VANDERBILT UNIVERSITY®
OWEN GRADUATE SCHOOL OF MANAGEMENT

January 11, 2022

Via Electronic Mail

Honorable Gary Gensler, Chairman
Securities and Exchange Commission
100 F Street, NE
Washington, DC 20549-1090

RE: Research related to human capital disclosure requirements

Dear Chair Gensler,

We are responding to your recent public statement instructing the Commission staff propose recommendations for the Commission's consideration on human capital disclosure.[1] We would like to make you and the staff aware of our recent research on this topic and its potential implications for the Commission's review of this topic.

Brief Research Summary

Human capital is a primary source of value in modern companies, yet little is known about what workforce information issuers disclose to the SEC and whether it is timely and informative given the Commission's flexible disclosure rules. In our paper titled, "*Human Capital Disclosure*," we examine the topics and determinants of issuers' human capital disclosures over the past two decades by combining textual analysis of 10-K disclosures via natural language processing with a proprietary dataset on 45 million individual career histories.[2]

We show that issuers provide greater human-capital disclosure when market demand for this information is higher. Contrary to proprietary costs theories of disclosure, reporting issuers in competitive environments disclose more, which has important cost-benefit implications for the Commission that we discuss below.

Using our job history dataset, we then generate issuer-specific measures of the stock and flow of the workforce. These measures allow us to compare what issuers say about employee turnover risk and the actual underlying changes in their workforce. For employee flows, we measure several aspects of hiring and separation rates, including those for high-skill workers and unexpected turnover. For the stock of human capital, we estimate issuer-level average employee tenure (i.e., the length of employment). We find that issuers make timely disclosure changes around variation in the underlying stock and flow of employees.

We then study two SEC rule changes that encourage but do not require specific human capital information.[3] Both rule changes elicit greater human capital disclosures, especially from issuers that previously under-disclosed workforce information based on our model of predicted disclosure.

---

[1] See Gary Gensler, Chair, U.S. Securities and Exchange Commission, "Prepared remarks at London City Week," June 23, 2021. Available at https://www.sec.gov/news/speech/gensler-speech-london-city-week-062321.

[2] See Peter Haslag, Berk A. Sensoy, and Joshua T. White, "Human Capital Disclosure," December 21, 2021. Available at SSRN: https://ssrn.com/abstract=3991257.

[3] See Securities Offering Reform, Rel. Nos. 33-8591 and 34-52056, July 19, 2005, available at https://www.sec.gov/rules/final/33-8591.pdf; and Modernization of Regulation S-K Items 101, 103, and 105, Rel. No. 33-10825, August 26, 2020, available at https://www.sec.gov/rules/final/2020/33-10825.pdf.

Implications for Policymaking

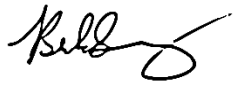
Our findings have important policy implications on both the efficacy of current disclosure rules and specific metrics the Commission could consider for future human capital disclosure mandates. In your June 2021 speech, you noted that, "new recommendations could include a number of metrics, such as workforce turnover, skills and development training, compensation, benefits, workforce demographics including diversity, and health and safety." Our findings have six specific implications for these endeavors:

1. Under the risk-factor disclosure regime, issuers often note that the ability to attract and retain ("A&R") workers is a key risk. Our study shows that these risk factor disclosures are informative and that, on average, issuers dynamically adjust A&R disclosures to reflect changes in their underlying workforce. Yet, investors could still benefit from periodic disclosure of workforce turnover metrics.
2. We examine granular workforce turnover metrics that go beyond simple measures of net turnover. Our analysis finds that decomposing net turnover into hiring rates and separation rates provides unique information on the flow of the workforce to investors.
3. While flow measures identify *how many* employees join or leave, they do not gauge *which* employees are turning over. We estimate the tenure of each issuer's employees based on the average length of employment, which measures the stock of human capital at each issuer. As the stability of the issuer's stock of human capital grows, we find that managers reduce the intensity of 10-K discussions about the risk of attracting and retaining workers.
4. Disaggregation of turnover metrics into high-skill and non-high-skill workers, or some type of occupation-related category could benefit issuers. Our analysis shows that issuers alter the extent of human capital turnover discussions based on the fraction of its workforce that are high skill.
5. Strengthening SEC mandates would likely "shock" issuers that may be currently under-reporting information on the risk of its employee turnover. We find the 2020 SEC rule change had a meaningful impact on previously low-disclosing issuers (based on our model) and those where human capital is key to value creation.
6. We find that issuers with higher product-market and labor-market competition disclose more information on workforce turnover risk. Thus, competition costs of human capital disclosure are likely low under the risk-factor disclosure regime. Although this relation might extend to more granular turnover metrics, we caution that it could generate a competition cost for certain issuers.

Closing Remarks

We thank the Chair and Commission for allowing us to comment on the human capital disclosure requirements. Should you have any questions, we would welcome the opportunity to further discuss the details or implications of our research.

