

where the dependent variable represents the number of A&R sentences in year t. Given the dependent variable is a count, we employ the Poisson fixed effects regression as advocated by Cohn et al. (2022). We use lagged workforce turnover metrics to assess firms' disclosure responses to prior workforce dynamics, including *separation rate*$_{i,t-1}$, *hiring rate*$_{i,t-1}$, and *employee tenure*$_{i,t-1}$. Under H1, we predict positive coefficients on β_1 and β_2, indicating increased disclosure following heightened turnover, and a negative coefficient on β_3, reflecting lower disclosure in stable workforces. Equation 2 includes firm and year FEs to control for unobservable within-firm differences and

[7] Appendix B discusses a topic analysis of other employee discussions in 10-Ks. Appendix Table B1 provides statistics.
[8] For example, if a firm has three A&R sentences in a given year and their positive sentiment scores are 0.2, 0.25, and 0.3, we use an average positive sentiment of 0.25 for that year.

broader time trends. We double cluster standard errors at the firm and year level.

We include four categories of $Controls_{i,t-1}$: 1) demand for workforce information, 2) disclosure-cost pressures, 3) firm financial characteristics, and 4) general disclosure properties. For demand, we control for *institutional ownership*, as these investors note they want greater human capital transparency (Morrow Sodali, 2019). We also control for *analyst following*, as prior work shows non-financial information is important to their models (Dhaliwal et al., 2012). Thus, analysts may pressure firms for turnover information.

Disclosure can be costly when it conveys proprietary information to stakeholders (Beyer et al., 2010). To account for these costs, we control for *product market competition*, *labor market competition*, and *union coverage*. Firms facing intense product market competition may avoid disclosing workforce challenges, such as hiring or retention issues, to prevent rivals from exploiting operational vulnerabilities (Verrecchia, 2001; Ellis et al., 2012; Li et al., 2018). Similarly, in competitive labor markets, disclosure of workforce instability could hinder recruitment and retention efforts.[9] Higher union coverage may also discourage turnover disclosures that could weaken firms' bargaining positions with organized labor (Bova, 2013; Arslan-Ayaydin et al., 2021).

We control for several firm characteristics. We control for *size* because larger firms may face greater transparency pressures and have resources to provide it. We also include *cash-to-assets* and *return on assets (ROA)*, as firms with greater liquidity and profitability may adopt different disclosure strategies. We control for *leverage* to account for creditor scrutiny, which may encourage transparency or discourage it for fear of highlighting vulnerabilities. We control for growth opportunities using the *market-to-book (MTB) ratio*, as firms with stronger prospects may disclose more workforce details to inform investors. We also include *sales growth*, *R&D intensity*, and *capital expenditure (CapEx) intensity*, as rapidly growing firms or those making significant investments could face greater investor demand for transparency.

Finally, we include a *management guidance indicator* and *10-K readability*, since firms offering forward-looking guidance or clearer overall disclosures may apply similar transparency standards to human capital reporting.

[9] Gao et al. (2018) find that firms strategically manage earnings to retain key talent. Moreover, employees often use financial disclosures to evaluate job security (deHaan et al., 2023), making it is possible that employees would pay attention to non-financial A&R disclosures in 10-Ks.

3.4.2 Empirical Specification for H2

To empirically test whether A&R disclosure sentiment aligns with workforce dynamics (H2), we employ firm FE Poisson specifications similar to Equation 2, but with sentiment as the dependent variable. Specifically, we estimate the following equations separately for *positive* and *negative* sentiment:

$$\begin{aligned}\text{Negative sentiment}_{i,t} = \textit{Poisson}(&\alpha + \beta_1 \text{Separation rate}_{i,t-1} + \beta_2 \text{Hiring rate}_{i,t-1} \\ &+ \beta_3 \text{Employee tenure}_{i,t-1} + \omega \text{Controls}_{i,t-1} + \text{FEs} + \varepsilon_{i,t});\end{aligned} \tag{3a}$$

$$\begin{aligned}\text{Positive sentiment}_{i,t} = \textit{Poisson}(&\alpha + \beta_1 \text{Separation rate}_{i,t-1} + \beta_2 \text{Hiring rate}_{i,t-1} \\ &+ \beta_3 \text{Employee tenure}_{i,t-1} + \omega \text{Controls}_{i,t-1} + \text{FEs} + \varepsilon_{i,t}),\end{aligned} \tag{3b}$$

where the dependent variables represent the average negative and positive sentiment across all A&R sentences in year t. We then examine how disclosure sentiment varies based on our lagged workforce dynamics measures: *separation rate*$_{i,t-1}$, *hiring rate*$_{i,t-1}$, and *employee tenure*$_{i,t-1}$. Both equations include firm and year FEs, and we double cluster standard errors at the firm and year level. All *Controls*$_{i,t-1}$ are identical to those in Equation 2: *institutional ownership*, *analyst following*, *product market competition*, *labor market competition*, *union coverage*, *size*, *cash holdings*, *ROA*, *MTB*, *leverage*, *sales growth*, *CapEx intensity*, *R&D intensity*, *management guidance indicator*, and *10-K readability*.

Under H2, we expect higher separation rates to increase negative sentiment ($\beta_1 > 0$ in Equation 3a) and reduce positive sentiment ($\beta_1 < 0$ in Equation 3b). Conversely, higher hiring rates and longer employee tenure should decrease negative sentiment ($\beta_2 < 0$, $\beta_3 < 0$ in Equation 3a) and increase positive sentiment ($\beta_2 > 0$, $\beta_3 > 0$ in Equation 3b).

3.4.3 Empirical Specification for H3

To test if disclosures are more responsive for firms with predominantly high-skill workers (H3), we partition firm-years into *higher skill* (over 50% high-skilled workforce) and *lower skill* groups.[10] We then re-estimate Equations 2, 3a, and 3b for each subsample. We perform F-tests to assess differences in coefficient magnitudes between the higher- and lower-skill subsamples. H3 predicts stronger disclosure responses (i.e., larger coefficients) to workforce dynamics for higher-skill firms.

[10] Results remain qualitatively similar using alternative skill thresholds (e.g., 40%, 60%) or the sample median (58.6%).

4 Results

4.1 Sample Statistics

Table 1 presents summary statistics for disclosure, workforce, and firm characteristics, with all data winsorized at the 1% level. All variable definitions are in Appendix Table C1.[11] Separation rates average 13.9% per year, hiring rates 18.8%, and employee tenure 5.5 years. On average, 57.5% of employees are classified as high-skill workers.

[Insert Table 1 here]

Firms provide an average and median of four *A&R sentences* in 10-Ks, with 83% including at least one such sentence (untabulated). The standard deviation of 3.4 sentences (max of 16) further supports using disclosure intensity rather than presence alone. The average negative sentiment of A&R sentences is 0.4, while positive sentiment is 0.1.

We also summarize control variables related to information demand and disclosure costs. *Institutional ownership* averages 67.2%, with significant variation across firms (SD = 26.5%), while *analyst following* averages 9.0 analysts per firm. *Product market competition*, based on the Hoberg et al. (2014) measure, is relatively low on average (0.1). *Labor market competition*, which reflects workforce mobility and job alternatives across industries, averages 6.6 and varies across firms. *Union coverage* is relatively low, averaging 8.0%, though some firms operate in highly unionized industries.

On average, sample firms have a *cash-to-assets* ratio of 21.0%, an *ROA* of 2.0%, a *market-to-book* (MTB) ratio of 2.8, and *leverage* of 21.0%. *Sales growth* averages 12.2%, with some notable dispersion. Firms invest moderately in R&D (4.6%) and CapEx (5.6%). Around 70% of managers in our sample provide some type of forward-looking guidance in I/B/E/S, which includes revenue, earnings, CapEx, and other forecasts. For our measure of *10-K readability*, the average firm's 10-K has a Flesch-Kincaid reading ease score of 24.6, which corresponds to "difficult" or college-level.

Figure 1 shows A&R disclosure from 2001–2021, split by firms with above- and below-median high-skill workers. A&R disclosures increase over time, with high-skill firms consistently providing more discussion, reinforcing the use of A&R intensity. The figure also suggests that SEC mandates in 2005 and 2020 increased disclosure.

[11] Appendix Table C2 provides univariate comparisons of A&R disclosure intensity across firm characteristics, including turnover rates, skill composition, and measures of information demand and disclosure cost.

[Insert Figure 1 here]

Figure 2 examines time series variation in human capital measures. Employee tenure generally rises, possibly reflecting changes in online job platform usage. Separation and hiring rates remain stable except during the financial crisis, when tenure spikes and hiring drops sharply, highlighting tenure's distinct informational value from turnover and hiring rates.

[Insert Figure 2 here]

We validate our workforce turnover measures by comparing them to other sources. Our average employee tenure (5.5 years) aligns with Agrawal et al. (2021) using LinkedIn data. Separation rates are significantly correlated with U.S. Bureau of Labor Statistics (BLS) survey data, including strong industry- and time-series correlations with BLS JOLTS separation rates. These findings support the reliability and comparability of our data to prior studies and public sources.

4.2 Workforce Turnover and Firm Performance

Before examining workforce turnover disclosure decisions, we first assess the value relevance of employee turnover metrics. Specifically, we analyze how changes in hiring, separation, and tenure relate to firm performance, growth, and investment in the following year. Prior research links high employee turnover to lower future operating performance and growth (Li et al., 2022). We measure performance using ROA and growth using sales growth and MTB ratios.

We extend the analysis by examining how workforce turnover relates to firm investment, specifically R&D expenses and CapEx scaled by total assets. High separation or hiring rates may precede shifts in R&D investment because employee compensation constitutes roughly half of firms' R&D expenses.[12] Workforce turnover could also impact CapEx, as employee turnover affects firms' ability to efficiently convert investments, both tangible (e.g., equipment) and intangible (e.g., patents), into productive outputs.