Sincerely,



Berk Sensoy
Hans Stoll Professor of Finance,
Owen Graduate School of
Management, Vanderbilt University

Peter Haslag
Assistant Professor of Finance,
Owen Graduate School of
Management, Vanderbilt University

Joshua T. White
Assistant Professor of Finance,
Owen Graduate School of
Management, Vanderbilt University

Attachment: Manuscript titled "Human Capital Disclosure."

Human Capital Disclosure

Peter Haslag*[1], Berk A. Sensoy[1], and Joshua T. White[1]

[1]Owen Graduate School of Management, Vanderbilt University

December 21, 2021

Abstract

Human capital is a primary source of value in modern firms, yet little is known about what employee information firms disclose and whether it is timely and informative given the SEC's flexible disclosure rules. We examine the determinants of firms' human capital disclosures by combining textual analysis of disclosures via natural language processing with a proprietary dataset on 45 million individual career histories. We show that human capital disclosure is greater when market demand for disclosure is likely to be higher. Contrary to proprietary costs theories of disclosure, firms in competitive environments disclose more. Human capital disclosures also respond to changes in the underlying stock and flow of employees. Two SEC rule changes that encourage but do not require specific human capital information elicit greater disclosures, especially from firms that previously under-disclosed workforce information.

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

JEL Classification: G38, J60, M41, M48

*Corresponding author: Peter Haslag, Vanderbilt University, Owen Graduate School of Management. Email: peter.haslag@vanderbilt.edu. We thank Craig Lewis, Veronika Pool, and Austin Starkweather for helpful comments. This research was supported by the Financial Markets Research Center at Vanderbilt University.

"I do not remember engaging with a high-quality, lasting company that did not focus on attracting, developing, and enhancing its people."
—Jay Clayton, Chair, US Securities & Exchange Commission (SEC)[1]

1 Introduction

Firms are a unique combination of human and nonhuman capital. In the modern firm, the stock of human capital is a primary source of value (Zingales, 2000) and its flows impact investor returns (Agrawal et al., 2021). Although firms disclose some workforce information, mandatory SEC disclosure requirements remain limited (Gutiérrez et al., 2020). Accordingly, institutional investors are increasingly raising concerns about the adequacy of the SEC's human capital disclosure (HCD) requirements (Klemesh et al., 2019) and rank human capital as the most important topic when engaging companies for additional information.[2]

Despite its importance, there is sparse academic literature on what human-capital information managers provide to investors and whether such disclosures are informative and adequate. We seek to fill this gap using a proprietary dataset of 45 million individuals' job histories combined with new evidence on firms' HCD contained in their 10-K annual reports. Our analyses first provide descriptive evidence on the time-series and cross-sectional properties of HCD over the past two decades. We then scrutinize firms' specific disclosures on the stock and flow of employees by comparing these discussions to the actual workforce changes revealed by our dataset of job histories. In a final step we examine how and which firms adjust their HCD in response to significant changes in SEC disclosure requirements.

Prior to 2005, the SEC required firms to disclose minimal information about its employees. Firms were simply required to report the total number of employees in the annual 10-K. Beginning in 2005, the SEC expanded 10-K disclosure mandates to include a detailed discussion of salient risk factors to its business (Campbell et al., 2014). Accordingly, if

[1]See SEC Open Meeting, Modernization of Regulation S-K Items 101, 103, and 105, August 26, 2020, available at https://www.sec.gov/video/webcast-archive-player.shtml?document_id=082620-open-meeting.
[2]Survey evidence shows that 83% of institutional investors say human capital management is the most important topic for additional detailed disclosure. See Morrow Sodali, "Institutional Investor Survey 2019," https://morrowsodali.com/uploads/insights/attachments/ae189c6414e1ef6b0eed5b7372ecb385.pdf.

human capital is a significant risk factor for a particular firm, managers should devote part of the 10-K to this discussion. Firms could also voluntarily furnish additional information on aspects of human capital management, for example, in the Management Discussion & Analysis section of the 10-K (Muslu et al., 2015).

More recently, the SEC updated Regulation S-K in November 2020 by requiring expanded discussion of firms' human capital management processes. Critics note, however, that the SEC afforded managers with significant latitude by employing a principles-based rather than prescriptive approach. Under this framework, the SEC does not mandate specific topics or data points that must be disclosed to investors.

To shed light on the properties of HCD, we first analyze what type of employee-related information that managers provide to investors over the period 2001–2021. We extract all paragraphs with employee-linked words from 10-K filings and use a natural language processing (NLP) technique to assign key phrases to distinct topics. After removing boilerplate topics (e.g., fiscal year), we use an additional NLP approach to identify phrases associated with dimensions of human capital demanded by market participants (e.g., diversity).

Our approach identifies eleven key HCD topics (in order of overall phrase count): Attract & Retain (A&R), Integration, Workforce Reductions, Unions, Data Security, Health and Safety, Trade Secrets, Competition, Bribery, Morale, and Diversity. One the one hand, if managers are disclosing appropriately, we expect them to provide more intensive discussions of a topic when it is more likely to be material to its investors. On the other hand, we might not find this result if investor concerns about inadequate disclosure are valid.

Across each of the eleven topics, we partition the sample based on cross-sectional properties that prior work identifies as important to the topic. For example, consider the employee topic "Unions." We expect managers to provide more frequent discussions of employees and unions when they operate in industries with greater unionization. Indeed, for all eleven topics, we find that firms with higher values of cross-sectional partitioning variables

provide more intensive discussions than those with lower values, statistically significantly so in eight of the eleven topics. These results provide initial evidence that firms are forthcoming in the relevant factors of their underlying human capital.

Across the entire sample of disclosures, A&R is by far the topic with the most extensive discussions. Moreover, prior work by Agrawal et al. (2021) shows that the stock and flow of human capital, which is the essence of A&R disclosures, impacts firm value and stock returns. Accordingly, we focus the remainder of our analyses on A&R disclosures, emphasizing how these disclosures relate to firm characteristics and actual employee turnover revealed by our proprietary data on employees' job histories.

We next examine which firm characteristics are associated with the intensity of A&R disclosures. A large disclosure literature points to proprietary disclosure costs as a reason why managers might strategically withhold value-relevant information, lest rival firms gain a competitive advantage (Verrecchia, 1983; Li et al., 2018; Chen et al., 2021). In this view, managers might strategically withhold human capital information from investors, especially in competitive industries.

However, if A&R disclosure is fulfilling its intended purpose, we expect firms with more workforce competition to inform investors of this risk. Firms could also use A&R disclosure to signal hiring intentions or workplace advantages to potential employees (Brown and Matsa, 2016).

We find that proprietary costs do not mitigate workforce disclosure. In fact, firms with both greater product and labor market competition disclose more A&R statements. These findings suggest that, on average, firms comply with the spirit of SEC requirements rather than strategically withholding information due to competition.

We also expect managers to be more forthcoming in their disclosures when the information is demanded by key market participants. Institutional investors are vocal proponents of greater firm-level transparency on the workforce properties (Klemesh et al., 2019). Analysts might also demand information on labor flows given its value relevance.

Institutional investors and analysts might also be drawn to companies that provide greater HCD. Consistent with these hypotheses, we find that firms with greater levels of institutional ownership and analyst following provide more A&R disclosures. However, in contrast to these measures of external governance, we find no consistent relation between A&R statements and proxies for internal firm governance such as the entrenchment index (E-index) or presence of more takeover delay provisions (Bebchuk et al., 2009).

We next use our database of employee job histories to examine whether A&R disclosures accurately reflect changes (i.e., flows) in firms' human capital. To examine employee flows, we compute hiring and separation rates for each firm. We then decompose these values into predicted and unpredicted components based on occupational and industry mobility at the local and national levels. We conjecture and validate that the unpredicted components of firm-level hiring and separation also proxy for employee satisfaction, which prior work finds can impact firm performance (Edmans, 2011, 2012).

Using a firm and year fixed effect (FE) model, we find a strong positive relation between within-firm employee turnover increases and A&R disclosure intensity. Moreover, increases in the unpredicted (i.e., residual) components of both hiring and separation tend to be followed by additional firm-level disclosures of A&R information. As predicted, these effects are stronger when we focus our sample on the high-skilled portion of labor who likely generate more value for firms. Overall, these results support the notion that managers are forthcoming about A&R risk and disclosures reflect actual changes in the underlying human capital at the firm level.

Although flow measures gauge *how many* employees are separating or joining a firm, they do not capture *which* employees are turning over. To understand the "stock" of human capital, we estimate the tenure of employees based on the average length of employment. We argue that employee tenure reflects both the stability of the firm's employee base and sheds light on the amount of firm-specific knowledge capital lost as the workforce turns over.

Using these measures and annual changes in A&R statements in the 10-K, we then

determine if managers dynamically adjust HCD based on abnormal changes in their workforce. We find a negative relation between employee tenure and subsequent A&R statements. Thus, as the stability of the firm's stock of human capital grows, managers reduce the intensity of discussions pertaining to A&R risk. This finding is again consistent with informative, as opposed to opportunistic, human-capital disclosures.

In our final set of analyses, we examine how HCD changes in response to strengthening SEC requirements. In 2005, the SEC expanded mandatory risk-factor disclosures. This rule change required firms to discuss key risks that could disrupt their business but did not explicitly require firms to disclose human capital information. Despite the generality of the rule, we find a 20% increase in HCD after 2005. This increase in disclosure is especially strong for firms whose disclosure was previously low, in both absolute terms and relative to the determinants models from our previous analyses. These results suggest that the SEC's 2005 risk-factor mandates helped strengthen the adequacy of HCD by shocking firms that might have otherwise withheld information.