To analyze these relations, we adopt the specification from Li et al. (2022) and extend it by incorporating decomposed measures of employee stock and flow using OLS panel regressions:

$$\begin{aligned} Y_{i,t} = \alpha &+ \beta_1 \text{Separation rate}_{i,t} + \beta_2 \text{Hiring rate}_{i,t-1} + \beta_3 \text{Employee tenure}_{i,t-1} + \beta_4 \text{Size}_{i,t-1} \\ &+ \beta_5 \text{ROA}_{i,t-1} + \beta_6 \text{MTB}_{i,t-1} + \beta_7 \text{Lev}_{i,t-1} + \beta_8 \text{Sales growth}_{i,t-1} + \beta_9 \text{R\&D}_{i,t-1} \\ &+ \beta_{10} \text{CapEx}_{i,t-1} + \text{FEs} + \epsilon_{i,t} \end{aligned} \tag{4}$$

[12] See U.S. Census Bureau, "Business Research and Development Survey," https://www.nsf.gov/statistics/srvyindustry/. In 2017, "salaries, wages, and fringe benefits" represented 51% of domestic R&D spending.

The dependent variable Y represents firm profit and growth (*ROA*, *sales growth*, *MTB*) and investment (*R&D* and *CapEx*) scaled by total assets in year t. Our key variables of interest, *separation rate*, *hiring rate*, and *employee tenure*, are measured in year $t-1$. Following Li et al. (2022), we include industry and year FEs and cluster standard errors at the firm level to account for time trends and industry-specific differences in growth and investment. All regressions control for lagged dependent variables, firm *size* (log market capitalization), *ROA*, and *leverage* measured in year $t-1$. Table 2 reports the results, with Panel A replicating Li et al. (2022) and Panel B incorporating our workforce turnover measures. For brevity, we report only the coefficients on turnover metrics.

[Insert Table 2 here]

Panel A shows that higher employee separation rates are associated with lower firm performance, consistent with Li et al. (2022). Additionally, *separation rates* (columns 4 and 5) are negatively related to R&D and CapEx in the following year. These findings suggest that employee turnover influences not only firm performance but also investment decisions.

Panel B offers a more detailed perspective on workforce turnover. Including hiring rates and employee tenure improves predictive ability. *Hiring rates* are positively associated with *sales growth* and *MTB* but negatively with *ROA*, likely reflecting the costs of workforce expansion. In contrast, *employee tenure* is positively related to *ROA* but negatively associated with *sales growth*.

Columns 4 and 5 show that higher *separation rates* remain negatively associated with investment, suggesting diminishing returns without sufficient labor. *Employee tenure* correlates with lower *R&D intensity* but slightly higher *CapEx intensity*, while *hiring rates* predict increased CapEx. These results highlight the interplay between labor and capital investment, with workforce turnover relating to growth and investment differently. This highlights the importance of considering multiple workforce turnover metrics for a more comprehensive view of a firm's future prospects.

Table 2 highlights three key insights. First, workforce turnover measures are linked to operating performance, growth, and investment, reinforcing their economic relevance and supporting the validity of our data. Second, the findings highlight the importance of human capital as a value-relevant factor in firm performance. Third, they suggest that both the stock and flow of labor provide meaningful signals for investors, extending the focus beyond separation rates alone.

4.3 Turnover Disclosure and Workforce Dynamics

4.3.1 A&R Disclosure Intensity

H1 predicts that firms adjust A&R disclosure intensity based on actual workforce dynamics. If disclosures are informative, firms should increase A&R disclosure following higher separation and hiring rates. We test H1 by estimating Equation 2 and present results in Table 3.

[Insert Table 3 here]

Column 1 shows a strong positive relation between *separation rates* and A&R disclosure intensity (0.271, $p<$ 0.010).[13] Column 2 finds a smaller but significant effect for *hiring rates* (0.196, $p=$ 0.036). Column 3 shows a negative relation between *employee tenure* and A&R disclosure intensity ($-$0.041, $p<$ 0.010). This indicates that firms with a more stable workforce disclose less about turnover, reinforcing the idea that A&R discussions reflect actual workforce dynamics. These results support H1, indicating that firms increase workforce disclosures in response to actual turnover rather than providing purely boilerplate information.

In column 4, we include all three measures of employee turnover and find that *separation rate* and *employee tenure* remain significant at the 10% level or better, while *hiring rate* remains positive but loses significance ($p=$ 0.464). This result suggests that turnover disclosures may emphasize workforce risks rather than opportunities.[14]

As an additional test, in column 5 we separate firm-specific workforce changes from broader labor market trends using the expected and unexpected workforce turnover measures derived in Equation 1. We find that unexpected firm-specific deviations in separation and hiring strongly predict A&R disclosure intensity, while broader industry- and occupation-level trends (*expected hiring rate*) do not. This suggests that firms adjust turnover disclosures primarily in response to internal workforce changes rather than broader labor market conditions.

Overall, the findings show that turnover disclosures provide valuable information. Firms expand A&R statements in response to higher turnover (supporting H1). Moreover, disclosure policies are more responsive to firm-specific trends than broader labor market conditions. These results

[13] Given the standard deviation of *separation rate* is 0.059, the economic magnitude corresponds to approximately half of the average annual within-firm change in A&R disclosure, which is meaningful given the general stickiness of disclosure. Indeed, most firms make no yearly adjustments to their A&R language.

[14] The results are similar if we use *high-skill separation rate*, *high-skill hiring rate*, and *high-skill employee tenure*. We report these results in Table C3 of the Internet Appendix.

reinforce the usefulness of firm-provided workforce turnover disclosures as a meaningful indicator of workforce dynamics.

4.3.2 A&R Disclosure Sentiment

We next test whether A&R disclosure sentiment aligns with workforce dynamics, as predicted by H2. If disclosures are informative, higher separation rates and declines in employee tenure should increase negative sentiment, while higher hiring rates and increases in employee tenure should increase positive sentiment. Panel B of Table 3 presents the results of the firm FE Poisson models from Equations 3a and 3b.[15]

In support of H2, column 1 shows that negative sentiment in A&R disclosures rises with higher *separation rates* (0.194, p= 0.092), while higher *hiring rates* reduce negative sentiment ($-$0.160, p= 0.080). Column 2 reveals no significant association between workforce dynamics and positive sentiment, suggesting firms are less likely to emphasize positive workforce developments in disclosures. These results suggest an asymmetric response—firms emphasize workforce risks but rarely highlight positive workforce developments such as increased hiring or reduced separations.

We find no significant relation between *employee tenure* and disclosure sentiment. While H2 predicts that longer tenure might indicate workforce stability and encourage more positive or less negative narratives, it is possible that long-tenured employees with valuable firm-specific knowledge represent elevated risk of retention, offsetting expected changes in sentiment.

Columns 3 and 4 assess whether disclosure tone responds more to firm-specific workforce changes than broader labor market trends. Column 3 shows that a higher *unexpected hiring rate* is followed by significant reductions in negative sentiment ($-$0.300, p< 0.001), suggesting that firms downplay risks when hiring exceeds expectations. However, broader labor market trends (*expected hiring rate*) do not significantly affect negative sentiment. In column 4, neither unexpected firm-specific nor expected industry-wide hiring and separation measures significantly impact positive sentiment, reinforcing that firms reduce negative tone amid unexpected hiring but do not highlight workforce growth more positively.

Overall, Panel B of Table 3 shows that A&R disclosure sentiment reflects workforce dynamics, providing some support for H2. Firms adopt a more negative tone when separation rates rise, particularly for high-skilled employees, while unexpected hiring moderates negative sentiment.

[15]Results are similar when using word-weighted sentiment or the most prominent sentiment score.

However, firms do not systematically increase positive sentiment in response to improved workforce conditions, suggesting a stronger focus on risks than opportunities.

4.3.3 Quantitative Employee Disclosure

While A&R disclosures capture turnover, firms may also provide quantitative workforce discussions. We find that these disclosures are infrequent, likely due to the lack of a prescriptive mandate. However, to assess whether firms supplement A&R discussions with numerical data, we examine quantitative disclosures on employee turnover, workforce size, and labor costs.

Specifically, we construct a battery of measures that capture the frequency and nature of employee-related quantitative disclosures in 10-K filings. Our variables are count measures that track the number of numerical statements quantifying aspects of employee turnover, workforce size, labor costs, and directional workforce changes. We extract these statements using a text-based approach, identifying sentences containing explicit numerical references to workforce metrics.

We count *turnover related statements*, which disclose numerical details on employee departures, including separation rates and layoff counts. To identify more informative disclosures, we separately count *non-boilerplate turnover statements*, excluding generic language. We also measure disclosures quantifying headcount (*quantify employees statements*) and labor costs as a percentage of financial items (*quantify labor cost statements*). To test for asymmetric disclosure, we classify statements as *workforce decrease* (e.g., layoffs) or *workforce increase* (e.g., hiring). These measures help assess the extent and alignment of numerical workforce disclosures with workforce dynamics. Summary statistics on the quantitative measures, provided in Appendix Table C4, show *quantitative turnover statements* are much less common than A&R disclosures, averaging 0.5, and are almost all non-boilerplate. Appendix Figure C1 plots quantitative disclosures, which peaked before 2005 and again after the financial crisis, supporting their link to workforce reductions during restructuring periods.

[Insert Table 4 here]

Table 4 reports panel Poisson regression results on workforce-related quantitative disclosures. Column 1 shows that firms with higher *separation rates* provide significantly more numerical workforce disclosures, suggesting increased transparency amid higher turnover. In contrast, firms with higher *hiring rates* disclose fewer such statements, indicating a focus on workforce reductions over expansions. Column 2 excludes boilerplate statements, yielding similar results and reinforcing the informativeness of these disclosures.