In November 2020, the SEC again amended its disclosure regime to require firms to provide additional information about their human capital management processes, but did not prescribe specific data points. We find that A&R statements increase by 40% following this rule change. Similar to the 2005 SEC rule change, we find that both the absolute and the abnormally low disclosure firms responded more to the 2020 SEC rule change. The response is especially strong for previously low disclosers and firms with higher analyst following and market-to-book values where intangibles are likely key to value creation. These results suggest the SEC mandate had a meaningful impact on those firms who might not have otherwise provided this information, especially when there is higher demand for human capital information from market participants.

Taken together, our study provides three key contributions. First, we advance the nascent literature on human capital disclosure. A large body of literature examines mandatory and voluntary disclosure of non-human capital (Leuz and Wysocki, 2016). However,

scant evidence exists regarding the determinants, characteristics, and consequences of HCD (Klemesh et al., 2019; Gutiérrez et al., 2020). Given the growing importance of human capital as a source of value (Zingales, 2000; Edmans, 2011), our textual analysis provides important and original evidence on how firms describe the stock and flow of human capital to investors. In doing so we build on a literature using natural language processing techniques to examine the information content of SEC disclosures (e.g., Hoberg and Phillips, 2010; Hanley and Hoberg, 2010; Hoberg et al., 2014; Dyer et al., 2017).

Second, we contribute to the growing literature on the value-relevance of human capital. Several recent papers highlight how employees affect firm value and performance (e.g., Edmans, 2011, 2012). Recent studies find that non-disclosure based measures of employee turnover predict future firm performance and stock returns (Agrawal et al., 2021; Li et al., 2021). Gutiérrez et al. (2020) find that changes in online job postings correlate with changes in stock prices. By showing that managers dynamically adjust labor-mobility related disclosures in response to changes in the flow of human capital, our paper adds to the literature on the connection between risk factor disclosures and firm performance (e.g., Campbell et al., 2014; Heinle et al., 2018; Lopez-Lira, 2019).

Third, we contribute to an emerging literature on the strategic use of disclosure in the context of product and labor market competition (e.g., Chen et al., 2021). Some work finds that managers tend to reduce certain elements of firm transparency in response to increases in proprietary disclosure costs via the labor channel (Li et al., 2018). On the other hand, Qiu and Wang (2021) show that high-skill labor risk, as measured by disclosure intensity, positively impacts employee wages. Other work finds that managers strategically increase good news disclosures to gain an edge over competitors involved in labor negotiations (Aobdia and Cheng, 2018). We find that managers increase the intensity of human capital disclosures in response to greater product and labor market competition, which suggests that strategic considerations outweigh proprietary disclosure costs for this dimension of disclosure.

Our paper also has important and timely regulatory implications. Investors recently

voiced concerns to the SEC about the adequacy of human capital disclosures (Klemesh et al., 2019). In response, the SEC revised 10-K disclosure rules in November 2020 by asking firms to disclose, "human capital measures or objectives that the registrant focuses on in managing the business." However, some claim the new rules are too flexible and do not go far enough in requiring disclosures that reflect the economic value of workers' skills or data on specific items such as employee turnover.[3] We find the 2020 SEC rule had a meaningful impact on previously low-disclosing firms and those where human capital is key to value creation. Thus, despite the flexibility afforded to managers, the SEC regulations were effective at increasing human capital disclosure. We also identify key employee data points such as average employee tenure and rates of hiring and separation that would likely benefit investors, but caution that mandating such disclosures could generate a cost for certain firms. Thus, we heed the call of Leuz and Wysocki (2016) to conduct research on disclosure regulations that are of first-order importance to both academics and policymakers.

2 Background and Conceptual Framework

2.1 SEC Disclosure Rules

In this subsection, we briefly review SEC disclosure rules pertaining to human capital disclosures in annual reports. The SEC requires publicly listed companies that are domiciled in the U.S. to file an annual report on Form 10-K. This form provides a comprehensive overview of the firm's operating and financial condition. Within a 10-K, firms must disclose the number of employees, which they typically furnish as part of "Item 1: Business." However, firms are not required to provide employee turnover information, and it is impossible to infer turnover, let alone hiring and separation rates, from the number of

[3]See Andrew Ramonas, "Divided SEC requires more workforce disclosures from companies," Aug 26, 2020, https://news.bloomberglaw.com/securities-law/
divided-sec-requires-more-workforce-disclosures-from-companies; and "SEC Wants More Human Capital Disclosures But Won't Say How Much," Bloomberg Law, Aug 28, 2020, https://news.bloomberglaw.com/securities-law/sec-wants-more-human-capital-disclosures-but-wont-say-how-much.

employees alone.

In 2005, the SEC began requiring firms to include a new section in their annual report, known as "Item 1A: Risk Factors." This section provides the "the most significant factors that make the company speculative or risky" under Item 305c of Regulation S–K. Before 2005, companies were only required to provide risk factor information in registration statements that pertain to capital raising of debt and equity. Campbell et al. (2014) argue that by mandating risk factor disclosures in annual reports, the SEC believes this information is informative and benefits investors. Thus, if dimensions of human capital are a source of risk to investors, firms should provide this information in the 10-K starting in 2005.