Columns 3 and 4 assess whether firms disclose specific quantitative details about workforce size and labor costs. Firms with higher *separation rates* provide more disclosures on both workforce size (column 3) and labor costs (column 4), while those with a higher *hiring rate* disclose fewer such statements. This suggests that firms use numerical disclosures to contextualize workforce reductions, potentially signaling cost management strategies or justifying restructuring efforts.

Columns 5 and 6 examine whether firms adjust disclosure asymmetrically based on workforce contraction or expansion. Column 5 shows firms increase quantitative disclosures when experiencing higher separation and lower hiring, while column 6 indicates no corresponding increase for workforce expansion. The negative and significant coefficient on *employee tenure* in column 6 (-0.281, p=0.033) suggests that as tenure increases, firms provide fewer workforce growth statements. This is consistent with hiring naturally reducing average tenure and firms placing less emphasis on workforce expansion in disclosures.

Overall, firms disclose quantitative workforce information but emphasize reductions over expansions, mirroring A&R disclosures and reinforcing the focus on downside risks. While disclosures adapt to workforce dynamics, the limited discussion of growth may leave investors with an incomplete view of human capital management. These findings help motivate our examination of regulatory changes aimed at enhancing workforce transparency in the next section.

4.3.4 Disclosure Responses by Employee Skill Level

H3 predicts that disclosure responses to workforce dynamics will be stronger for firms employing predominantly high-skilled workers. Tables 5 and 6 compare disclosure intensity and sentiment responses for *higher-skill* versus *lower-skill* firms. Recall that firm-years are classified as *higher skill* if more than 50% of employees are high-skilled. We run separate regressions for each subsample and use F-tests to statistically compare coefficient differences.

[Insert Table 5 here]

Table 5 compares A&R disclosure intensity responses. Columns 1 and 2 show that higher-skill firms significantly increase disclosure in response to higher *separation rates* (0.320, p=0.011), whereas lower-skill firms do not. The difference is statistically significant, as the p-value of the F-test is 0.011. Columns 3 and 4 report a positive response in disclosure intensity to *hiring rate* for higher-skill firms (0.187, $p = 0.064$), while the response in lower-skill firms is not statistically significant. Columns 5 and 6 indicate that higher-skill firms significantly decrease disclosures as

employee tenure increases (-0.048, $p < 0.001$), whereas the lower-skill firm response is smaller and insignificant. The difference between these groups is statistically significant at the 1% level.

When jointly considering all workforce metrics (columns 7 and 8), higher-skill firms maintain significant disclosure responses to higher *separation rates* (0.269, $p = 0.057$) and *employee tenure* (-0.042, $p < 0.001$), with significant F-tests at the 10% level or lower for both measures ($p = 0.053$ and $p = 0.005$, respectively). The response to hiring rates is not significantly different between subsamples. These differences are also economically meaningful. For example, the coefficient on *employee tenure* for higher-skill firms is roughly three times larger than for lower-skill firms, indicating substantially greater responsiveness in disclosure intensity.

Overall, the results in Table 5 support H3, indicating that higher-skill firms have stronger disclosure responses to workforce dynamics, especially regarding separations and employee tenure. These findings further suggest that disclosures reflect meaningful workforce changes rather than being purely boilerplate.

Table 6 examines differences in sentiment based on firm skill. Panel A addresses negative sentiment. Columns 1 and 2 show that higher-skill firms significantly increase negative sentiment following higher *separation rates* (0.453, $p = 0.001$), while lower-skill firms do not. The difference is significant at the 1% level. Neither subsample significantly adjusts negative sentiment in response to changes in *hiring rates*. However, columns 5 and 6 show higher-skill firms significantly reduce negative sentiment with increases in *employee tenure* (-0.048, $p = 0.012$), whereas lower-skill firms do not. F-tests show that this difference is statistically significant ($p = 0.012$). Columns 7 and 8 confirm these findings when including all three workforce dynamic measures, with higher-skill firms being more responsive to *separation rates* and *employee tenure*, and the differences remaining statistically significant at the 5% level or lower.

[Insert Table 6 here]

Panel B assesses positive sentiment. When testing individually in columns 1 through 6, neither higher-skill nor lower-skill firms significantly adjust positive sentiment in response to *separation rates*, *hiring rates*, or *employee tenure*. However, in columns 7 and 8, where we include all three measures jointly, we observe a marginally significant difference in responses to *separation rates* between higher-skill (-0.657, $p = 0.095$) and lower-skill firms (0.598, $p = 0.141$). The F-test of this difference is marginally significant at the 10% level ($p = 0.095$), which suggests that higher-skill

firms may reduce their positive sentiment somewhat more when employee separations increase. Overall, these findings align with the earlier results in Table 3, indicating firms rarely increase their positively-slanted disclosure in response to improved workforce dynamics.

Collectively, the results in Tables 5 and 6 support H3. They show that higher-skill firms respond more strongly to workforce dynamics than lower-skill firms, particularly in terms of A&R disclosure intensity and negative sentiment regarding employee separations and tenure.

5 SEC Rule Changes

Financial-reporting mandates can alter the trade-off managers face between capital-market pressure for transparency and the costs of revealing sensitive information (Leuz and Wysocki, 2016). Two recent SEC interventions—one prescriptive and risk-based (2005) and one principles-based (2020)—allow us to examine how the design of a mandate affects both the intensity and sentiment of workforce-turnover discussions.

5.1 The Prescriptive 2005 Risk Factor Mandate

Beginning with fiscal-year 2005 filings, the SEC required all registrants to disclose "material risk factors" under Item 1A of their annual Form 10-K. Prior research finds that the newly mandated section conveyed meaningful information. Firms with greater underlying risk exposure responded by disclosing more extensive risk factors, and investors adjusted valuations accordingly (Campbell et al., 2014; Nelson and Pritchard, 2016). Additionally, the rule pushed managers toward adopting more cautionary disclosure language, as risk sections became more negatively toned on average (Kravet and Muslu, 2013; Dyer et al., 2017). Notably, firms that previously omitted risk-factor disclosures exhibited particularly pronounced changes, becoming more willing to provide forward-looking statements, especially those expressing positive expectations (Huang et al., 2021).

Applying this to workforce turnover disclosure, the evidence in the literature yields two testable implications. First, regarding disclosure intensity, if employee turnover represents a material risk, managers—particularly those who previously under-disclosed—should respond by increasing the number of A&R sentences once the mandate explicitly directs them to disclose such risks in Item 1A. Second, because the rule emphasizes risk disclosures, we anticipate a shift toward more negative language (e.g., highlighting "our work environment pose challenges to our ability to attract and

retain employees"). However, because Huang et al. (2021) document that first-time risk factor disclosers increased optimistic language, the overall shift toward negative sentiment remains an open question.

To test whether the 2005 SEC rule change led to an increase in the *intensity* of turnover disclosures, we estimate the following panel Poisson FE regression model:

$$\mathrm{Y}_{i,t} = \mathit{Poisson}(\alpha + \beta_1 \mathrm{Post}_{i,t} + \mathrm{FEs} + \varepsilon_{i,t}), \tag{5}$$

where the dependent variables are (i) the number of A&R sentences in year t; or (ii) the average negative and positive sentiment across all A&R sentences as described in Equations 3a and 3b. The key variable, *Post*, equals 1 for the two years following the 2005 SEC rule adoption (2005-2006) and 0 for the two years prior (2003-2004). A positive β_1 implies the 2005 mandate induced increases in workforce turnover disclosures. We include firm FEs to absorb time-invariant factors but omit year FEs so β_1 captures the average change around the rule. Standard errors are clustered by firm not time to avoid potential bias (Thompson, 2011) arising from a small number of year clusters.

To test whether *under-disclosing* firms react more to the 2005 rule change, we sort firms into terciles of abnormal A&R disclosure in 2003-2004. We define *abnormal A&R disclosure* as the average difference between actual and expected A&R sentence counts, capturing the extent of disclosure adjustment relative to underlying workforce dynamics. Specifically, we form expected sentence counts using the fitted values from Equation 2, whose parameters are estimated solely on the pre-mandate sample (fiscal years 2001–2004). Thus, the abnormal disclosure measure captures the extent to which firms update their disclosure in response to their underlying workforce dynamics in the years prior to the rule change. Firms whose actual disclosures exceed expectations are labeled as *High Disclosers*, those near expectations as *Medium Disclosers*, and those below expectations as *Low Disclosers*. We then estimate the following panel Poisson regression model:

$$\begin{aligned} \mathrm{Y}_{i,t} = \mathit{Poisson}(\alpha + \beta_M \mathrm{Post} \times \mathrm{Medium\ Disclosers}_{i,t} \\ + \beta_L \mathrm{Post} \times \mathrm{Low\ Disclosers}_{i,t} + \mathrm{FEs} + \varepsilon_{i,t}). \end{aligned} \tag{6}$$

where the dependent variables are (i) the number of A&R sentences in year t; or (ii) the average negative and positive sentiment across all A&R sentences as described in Equations 3a and 3b. The variable *Post* equals 1 for the two years following the 2005 SEC rule adoption (2005-2006)

and 0 for the two years prior (2003-2004). The *High Disclosers* group is the baseline category in the intercept. Thus, a positive β_L (or β_M) indicates that previously low (or medium) disclosure firms increased their turnover disclosures more than *High Disclosers* following the 2005 rule. This specification includes firm and year FEs, and the standard errors are clustered at the firm level.

Together, Equations 5 and 6 allow us to assess whether a prescriptive, risk-focused mandate (i) increases the intensity of workforce-turnover discussions and (ii) shifts the narrative tone toward greater caution, particularly among firms that previously exhibited lower disclosure levels. The results are presented in Table 7.