Item 7 of the 10-K contains Management's Discussion and Analysis (MD&A), which is required under Item 303 of Regulation S-K. In this section, managers discuss changes in financial condition and operations. The SEC also encourages firms to provide information on the key performance indicators that management consider to be material to investors. Indeed, some companies provide financial and non-financial metrics in the MD&A (Ball et al., 2015). Thus, managers could voluntarily furnish employee-related information such as collective bargaining agreements, employee relations, or employee turnover.

In August 2020, the SEC updated human capital disclosure requirements under Regulation S-K.[4] Effective November 2020, firms are now required to disclose measures and objectives of human capital management, but only if they are material to firm's operations. These principles-based requirements leave considerable flexibility in reporting standards. Hence, it remains unclear the extent to which the new rules will impact disclosure.[5]

[4]See SEC Final Rule, Modernization of Regulation S-K Items 101, 103, and 105, Rel. No. 33-10825, August 26, 2020, available at https://www.sec.gov/rules/final/2020/33-10825.pdf.

[5]Consulting firms note the uncertainty of the new HCD requirements. See https://corpgov.law.harvard.edu/2021/02/06/new-human-capital-disclosure-requirements/; and https://corpgov.law.harvard.edu/2020/10/31/incorporating-human-capital-management-disclosures-into-a-companys-annual-report/.

2.2 Voluntary Disclosure

While the SEC requires a minimal level of employee-related disclosures, managers can augment 10-Ks to include voluntary information on human capital. Such information might be demanded by market participants, especially since balance sheets do not reflect investments in human capital (Lev and Schwartz, 1971). Indeed, as noted earlier, 83% of institutional investors say human capital management is the most important topic when asking companies for additional detailed disclosure. The demand for voluntary human capital disclosures has likely risen over time due to the growing importance of human capital in firm value (Zingales, 2000; Klemesh et al., 2019).

Like other voluntary disclosures, managers likely trade-off the costs and benefits of providing information on human capital. Greater transparency reduces information asymmetry between managers and investors, which can increase stock liquidity, price efficiency, and access to capital (Diamond and Verrecchia, 1991; Balakrishnan et al., 2014; Leuz and Wysocki, 2016). However, there are many different stakeholders who utilize these disclosures, making voluntary disclosures potentially costly. If human capital disclosures reveal proprietary and costly information to competitors or other parties, then firms might disclose less information or only provide information when it is more favorable.

The SEC periodically reviews and comments on a firm's 10-K filings to ensure that managers provide adequate information to satisfy disclosure regulations and that disclosures are clear for investors. Thus, firms might provide substantial information, especially when demanded by market participants such as institutional investors and analysts. Firms might also dynamically adjust human capital disclosures when the risk of attracting or retaining its employees increases. Managers might also provide additional human capital information to signal to employees that they are an important and valuable asset (Brown and Matsa, 2016).

3 Data

We combine data from several sources in our study. Standard firm-level financial and stock price data are from Compustat and CRSP. Information on analyst following and management forecasts are from I/B/E/S. Institutional ownership information are from the Thomson Reuters 13-F database. Governance data are from Institutional Shareholder Services. Information on product market competition are from Hoberg et al. (2014). Data on core-based statistical areas (CBSA) are from the U.S. Census. 10-K readability data are from WRDS SEC Analytics Suite. We extract employee-related disclosure from all firms' SEC Form 10-Ks using a Python script which we describe below.

For measures of human capital, we use a proprietary database of anonymized employment and educational histories for over 45 million individuals in the U.S. over the period 2001-2017. The database provided by Emsi Burning Glass contains complete employee job histories with company identifiers at the individual level using a unique anonymized individual identifier.[6] These data are sourced from a third-party data aggregator which utilizes information from online profiles and is supplemented with other public sources. To create the firm-level measures, we aggregate individual level occupation data to the firm level. Because we want to predict HCD in the following year, our primary human capital measures cover the sample period 2001 to 2016.

Our job history data reflect a significant portion of employment within the U.S. At any point in time, the data represents approximately 30% of employed persons. The sample is slightly tilted towards high-skilled individuals. Appendix D provides an expanded description of the Emsi Burning Glass data.

The breadth of individual employment data allows us to compute several measures of human capital at the firm level, which we detail below. To give a sense of the process, we begin by matching each firm in the database to the corresponding public firm through name,

[6]Emsi Burning Glass provides a multitude of services for job seekers, recruiters, colleges, and policy makers. Their propriety data come from public and non-public sources. See https://www.economicmodeling.com/.

industry, and location. We aggregate individual level outcomes to create firm-level changes in human capital. We restrict the final sample to have a minimum of 25 employees to reduce the noise that originates from a small sample. We are able to match over 3,000 unique public firms over the 2001-2021 period, with an average annual match of approximately 1,500 firms.

Overall, the job history database provides us with an advantage over commonly used labor data sets. Most importantly, we can track individuals employment over a long horizon and can distinctly characterize their occupation at the firm. Datasets such as the Current Population Survey, the Panel Study on Income Dynamics, and the US Census Longitudinal Employer-Household Dynamics or administrative data set would not allow us to observe the flows and types of individuals for such firm-level aggregation over such a long period. Thus, our large dataset of employees allow us to generate firm-level measures that provide a more accurate proxy of the true underlying stock and flow of human capital.

3.1 Measures of Human Capital

3.1.1 Employee Variables

We calculate several measures of employee turnover. First, we compute annual values of firm-level employee separation and hiring rates. For these measures, we follow prior work (e.g., Agrawal et al., 2021) in counting the number of firm-level hires and separations divided by the number of employees in our database at the end of the previous year. The resulting values are the firm's *hiring rate* and *separation rate*, respectively.

Next, we partition the *hiring rate* and *separation rate* into expected and unexpected components. For each year, we estimate individual-level regressions that account for local and national rates of hiring and separation for the employee's occupation and industry.[7] Specifically, each annual regression utilizes individuals working at both private and public firms, with FE including Occupation×Industry, Industry×CBSA, and Occupation×CBSA.

[7]These regressions include all individuals, regardless of whether they work for a public firm or not. Thus, they capture individual-level predictions for a large swath of the entire labor market.

The year-by-year analysis accounts for time variation in the outcomes, and the tight FE account for both local and national employment trends in that year. The predicted values from these regressions are averaged at the firm-year level and labeled as *predicted hiring rate* and *predicted separation rate*. We repeat that process by averaging the residuals at the firm-year level to calculate *residual hiring rate* and *residual separation rate*.

A key advantage of our approach is that the predicted values of employee turnover exclude firm-level characteristics. Thus, the residual hiring and separation rates retain important information on firm-level variation in human capital. By isolating the components of employee turnover that are firm-specific, we can determine whether managers adjust human capital disclosures in response to idiosyncratic risk factors versus systematic growth and contraction of the occupation, industry, and local economy. To our knowledge, these measures of the flow of human capital are new to the literature.

We also generate a measure of the stock of human capital. While measures of human capital flow are likely important to investors, they do not shed light on which employees are leaving or joining the firm. To capture this aspect, we estimate *employee tenure* as the number of years an employee has worked at the firm. We expect tenure to reflect the stock of human capital as firms with a greater portion of long-term employees will reflect both occupation-specific and firm-specific knowledge capital.

Given that our data have detailed occupation codes using the Occupational Information Network (O*NET), we can classify the workers' skill level using Job Zone. Job Zone is a classification provided by the Department of Labor on a scale of 1 to 5, where Job Zone 1 requires very little education or training (e.g., dishwasher) and Job Zone 5 requires significant education and training (e.g., attorney). We define *high-skill workers* as those who are in occupations that are designated as Job Zone 4 or 5, as in Belo et al. (2017). We then compute the annual fraction of high-skill workers at the firm level. For some tests, we re-compute the employee turnover and tenure measures for high-skill labor.

3.2 Sample Statistics

We report summary statistics for our measures of human capital and basic firm characteristics in Table 1. All data are winsorized at the 1% level in each tail. Variable definitions are provided in Appendix B. Annual separation rates average 14%, while the average annual hiring rates is just above 18%. Average employee tenure is just under six years. The distribution of tenure mimics those found in Agrawal et al. (2021), while our annual separation and hiring rates are, as expected, larger than their monthly measures. Given serial separation of individuals, it makes sense that annual measure will not amount to twelve times greater separation. The average firm furnishes around four A&R sentences in its 10-K over the sample period 2001 to 2016.

[Insert Table 1 here]

Figure 1 displays time series variation in A&R disclosure over 2001 to 2021, split on whether the firm has above or below sample median percentage of high-skill workers. For all firms, A&R disclosure is generally increasing over time. However, there is a persistent gap where firms who rely more on high-skill labor tend to discuss the importance of attracting and retaining labor more than those employing fewer high-skill workers. This figure also provides initial evidence that the 2005 and 2020 SEC regulatory shocks—discussed in Subsection 2.1—led to an increase in overall A&R disclosure intensity.

[Insert Figure 1 here]

We next plot time series averages of our human capital measures in Figure 2. Notably, employee tenure is generally increasing over the years. This result could reflect the increasing number and type of users who report information to online job platforms. The sizeable increase in tenure during the financial crisis also highlights why employee tenure is distinct from turnover and hiring rates. During the crisis, public firms were laying off more recent hires which boosted the average employee tenure. In terms of separation and hiring rates, the levels are fairly constant outside of the financial crisis period.

[Insert Figure 2 here]

3.3 Measuring Human Capital Disclosure

To measure human capital disclosure, we use information from annual 10-Ks. We first develop a Python script to download all 10-K filings from the SEC's EDGAR database and extract paragraphs with words that reference the firm's employees—which includes variants of employee, worker, personnel, workforce, professional staff, team member, and labor.