[Insert Table 7 here]

Panel A examines disclosure intensity. Column 1 presents the baseline difference-in-differences estimate from Equation 5. The coefficient on *Post* is positive and statistically significant (0.099, $p < 0.001$), indicating that firms increased their A&R disclosure intensity by approximately 10.4% during the two years following the mandate.[16]

Column 2 examines heterogeneity based on pre-rule disclosure levels. Compared to *High Disclosers*, *Medium Disclosers* significantly increase disclosure intensity by 24% ($p < 0.001$), while *Low Disclosers* exhibit an even stronger increase of 53% ($p < 0.001$). Collectively, these findings suggest that the prescriptive 2005 rule has a stronger influence on firms with previously lower disclosure than predicted.

Panel B analyzes changes in A&R disclosure sentiment around the rule change. For negative sentiment, column 1 shows the average firm increases negative wording following the mandate, which is marginally significant at the 10% level ($p = 0.052$). Column 2 reveals that the increase in negative disclosure predominantly arises from previous under-disclosing firms. The coefficient for *Low Disclosers* corresponds to a 19% increase in negative tone and is statistically significant ($p = 0.024$), whereas the incremental effect for *Medium Disclosers* remains statistically insignificant.

For positive sentiment, column 3 shows a significant reduction in positive disclosure across firms after the 2005 mandate ($p = 0.028$). Column 4 indicates that this reduction primarily stems from the under-disclosing group, as reflected in a marginally significant negative coefficient ($p = 0.086$) for *Low Disclosers*, while the coefficient on *Medium Disclosers* is insignificant.

[16]The percentage change in the conditional mean is computed as $100 \times (e^{0.099} - 1)$.

Together, these findings are consistent with our predictions. They suggest that the 2005 mandate not only raises the intensity of workforce turnover discussions but also prompts firms, particularly those that were previously under-disclosing, to adopt a more cautious narrative framing.

5.2 The Principles-Based 2020 Human-Capital Rule

In 2020, the SEC amended Regulation S-K, shifting disclosure requirements around human capital toward a more principles-based, registrant-specific regime. Under this revised mandate, firms must discuss human-capital resources if they are material to investor decision-making, though the SEC does not prescribe specific metrics or formats. Early evidence on the rule's impact is mixed. While many firms have expanded their human-capital reporting to cover issues such as employee diversity, the resulting disclosures vary widely across firms, often strategically highlighting select metrics while omitting others (Batish et al., 2021; Bourveau et al., 2025). Additionally, initial disclosures under the 2020 rule tend to be longer, distinctly positive in tone, and predominantly qualitative rather than quantitative (Demers et al., 2024a). This pattern suggests that managers retain considerable flexibility in both the selection and framing of disclosed information, likely fostering strategic disclosure practices.

These considerations yield two predictions. First, firms will likely increase their workforce-turnover disclosures following the 2020 mandate, particularly those that historically provided less information. Second, given the absence of a specific risk-focused requirement, managers have latitude to emphasize positive workforce outcomes, such as successful hiring or employee retention. Thus, we predict a reduction in negative disclosure sentiment and an increase in positive sentiment after the 2020 rule, especially among previously under-disclosing firms.

To test these predictions, we re-estimate the Poisson models from Equations 5 and 6 after redefining the indicator *Post* as equal to one for fiscal years 2020–2021, and zero for fiscal years 2018–2019. Tercile classifications follow the earlier methodology but use disclosure data from 2016–2017 due to workforce data availability constraints. All other variables and FEs remain consistent with the earlier 2005 analysis. The only difference is the event period. Our estimation sample includes all 10-K filings submitted through June 30, 2021, which represents approximately 90% of registrants. Table 8 presents the results.

[Insert Table 8 here]

Panel A shows a large increase in disclosure intensity. Column 1 reveals that, after the 2020 rule change, firms significantly increase the average number of A&R sentences by 39% ($p < 0.001$). Column 2 shows the strongest disclosure increases among historically lower-disclosing firms. Relative to *High Disclosers*, *Medium Disclosers* increase disclosures by 15% (0.140, $p < 0.001$), and *Low Disclosers* increase disclosure intensity by approximately 31% (0.267, $p < 0.001$). These findings suggest the flexible disclosure regime successfully elicited greater workforce-related discussion from firms previously reluctant to disclose.

Panel B also shows a large shift in turnover sentiment following the 2020 rule. Column 1 shows that firms, on average, reduce negative turnover language by approximately 16%, while column 3 indicates a corresponding 72% increase in positive turnover language, both of which are significant at the 1% level ($p < 0.001$). Column 2 indicates this sentiment shift predominantly occurs among historically under-disclosing firms. Specifically, *Low Disclosers* significantly reduce negative sentiment by 17% ($p < 0.001$) and increase positive sentiment by 34% (0.290; $p = 0.018$), compared to *High Disclosers*. In contrast, Medium Disclosers do not significantly differ from High Disclosers in sentiment adjustments.

Collectively, these results support a "more-but-rosier" interpretation of the 2020 principles-based rule. While the mandate increased discussion of workforce turnover, especially among previously reticent firms, it simultaneously allowed managers substantial flexibility to emphasize positive narratives about their workforce. This contrasts with the prescriptive 2005 mandate, which prompted greater emphasis on risks. Thus, our findings illustrate a key regulatory trade-off: principles-based flexibility promotes broader human capital disclosures but enables strategically optimistic framing, potentially reducing comparability and transparency.

6 Conclusion

Human capital is an important driver of firm performance and valuation, yet investors and regulators remain concerned about the adequacy and transparency of workforce turnover disclosures. This study provides new insights into whether and how human capital disclosures reflect underlying workforce dynamics. Leveraging a proprietary dataset containing detailed workforce transition data from millions of employee resumes, combined with textual analyses of SEC 10-K filings, we document that firms systematically adjust both the intensity and sentiment

of their workforce turnover disclosures in response to actual employee inflows, outflows, and changes in tenure. Moreover, we find that disclosure responsiveness is stronger among firms with predominantly high-skilled employees, where the impact of employee flows on operating performance and firm value is greater.

Our findings indicate that, despite concerns about strategic or boilerplate reporting, disclosures generally reflect meaningful firm-specific workforce changes. However, investors must still infer workforce dynamics indirectly from narrative disclosure adjustments, suggesting clearer regulatory standards might enhance transparency, Nevertheless, such standards must carefully balance improved transparency against additional disclosure burdens, highlighting the importance of thoughtful regulatory designs.

To further investigate the influence of regulatory approaches on turnover disclosure practices, we examine two key SEC mandates: the prescriptive 2005 risk-factor rule and the principles-based 2020 human-capital disclosure requirement. We find that while both regulations increase workforce-related disclosures, their effects diverge markedly. The more prescriptive 2005 rule led firms, particularly those previously disclosing less than expected, to adopt more cautionary narratives about workforce turnover. In contrast, the principles-based 2020 amendment elicited greater disclosure of workforce turnover but affords managers discretion to strategically provide more positively toned discussions. These findings highlight a critical trade-off for policymakers between standardized and principles-based disclosure mandates.

Overall, our study advances the literature on human capital reporting and regulatory policy by identifying the informativeness of workforce turnover disclosures and highlighting the critical role that regulatory design plays in shaping disclosure choices. Given ongoing debates over human capital disclosure reform, our results provide valuable evidence to investors, regulators, and researchers seeking to understand transparency and comparability in firms' workforce reporting.

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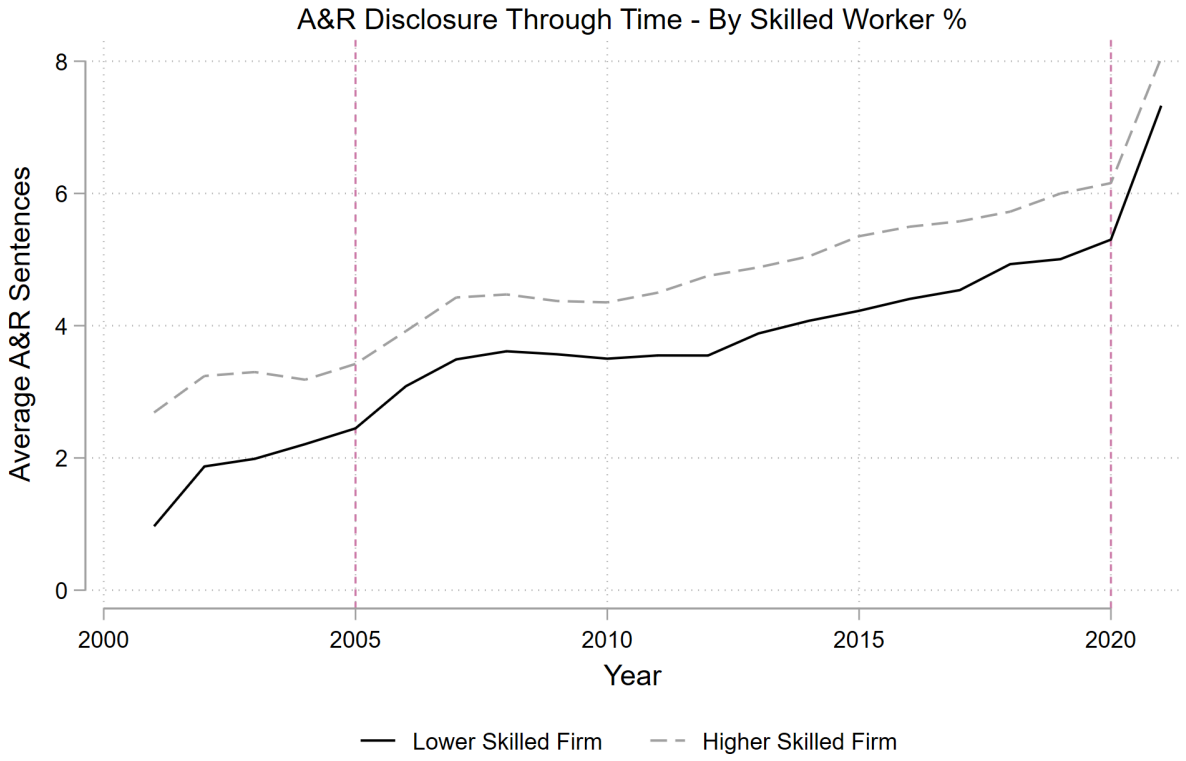


Figure 1. Time Series of A&R Disclosure Intensity by Firm Skill Composition
This figure plots the average number of attract-and-retain (A&R) sentences disclosed annually in SEC Form 10-K filings from 2001 to 2021. We partition the sample based on whether a firm-year is classified as predominantly high-skill. Firms with more than 50% of employees in high-skill occupations (Job Zone 4 or 5) are labeled "higher skill," while those below 50% are labeled "lower skill." The dotted red lines denote the timing of two SEC regulatory changes: the 2005 risk-factor disclosure mandate and the 2020 principles-based human capital rule (see Subsection 2.1).

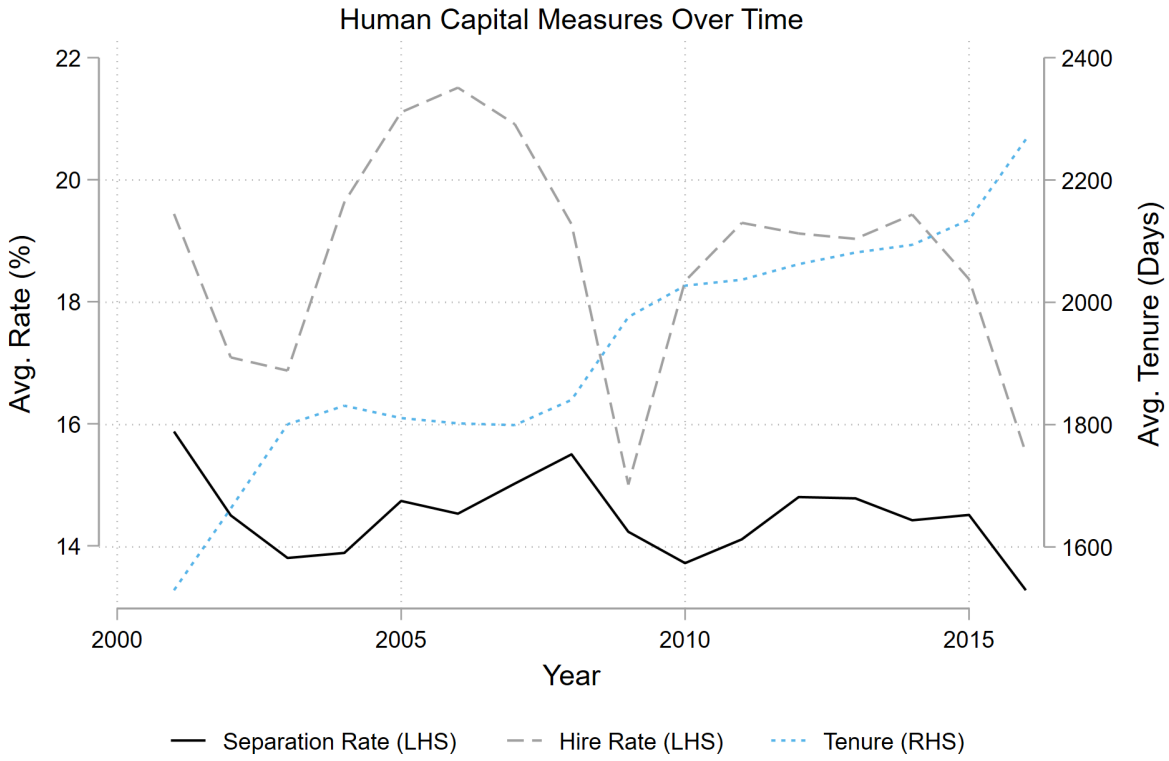


Figure 2. Time Series of Workforce Turnover Measures
This figure shows the average annual values of key human capital measures for public firms from 2001 to 2016. The *separation rate* is defined as the number of employee separations in year t divided by the number of employees at the end of year $t-1$. The *hiring rate* is defined analogously, as the number of hires divided by lagged firm employment. *Average tenure* is the mean number of days employees have been with the firm, aggregated at the firm level.

Table 1. Summary Statistics

Variable	Obs.	Mean	SD	Min.	25%	Median	75%	Max.
Workforce Measures								
Separation Rate (%)	13,882	13.9	5.9	2.7	10.0	13.0	16.8	35.7
Hiring Rate (%)	13,882	18.8	7.8	3.1	13.5	17.8	23.1	43.6
Employee Tenure (years)	13,882	5.5	2.0	1.8	4.0	5.3	6.8	11.2
High-Skill Workers (%)	13,882	57.5	15.9	17.1	47.5	58.6	68.3	86.4
Disclosure Measures								
A&R Sentences	13,882	4.1	3.4	0.0	1.0	4.0	6.0	16.0
Negative Sentiment	13,882	0.4	0.3	0.0	0.0	0.4	0.6	1.0
Positive Sentiment	13,882	0.1	0.2	0.0	0.0	0.0	0.2	1.0
Information Demand								
Institutional Ownership (%)	13,882	67.2	26.5	3.6	49.0	74.1	88.9	100.0
Analyst Following	13,882	9.0	7.8	0.0	3.0	7.0	13.0	34.0
Disclosure Costs								
Product Market Competition	13,882	0.1	0.0	0.1	0.1	0.1	0.2	0.2
Labor Market Competition	13,882	6.6	3.4	1.5	4.1	5.9	8.3	18.0
Union Coverage (%)	13,882	8.0	8.0	0.0	2.6	4.9	10.1	35.5
Firm Characteristics								
Size	13,882	13.5	1.8	9.4	12.2	13.5	14.8	17.9
Cash-to-Assets (%)	13,882	21.0	22.3	0.0	3.6	12.9	31.2	90.6
ROA (%)	13,882	0.2	16.2	-80.7	-1.0	3.9	7.8	27.0
Market-to-Book	13,882	2.8	4.2	-11.8	1.2	1.9	3.2	28.5
Leverage (%)	13,882	21.0	20.8	0.0	0.6	17.2	33.25	92.3
Sales Growth (%)	13,882	12.2	33.3	-59.0	-1.7	7.4	19.2	215.5
R&D Intensity (%)	13,882	4.6	4.9	0.0	1.6	3.1	5.8	28.6
CapEx Intensity (%)	13,882	5.6	10.1	0.0	0.0	0.8	7.6	57.1
Manager Guidance Indicator	13,882	0.7	0.5	0.0	0.0	1.0	1.0	1.0
10-K Readability	13,882	24.6	3.7	15.9	22.2	24.4	26.7	38.1

This table reports descriptive statistics for key variables over the full sample of firm-year observations from 2001 to 2017. All variables are winsorized at the 1% level in each tail. The table presents the number of observations, mean, standard deviation (SD), minimum, 25th percentile, median, 75th percentile, and maximum for each variable. For detailed variable definitions, see Appendix Table C1.

Table 2. Workforce Turnover and Firm Performance, Growth, and Investment

Panel A: Separation Rate Only

	(1) ROA	(2) Sales Growth	(3) Market-to-Book	(4) R&D	(5) CapEx
Separation Rate$_{t-1}$	-0.031	-0.445***	-1.422*	-0.020**	-0.023***
	(0.03)	(0.07)	(0.79)	(0.01)	(0.00)
Controls	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	13,760	13,760	13,760	13,760	13,760
Adjusted R^2	0.491	0.113	0.202	0.858	0.693

Panel B: Full Workforce Turnover Measures

	(1) ROA	(2) Sales Growth	(3) Market-to-Book	(4) R&D	(5) CapEx
Separation Rate$_{t-1}$	0.003	-0.575***	-1.914**	-0.031***	-0.022***
	(0.03)	(0.07)	(0.86)	(0.01)	(0.00)
Hiring Rate$_{t-1}$	-0.063**	0.669***	3.429***	0.015*	0.040***
	(0.03)	(0.07)	(0.80)	(0.01)	(0.01)
Employee Tenure$_{t-1}$	0.003***	-0.006***	-0.012	-0.001***	0.001***
	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)
Controls	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	13,760	13,760	13,760	13,760	13,760
Adjusted R^2	0.494	0.144	0.205	0.858	0.695

This table presents panel regressions investigating how workforce turnover associates with firm outcomes using Equation 4. The dependent variables are future performance (ROA), growth (sales growth and market-to-book), and investment (R&D and CapEx), all measured in year t. In Panel A, we follow the empirical strategy of Li et al. (2022) and include only the lagged separation rate. Panel B adds lagged measures of hiring rate and average employee tenure. R&D and CapEx are scaled by total assets and set to zero when missing in Compustat. All models include lagged dependent variables, firm-level controls, and industry and year fixed effects. Standard errors clustered at the firm level are reported in parentheses. Variables are winsorized at the 1% level. Variable definitions can be found in Appendix Table C1. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3. Disclosure Responses to Workforce Turnover Dynamics