To characterize what aspects of human capital are discussed in the 10-K, we employ a natural language possessing (NLP) technique known as non-negative matrix factorization (NMF). The benefit of NMF is that it allows us to identify an initial set of human capital topics without researcher pre-judgment. Cai et al. (2021) note that NMF is a variant of Latent Dirichlet Allocation (LDA), but it has key attributes making it preferable for our setting. For example, NMF decomposes *all* text into smaller pieces belonging to different topics and captures the *magnitude* of the topic discussion and not just its probabilistic presence as in LDA.

Prior work notes that 10-Ks contain some boilerplate that researchers must remove from NLP-identified topics (e.g., Ball et al., 2015). In the context of employee discussions, we observe that boilerplate topics includes factual statements such as the fiscal period of the 10-K or references to accounting entries such as personnel expense. Given our long sample period, we expect that boilerplate might also vary systematically over time (Cohen et al., 2020). Thus, to identify salient human capital topics and remove boilerplate, we take a two-prong approach.

We first remove boilerplate discussions of employee stock option plans, defined benefit plans, and internal controls. To capture time variation, we then partition the sample into three equal periods: 2001-2007, 2008-2014, and 2015-2021. We use the NMF approach to identify 10 employee topics during each subsample period.[8] These topics contain the highest coherence, which reflects the degree of semantic similarity between phrases in the

[8]The Internet Appendix provides a list of topics during these periods, including those designated as boilerplate.

topic. Across all subsample periods, there is considerable overlap of topics. After removing additional topics that clearly reflect boilerplate language (e.g., fiscal period) and retaining the phrases associated with the remaining employee topics, the NMF approach identifies these four distinct human capital topics: A&R, Trade Secrets, Health and Safety, and Bribery.

Although the NMF approach has the benefit of objectively characterizing human capital disclosure topics, it does not take into account the demand for human capital information. Thus, to expand the set of employee topics we condition on those identified by the Sustainability Accounting Standards Board (SASB), which is an independent third party that publishes standards to assist firms with ESG-related disclosures.[9] SASB identifies labor practices (e.g., unions), employee health and safety (e.g., physical and mental health or morale), and diversity and inclusion as topics that are of material interest to investors of firms in specific industries.

To capture these additional topics, we isolate paragraphs with variants of the term "union," "morale," "attract and retain," and "diversity" and conduct an additional NMF test to extract the associated phrases. This process generates the additional employee topics of Unions, Morale, Diversity, Competition, Data Security, Integration, and Workforce Reduction. Using the multifaceted approach of including both NMF-identified topics in tandem with investor demanded topics allows us to create an exhaustive list of potentially important HCD topics. It remains an empirical question as to whether these topics will amount to economically meaningful discussions.

The final set of eleven human capital disclosure topics are: (1) A&R, (2) Integration, (3) Workforce Reduction, (4) Unions, (5) Data Security, (6) Health and Safety, (7) Trade Secrets, (8) Competition, (9) Bribery, (10) Morale, and (11) Diversity.

[9]SASB identifies what it believes are financially material ESG-related issues and provides a framework for disclosure that includes dimensions of human capital. In particular, SASB identifies labor practices, employee health and safety, and employee engagement and diversity as three dimension of human capital that are material in certain industries and provides a "materiality map" to help identify industries where human capital disclosure is encouraged. See SASB Materiality Map: https://materiality.sasb.org/.

3.4 Human Capital Disclosure Topics

In Table 2, we report the HCD topics, examples of associated key phrases, the percent of firm years where the topic discussion is present, and the average frequency of this discussion. A&R is the most frequently discussed employee topic at 83%, followed by discussions of integrating acquired companies (78%), workforce reductions (63%), and unions (59%). Although Trade Secrets (43%) is the seventh most common employee related topic, it has the second highest disclosure intensity, averaging 5.8 statements per 10-K.

[Insert Table 2 here]

In Table 3, we partition the sample across dimensions related to each topic.[10] We then test to see if firms with "high" values of each partitioning variable provide more human capital disclosures related to that topic than those with "low" values. We test for statistical differences by regressing the partitioning indicator variable on the topic count and double-cluster standard errors at the firm and year level.

[Insert Table 3 here]

Across eight of eleven topics, firms with higher values of the partitioning variable provide significantly more intense disclosures of human capital related to that topic. For example, firms with above median values of a high-skill workforce provide 3.7 more discussions per