Panel A: Attract and Retain Disclosure Intensity

	(1)	(2)	(3)	(4)	(5)
	Attract and Retain Sentences				
Separation Rate$_{t-1}$	0.271***			0.209*	
	(0.10)			(0.12)	
Hiring Rate$_{t-1}$		0.196**		0.079	
		(0.09)		(0.11)	
Employee Tenure$_{t-1}$			-0.041***	-0.035**	
			(0.01)	(0.01)	
Expected Hiring Rate$_{t-1}$					0.043
					(0.29)
Unexpected Separation Rate$_{t-1}$					0.273***
					(0.09)
Unexpected Hiring Rate$_{t-1}$					0.228**
					(0.09)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes
Observations	13,882	13,882	13,882	13,882	13,882
Pseudo R^2	0.387	0.387	0.387	0.387	0.387

Panel B: Attract and Retain Disclosure Sentiment

	(1)	(2)	(3)	(4)
	Negative Sentiment	Positive Sentiment	Negative Sentiment	Positive Sentiment
Separation Rate$_{t-1}$	0.194*	-0.415		
	(0.12)	(0.28)		
Hiring Rate$_{t-1}$	-0.160*	-0.078		
	(0.09)	(0.25)		
Employee Tenure$_{t-1}$	0.018	-0.002		
	(0.01)	(0.03)		
Expected Hiring Rate$_{t-1}$			0.033	-0.554
			(0.28)	(0.59)
Unexpected Separation Rate$_{t-1}$			0.135	-0.396
			(0.10)	(0.26)
Unexpected Hiring Rate$_{t-1}$			-0.300***	0.012
			(0.07)	(0.19)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes
Observations	12,118	12,118	12,118	12,118
Pseudo R^2	0.118	0.216	0.118	0.216

This table presents panel Poisson regression results examining how firms adjust their human capital disclosures in response to workforce dynamics. Panel A models the number of attract and retain (A&R) sentences in year t as a function of prior-year workforce metrics using Equation 2. Panel B examines *negative* and *positive* sentiment of A&R disclosure in year t using Equations 3a and 3b. Columns 1–4 in Panel A and 1-2 in Panel B include raw turnover measures. Column 5 in Panel A and 3–4 in Panel B replace these with expected and unexpected turnover rates. All models include firm and year fixed effects (FEs) and the full set of controls. Standard errors are double-clustered at the firm and year level. Variable definitions are in Appendix Table C1. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4. Employee-Related Quantitative Disclosure

	(1)	(2)	(3)	(4)	(5)	(6)
	Turnover Related Statements	Non Boilerplate Turnover Statements	Quantify Employees Statements	Quantify Labor Cost Statements	Workforce Decrease Statements	Workforce Increase Statements
Separation Rate$_{t-1}$	3.121***	3.120***	2.763***	3.193***	3.424***	-0.288
	(0.45)	(0.45)	(0.68)	(0.54)	(0.47)	(1.06)
Hiring Rate$_{t-1}$	-1.647***	-1.638***	-1.752**	-1.444**	-2.400***	0.729
	(0.50)	(0.50)	(0.70)	(0.67)	(0.64)	(1.02)
Employee Tenure$_{t-1}$	0.071	0.071	0.129*	0.039	0.098*	-0.281**
	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)	(0.13)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,295	8,295	5,393	7,213	7,269	2,871
Pseudo R^2	0.346	0.346	0.305	0.324	0.361	0.169

This table presents panel Poisson regression estimates relating the number of quantitative human capital disclosures to workforce dynamics in the previous year. The dependent variables are counts of specific numerical disclosures from 10-K filings. Columns 1 and 2 analyze *turnover related statements*, which disclose numerical details on employee separations, layoffs, or turnover rates, with column 2 excluding boilerplate statements (*non-boilerplate turnover statements*. Column 3 (*quantify employees statements*) counts statements providing numerical employee headcounts, and column 4 (*quantify labor costs*) counts statements disclosing labor costs as a percentage of financial items. Columns 5 and 6 separately quantify disclosures related to workforce reductions (*workforce decrease statements*) or expansions (*workforce increase statements*). All models include firm and year fixed effects and additional firm-level controls from Equation 2. Standard errors are double-clustered by firm and year. Variable definitions are in Appendix Table C1. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Disclosure Responses to Workforce Dynamics by Employee Skill Level

	Attract and Retain Sentences							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Lower Skill	Higher Skill	Lower Skill	Higher Skill	Lower Skill	Higher Skill	Lower Skill	Higher Skill
Separation Rate$_{t-1}$	-0.277	0.320**					-0.322	0.269*
	(0.24)	(0.13)					(0.25)	(0.14)
Hiring Rate$_{t-1}$			0.316	0.187*			0.248	0.078
			(0.24)	(0.10)			(0.28)	(0.11)
Employee Tenure$_{t-1}$					-0.016	-0.048***	-0.011	-0.042***
					(0.02)	(0.01)	(0.03)	(0.01)
F-test β_1 p-value		0.011						0.053
F-test β_2 p-value				0.063				0.479
F-test β_3 p-value						0.000		0.005
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,174	9,674	4,174	9,674	4,174	9,674	4,174	9,674
Pseudo R^2	0.387	0.382	0.387	0.382	0.387	0.382	0.387	0.382

This table presents cross-sectional Poisson regression estimates examining how workforce dynamics in year $t-1$ relate to counts of attract and retain (A&R) sentences in year t by re-estimating Equation 2 for each subsample of employee skill. We partition the sample based on whether a firm-year is classified as predominantly high-skill. Firms with more than 50% of employees in high-skill occupations (Job Zone 4 or 5) are labeled *higher skill*, while those below 50% are labeled *lower skill*. Regressions are estimated separately for each subsample. We test for differences in responsiveness using F-tests comparing coefficient estimates on *Separation Rate* (β_1), *Hiring Rate* (β_2), and *Employee Tenure* (β_3). We report the p-value of the F-tests below the estimates. We include firm and year fixed effects (FEs) and lagged control variables in all specifications. Standard errors are double-clustered at the firm and year level and reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Variable definitions are in Appendix Table C1.

Table 6. Disclosure Sentiment Responses to Workforce Dynamics by Employee Skill Level

Panel A: Negative Sentiment

	Negative Sentiment							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Lower Skill	Higher Skill	Lower Skill	Higher Skill	Lower Skill	Higher Skill	Lower Skill	Higher Skill
Separation Rate$_{t-1}$	-0.364	0.453**					-0.419	0.294**
	(0.39)	(0.14)					(0.41)	0.15)
Hiring Rate$_{t-1}$			-0.356	-0.027			-0.410*	-0.199
			(0.24)	(0.13)			(0.23)	(0.12)
Employee Tenure$_{t-1}$					0.015	-0.048**	-0.008	-0.052***
					(0.03)	(0.02)	(0.03)	(0.02)
F-test β_1 p-value		0.001						0.045
F-test β_2 p-value				0.831				0.108
F-test β_3 p-value						0.012		0.004
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,174	9,674	4,174	9,674	4,174	9,674	4,174	9,674
Pseudo R^2	0.156	0.116	0.156	0.115	0.156	0.116	0.156	0.116

Panel B: Positive Sentiment

	Positive Sentiment							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Lower Skill	Higher Skill	Lower Skill	Higher Skill	Lower Skill	Higher Skill	Lower Skill	Higher Skill
Separation Rate$_{t-1}$	0.101	-0.498					0.598	-0.657
	(0.39)	(0.43)					(0.41)	(0.39)
Hiring Rate$_{t-1}$			0.101	0.306			0.624	-0.090
			(0.52)	(0.32)			(0.63)	(0.39)
Employee Tenure$_{t-1}$					0.051	-0.053	0.087	-0.065
					(0.07)	(0.05)	(0.08)	(0.06)
F-test β_1		0.246						0.095
F-test β_2				0.332				0.819
F-test β_3						0.314		0.259
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,174	9,674	4,174	9,674	4,174	9,674	4,174	9,674
Pseudo R^2	0.302	0.258	0.302	0.258	0.302	0.258	0.302	0.259

This table presents cross-sectional Poisson regression estimates examining how workforce dynamics in year $t-1$ relate to the tone of attract and retain (A&R) sentences in year t by re-estimating Equations 3a and 3b separately for each subsample of employee skill. The dependent variables are the average negative sentiment (Panel A) and average positive sentiment (Panel B) across all A&R sentences, as classified using FinBERT. We partition the sample based on whether a firm-year is classified as predominantly high-skill. Firms with more than 50% of employees in high-skill occupations (Job Zone 4 or 5) are labeled *higher skill*, while those below 50% are labeled *lower skill*. Regressions are estimated separately for each subsample. We test for differences in responsiveness using F-tests comparing coefficient estimates on *Separation Rate* (β_1), *Hiring Rate* (β_2), and *Employee Tenure* (β_3). We report the p-value of the F-tests below the estimates. We include firm and year fixed effects (FEs) and lagged control variables in all specifications. Standard errors are double-clustered at the firm and year level and reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Variable definitions are in Appendix Table C1.

Table 7. Disclosure Changes Around 2005 SEC Rule Change

Panel A: Attract and Retain Disclosure Intensity

	(1)	(2)
	Attract and Retain Sentences	
Post	0.099***	
	(0.02)	
Post × Medium Disclosers		0.213***
		(0.05)
Post × Low Disclosers		0.424***
		(0.07)
Firm FE	Yes	Yes
Year FE	No	Yes
Observations	1,530	1,530
Pseudo R^2	0.358	0.364

Panel B: Attract and Retain Disclosure Sentiment

	(1)	(2)	(3)	(4)
	Negative Tone		Positive Tone	
Post	0.049*		-0.109**	
	(0.03)		(0.05)	
Post × Medium Disclosers		0.046		-0.071
		(0.05)		(0.11)
Post × Low Disclosers		0.177**		-0.214*
		(0.08)		(0.12)
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Observations	1,233	1,233	1,233	1,233
Pseudo R^2	0.171	0.172	0.251	0.252

This table presents Poisson regression estimates examining changes in attract and retain (A&R) disclosure intensity and sentiment around the 2005 SEC rule mandating Item 1A risk factor disclosures in SEC Form 10-K. The sample covers fiscal years 2003–2006. The variable *Post* equals one for fiscal years 2005–2006 and zero otherwise. Panel A reports results for A&R sentence counts. Column 1 estimates the average change in disclosure intensity in the two years after the rule using Equation 5. Column 2 includes interactions with firm disclosure terciles using Equation 6. Firms are classified based on their average abnormal A&R disclosure in 2003–2004, calculated as the difference between actual and predicted A&R sentences from Equation 2. *Medium Disclosers* (tercile 2) and *Low Disclosers* (tercile 1) are compared to the baseline of *High Disclosers* (tercile 3), which is in the intercept. Panel B estimates how average negative and positive sentiment across A&R sentences respond to the 2005 rule change, again comparing discloser terciles in columns 2 and 4. We include firm fixed effects (FEs) in all specifications, and year FEs in column 2 of Panel A and columns 2 and 4 of Panel B. Variable definitions are in Appendix Table C1. Standard errors are clustered at the firm level and reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 8. Disclosure Changes Around 2020 SEC Rule Change

Panel A: Attract and Retain Disclosure Intensity

	(1)	(2)
	Attract and Retain Sentences	
Post	0.331***	
	(0.02)	
Post × Medium Disclosers		0.140***
		(0.04)
Post × Low Disclosers		0.267***
		(0.05)
Firm FE	Yes	Yes
Year FE	No	Yes
Observations	2,063	2,063
Pseudo R^2	0.386	0.389

Panel B: Attract and Retain Disclosure Sentiment

	(1)	(2)	(3)	(4)
	Negative Tone		Positive Tone	
Post	-0.177***		0.544***	
	(0.02)		(0.05)	
Post × Medium Disclosers		-0.059		0.079
		(0.04)		(0.12)
Post × Low Disclosers		-0.190***		0.290**
		(0.05)		(0.12)
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Observations	1,982	1,982	1,982	1,982
Psuedo R^2	0.103	0.103	0.192	0.192

This table presents Poisson regression estimates examining how firms adjusted their attract and retain (A&R) disclosures following the SEC's 2020 human capital disclosure mandate. The estimation sample spans 2018–2021. *Post* equals one for fiscal years 2020–2021 and zero for 2018–2019. Panel A reports results for A&R sentence counts. Column 1 estimates the average change in disclosure intensity in the two years after the rule using Equation 5. Column 2 includes interactions with firm disclosure terciles using Equation 6. Firms are classified based on their average abnormal A&R disclosure in 2015–2016, calculated as the difference between actual and predicted A&R sentences from Equation 2. *Medium Disclosers* (tercile 2) and *Low Disclosers* (tercile 1) are compared to the baseline of *High Disclosers* (tercile 3), which is in the intercept. Coefficients on interaction terms capture differences in disclosure responses relative to the baseline group of *High Disclosers*. Panel B estimates how average negative and positive sentiment across A&R sentences respond to the 2020 rule change, again comparing discloser terciles in columns 2 and 4. We include firm fixed effects (FEs) in all specifications, and year FEs in column 2 of Panel A and columns 2 and 4 of Panel B. Variable definitions are in Appendix Table C1. Standard errors are clustered at the firm level and reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix A Data Description of Emsi Data

In this appendix, we detail the Emsi data and its usage. Emsi offers services to recruiters, colleges, and job seekers. The data provider, Emsi, has since merged with Burning Glass Technologies to form Emsi Burning Glass, now called Lightcast. Emsi combines public and proprietary data from third-party aggregators to create a database of individual-level data, constructed from self-reported online resumés and public information. These data are cleaned and anonymized.

The data set is comprised of three main data sets: (1) complete job history, (2) education history, and (3) last known location. The data covers more than 75 million unique individuals in the United States. At any given point in time, the data represents approximately one third of the U.S. labor force.

The job history data includes start date, end date, company name, and title from resumés. Lightcast cleans data for consistent company names and titles, and classifies jobs into O*NET codes, 8-digit codes representing around a thousand unique occupations. These codes can be merged with BLS data to capture occupational features like activities, skills, and actions, as well as wage distribution data at the MSA-year-occupation level. Lightcast's cleaning program also assigns each firm a NAICS industry code.

In terms of their educational history, Lightcast pulls self-reported educational attainment including graduation year, major, university. Once again, the data is cleaned such that the major and university are standardized. The school data contains the Integrated Postsecondary Education Data System (IPEDS) school code. With this code, the data can be linked to a host of university level information provided by the National Center for Education Statistics (NCES).

Finally, location data contain the individuals' last known workplace, allowing us to identify firms' most common location. We create a fuzzy match between firms and public firms using name, location, and industry. Employing strict filters and verifying matches, our conservative approach may limit matched firms but ensures correct matches between Compustat and Lightcast.

Appendix B Broader Employee Disclosure

Our main analysis focuses on A&R disclosure intensity to enable a comparison with actual turnover data. Yet, turnover is only one facet of workforce disclosure. To understand other aspects related to employees discussed in the 10-K and the prevalence of A&R disclosure, we use a natural language processing (NLP) technique called non-negative matrix factorization (NMF).

NMF is an unbiased technique that identifies additional human capital disclosure topics, and it quantifies the *extent* of discussion on each topic, rather than just its presence. This differs from other NLP techniques like Latent Dirichlet Allocation (LDA). NMF breaks down the entire text into smaller pieces and captures the degree of discussion on each subject. Thus, NMF assesses the intensity of conversation similarly to A&R sentence intensity.

We use an NMF analysis on 2.8 million employee paragraphs and 315 million words to uncover 15 human capital disclosure topics. Table B1 displays the results, including the topic, keywords or phrases, number of paragraphs, percentage of paragraphs, word frequency, percentage of total words, and coherence, which is the proximity between words within a topic.

[Insert Table B1 here]

A&R is one of the most commonly discussed employee topics, appearing in 38% of employee-related paragraphs and accounting for 0.5% of employee-related words in the 10-K. These frequencies rank A&R the fourth and third highest out of 15 topics, respectively. The significance of A&R disclosures is similar with 10 or 20 topics. Other frequent topics include employee expenses and the employees' effect on the firm's operations, such as profitability.

Table B1 results clarify two points. First, the high prevalence of A&R indicates that many firms consider it crucial to their success, validating the focus of our workforce disclosure analysis on this dimension. Second, A&R discussions occur in over 80% of all 10-Ks, but the intensity and level of detail differ significantly among firms.

Table B1. Employee-Related Topic Overview

Topic	Key Words and Phrases	Topic Coherence	Number of Paragraphs (000s)	Percent of Paragraphs	Frequency (000s)	Percent of Total Words
1. Related Costs	expenses; related costs; higher; partially offset	0.43	1314	46.2	2807	0.89
2. Results of Operations	condition; material; adversely affect; operating results	0.53	1317	46.3	2491	0.79
3. Attract and Retain	attract top talent; key personnel; retain qualified	0.47	1084	38.1	1521	0.48
4. Retirement Plan	retirement; plan; defined contribution	0.41	1385	48.7	1474	0.47
5. Financial Reporting	procedures; accounting; internal controls	0.45	998	35.1	1479	0.47
6. Executive Officers	chief executive; officers; board; principal executive	0.46	614	21.6	1294	0.41
7. Workers Compensation	claims; liabilities; workers compensation	0.37	1004	35.3	1154	0.37
8. Fiscal Period	december; fiscal year; ended june	0.39	849	29.8	1091	0.35
9. Laws and Regulation	regulations; laws; federal; state; health; environmental	0.46	775	27.3	1108	0.35
10. Data Security	information technology; security breach; data security	0.38	709	24.9	939	0.30
11. Research and Development	research; clinical; research and development expenses	0.38	590	20.7	784	0.25
12. Equity Compensation	equity; issued; awards; common stock	0.42	481	16.9	772	0.24
13. Economic Conditions	rates; factors; labor costs; economic conditions	0.33	720	25.3	629	0.20
14. Intellectual Property	intellectual; trade secrets; proprietary information	0.43	361	12.7	599	0.19
15. Location	states; united states; united states district court	0.29	169	6.0	248	0.08

This table summarizes the 15 most common employee-related topics identified using non-negative matrix factorization (NMF) applied to employee-related paragraphs from 10-K filings. For each topic, we report representative key words and phrases, topic coherence (a measure of interpretability), and distributional statistics: the number and percentage of paragraphs assigned to the topic, the total frequency of topic-related word tokens (in thousands), and the topic's share of all employee-related words.

Appendix C Variable Definitions and Additional Results

Table C1. Variable Definitions

Variable	Definition
Disclosure	
A&R Sentences	Number of "attract and retain" (A&R) employee-related sentences in 10-K
Negative Tone	The average negative sentiment score of "attract and retain" (A&R) employee-related sentences in 10-K using Huang et al. (2023) model
Positive Tone	The average positive sentiment score of "attract and retain" (A&R) employee-related sentences in 10-K using Huang et al. (2023) model
Quantitative T/O Statements	Number of employee-related sentences with numerical information
Non-Boiler T/O Statements	Subset of Quantitative Turnover Statements that exclude boilerplate language (manually classified)
Quantitative Employee Statements	Number of Quantitative Turnover Statements that specify headcount or changes in employment levels
Quantitative Cost Statements	Number of Quantitative Turnover Statements that include cost-related figures (e.g., severance, hiring costs)
Workforce Decrease	Number of Quantitative Turnover Statements indicating a decline in workforce workforce
Workforce Increase	Count of Quantitative Turnover Statements indicating workforce expansion workforce
Workforce Measures	
Separation Rate	Number of employee separations divided by prior-year employment
Hiring Rate	Number of new hires divided by prior-year employment
Expected Rate	Firm average of individual-level predicted separation or hiring rates
Unexpected Rate	Firm average of actual less predicted separation or hiring rate rates
Employee Tenure	Firm-level average of employee tenure, in years
High-Skill Workers	Workers with occupations in BLS Job Zone 4 or 5, divided by total number of employees
Higher-Skill Firm	Equals 1 for firm years with more than 50% of employees in high-skill occupations (Job Zone 4 or 5); else 0

This table contains definitions for the primary variables used in our analysis.

Table C1. Variable Definitions Cont.

Variable	Definition
Firm-level Controls	
Size	Natural log of market capitalization at the beginning of the year
Cash-to-Assets	Cash and cash equivalents scaled by total assets
Return-on-Assets (ROA)	Operating income divided by total assets
Market-to-Book	Market value of equity scaled by book value
Leverage	Long term debt scaled by total assets
Sales Growth	Percentage change in total sales over previous year
CapEx Intensity	Annual capital expenditure expense scaled by total assets
R&D Intensity	Annual research and development expense scaled by total assets where missing values take the value of zero
Management Guidance Indicator	Equals 1 if managers provide any type of guidance during the year; else 0
10-K Readability	$-1 \times$ Flesch-Kincaid readability ease score for the 10-K
Determinants	
Institutional Ownership	Percent of shares held by institutions reporting on SEC Form 13-F
Analyst Following	Number of analysts providing EPS estimates from I/B/E/S
Product Market Competition	The text based competition measure from Hoberg et al. (2014)
Labor Market Competition	The firm average of individual employee predicted separation rates
Union Coverage	The annual percent of employees covered by union membership by Census Industry Classification industries

Table C2. Human Capital Disclosure and Firm Characteristics

Variable	Mean A&R Sentences by Quintile						
	Lowest	Q2	Q3	Q4	Highest	Q5−Q1	p-value
Human Capital							
Separation Rate	3.57	3.71	3.92	4.23	5.13	1.56	0.000***
Hiring Rate	3.76	3.48	3.75	4.30	5.26	1.51	0.000***
Employee Tenure	6.05	4.58	3.64	3.35	2.93	-3.12	0.000***
High-Skill Workers	3.56	3.19	3.59	4.25	5.99	2.43	0.000***
Information Demand							
Institutional Ownership	3.95	4.09	4.03	4.04	4.45	0.50	0.070*
Analyst Following	3.62	4.09	4.32	4.35	4.27	0.65	0.117
Disclosure Costs							
Product Market Competition	2.87	3.80	4.43	4.76	4.71	1.85	0.003***
Labor Market Competition	2.91	3.68	4.31	4.79	4.87	1.95	0.000***
Union Coverage	5.29	4.74	4.30	3.32	2.87	-2.41	0.000***
Firm Characteristics							
Size	4.06	4.53	4.43	4.03	3.50	-0.56	0.099*
Cash-to-Assets	3.15	3.22	3.67	4.54	5.99	2.84	0.000***
ROA	5.24	3.22	3.63	3.70	4.00	-1.24	0.000***
Market-to-Book	3.60	3.83	3.92	4.31	4.90	1.30	0.003***
Leverage	5.33	4.49	3.83	3.41	3.44	-1.89	0.000***
Sales Growth	4.07	3.54	3.69	4.28	4.97	0.90	0.005***
R&D Intensity	3.51	1.73	2.97	4.46	6.03	2.52	0.000***
CapEx Intensity	4.71	4.42	3.98	3.67	3.78	-0.93	0.038**
Management Guidance Indicator	5.29				2.87	-2.41	0.000***
10-K Readability	5.44	4.83	3.99	3.35	2.99	-2.45	0.000***

This table reports the average number of attract-and-retain (A&R) sentences across firm-year observations sorted into quintiles based on key firm-level characteristics. Quintiles are formed each year. For each variable, we present the average A&R disclosure for each quintile, the difference between the highest (Q5) and lowest (Q1) quintiles, and the associated p-value. Differences are tested using two-sided t-tests with standard errors double-clustered by year and 2-digit NAICS industry. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table C3. High-Skill Workforce Disclosure Responses

	(1)	(2)	(3)
	A&R Sentences	Negative Sentiment	Positive Sentiment
High-Skill Separation Rate$_{t-1}$	0.223***	0.236***	-0.245
	(0.08)	(0.08)	(0.23)
High-Skill Hiring Rate$_{t-1}$	0.071	-0.132*	-0.059
	(0.08)	(0.07)	(0.19)
High-Skill Employee Tenure$_{t-1}$	-0.057***	0.037**	0.015
	(0.02)	(0.02)	(0.04)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes
Observations	13,882	12,118	12,118
Pseudo R^2	0.387	0.118	0.216

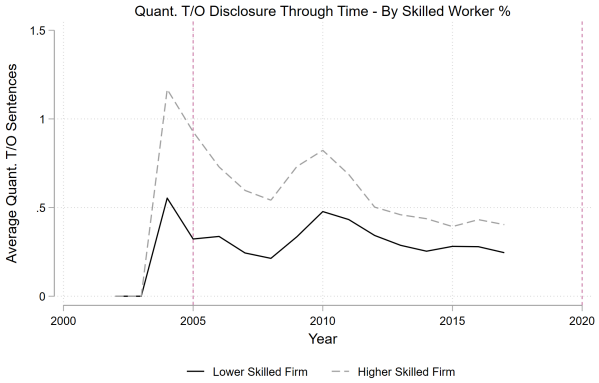
This table presents panel Poisson regression estimates of disclosure responses to high-skill workforce dynamics. The dependent variables are the number of attract-and-retain (A&R) sentences (Column 1), the average negative sentiment of A&R sentences (Column 2), and the average positive sentiment of A&R sentences (Column 3), each measured in year t. High-skill employees are defined as those in occupations classified as Job Zone 4 or 5 by the U.S. Department of Labor. Independent variables include high-skill separation rate, high-skill hiring rate, and high-skill employee tenure, all measured in year $t-1$. For each measure, we focus only high-skill employees and scale by the number of high-skill employees in the prior year. Firm and year fixed effects and lagged control variables are included. Standard errors are double-clustered by firm and year and reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table C4. Summary Statistics - Human Capital Quantitative Disclosure

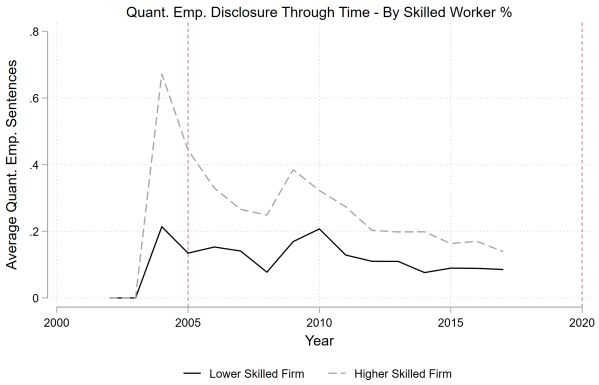
Variable	Obs.	Mean	SD	Min.	25%	Median	75%	Max.
Quantitative HC Disclosure								
Quantitative Turnover Stmts.	13,882	0.5	1.4	0.0	0.0	0.0	0.0	28.0
Non-Boilerplate Turnover Stmts.	13,882	0.5	1.4	0.0	0.0	0.0	0.0	28.0
Quantitative Employee Stmts.	13,882	0.2	0.8	0.0	0.0	0.0	0.0	15.0
Quantitative Cost Stmts.	13,882	0.4	1.2	0.0	0.0	0.0	0.0	24.0
Workforce Decrease	13,882	0.5	1.4	0.0	0.0	0.0	0.0	28.0
Workforce Increase	13,882	0.1	0.3	0.0	0.0	0.0	0.0	8.0

This table reports summary statistics for quantitative human capital disclosure variables over the period 2001 to 2017. Variables reflect counts of specific types of sentences in 10-K filings that include numeric information related to workforce turnover. For each variable, we report the number of observations, mean, standard deviation (SD), minimum, maximum, and the 25th, 50th (median), and 75th percentiles. All annual firm-level values are winsorized at the 1% level in each tail.

Panel A: Total Quantitative Disclosure



Panel B: Total Employee Count Disclosure



Panel C: Total Cost Disclosure

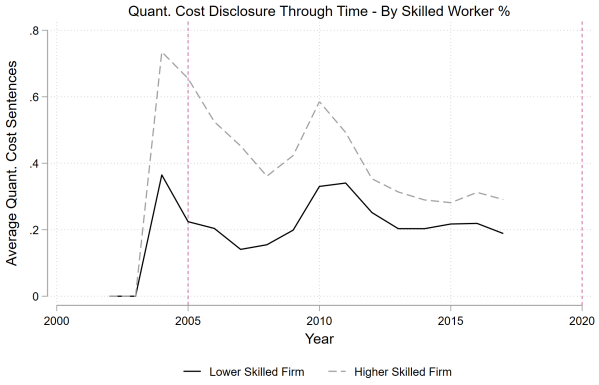


Figure C1. Time Series of Quantitative Employee Disclosure by Firm-Level Skills
This figure plots average annual counts of employee-related quantitative disclosures from 2001 to 2017. We partition the sample based on whether a firm-year is classified as predominantly high-skill. Firms with more than 50% of employees in high-skill occupations (Job Zone 4 or 5) are labeled "higher skill," while those below 50% are labeled "lower skill.' Panel A shows the average number of quantitative turnover-related statements. Panel B reports the average count of statements providing numerical information on employee headcounts. Panel C shows the average count of statements disclosing quantitative cost estimates related to workforce changes. Dotted red lines indicate the timing of the 2005 and 2020 SEC disclosure rule changes, as described in Subsection 2.1