[10] We partition on the following variables for each topic: (1) *Attract and Retain*: the percent of workforce that is high-skill as Qiu and Wang (2021) find skilled labor risk is strongly related to employee wages; (2) *Integration*: the percent of acquisitions within-industry as Ouimet and Zarutskie (2020) show that the post-merger retention of skilled labor is an important factor in M&A value; (3) *Workforce Reduction*: year-over-year (YoY) changes in the number of firm-level employees as our dataset allows us to observe employee turnover; (4) *Unions*: an indicator equal to 1 if the firm's industry has above average union membership (measured in 2001); (5) *Data Security*: an indicator equal to 1 if the firm operates in these customer-data intensive industries: hotels and motels, credit rating, computer services, general merchandise, food stores, auto dealers, apparel, home furniture, restaurants, miscellaneous retail; (6) *Health and Safety*: an indicator if firms' NAICS industry experienced more than one death during 2016-2019 based on Department of Labor incidence reports; (7) *Trade Secrets*: SEC filing redactions as Glaeser (2018) links redacted information in 10-K filings to greater firm-level trade secrets intensity; (8) *Competition*: we use the Hoberg et al. (2014) measure of product market fluidity for product-market competition and the firm average of the individual level predicted values of turnover for labor market competition; (9) *Bribery*: an indicator that equals 1 if the firm has a non-missing, non-zero value for pre-tax income from foreign operations as bribery charges are often related to the Foreign Corrupt Practices Act; (10) *Morale*: the Glassdoor.com average ratings of senior management over 2008 to 2020 as Green et al. (2019) link Glassdoor ratings to stock returns; and (11) *Diversity*: an indicator equal to 1 if the firm operates in a sector where SASB considers "Employee Engagement, Diversity & Inclusion" to be material for more than 50% of industries in the sector.

year of A&R than those that have below average proportions of high-skill workers. These findings provide initial evidence that firms provide more human capital disclosures when it is potentially material to their business.

As noted above, Table 2 shows that A&R is the most common human capital disclosure topic. Moreover, prior work by (Agrawal et al., 2021) shows that the stock and flow of human capital, which is the essence of A&R disclosures, impacts firm value and stock returns. Accordingly, we focus the remainder of our analyses on A&R disclosures, emphasizing how these disclosures relate to firm characteristics and actual employee turnover revealed by our data on employees' job histories.

To measure A&R disclosure intensity, we use a count based approach.[11] To cleanly identify A&R disclosures, we first retain any paragraph with an employee-related word and a attract- or retain-related word, which we further describe in Appendix C. We partition these paragraphs into sentences which helps to verify the correct textual context (Kravet and Muslu, 2013). We remove any duplicate sentences as they provide no new information. We then require a sentence to have at least one word from List 1 and List 2 below. Our key measure of disclosure, *A&R sentences*, counts the number of sentences meeting these conditions.

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

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

[11] Prior disclosure literature uses a count-based approach in a variety of disclosure settings, such as IPO prospectus words (Hanley and Hoberg, 2010), management forecasts (Balakrishnan et al., 2014), and SEC filings (Boone and White, 2015). In these studies, more frequent disclosures are interpreted as providing greater transparency.

4 Results

4.1 Determinants of Human Capital Disclosure

To understand which factors are associated the amount of A&R disclosure, we examine several observable firm- and industry-level factors that are plausibly related to HCD. Specifically, we examine our measures of firm-level *human capital* (e.g., separation and hiring rates) and *basic characteristics* (e.g., size and profitability). To gauge *proprietary disclosure costs*, we use the Hoberg et al. (2014) measure of product market fluidity for product-market competition. For labor market competition, we average the individual-level predicted values of employee turnover at the firm level.

To estimate *information demand*, we use analyst following and the percent of institutional ownership as prior work shows that higher levels of these measures associates with greater overall information demand (e.g., Boone and White, 2015). We also introduce a SASB labor indicator to the literature, which equals 1 if SASB indicates that human capital disclosure is material in the firm's industry.

Firms might also supply greater HCD when they are better governed or more transparent overall. To measure *firm transparency*, we use the extensive and intensive margins of management guidance (Balakrishnan et al., 2014). We also compute measures of *10-K overall readability* using the Flesch Reading Ease and Coleman Readability measures (Loughran and McDonald, 2014), where lower values indicate easier readability.[12] Finally, to proxy for *governance*, we examine the E-index and a count of takeover delay provisions (Bebchuk et al., 2009; Armstrong et al., 2014; Dey and White, 2021).

To test these determinants of HCD, we first conduct a univariate analysis in Table 4. Every year we sort firms into quintiles based on the factors described above. We then

[12]The Flesch-Kincaid readability formula is [0.39(# words / # sentences) + 11.8(# syllables / # words) − 15.59]. The Coleman readability formula is [5.88(# characters / # words) − 29.6(# sentences / # words) − 15.8]. The results are similar using the RIX , ARI, and LIX readibility measures.

average the amount of A&R disclosure in each quintile, take the difference between quintiles 1 and 5, and calculate a p-value using standard errors double-clustered on year and 3-digit NAICS industries.

[Insert Table 4 here]

Consistent with the view that managers furnish more human capital information when it is appropriate to do so, we find that firms with more high-skilled workers, greater workforce turnover and hiring, and shorter employee tenure provide more A&R disclosures.

Across basic characteristics, we find that high growth firms, low leverage firms, and less profitable firms tend to disclose more A&R information, while firm size is not significantly related. These results are consistent with the new economy type of firm described in Zingales (2000). Previous literature also notes that human capital-intensive firms also utilize less financial leverage (e.g., He, 2018).

Contrary to the proprietary costs view of disclosure, we find that firms with *higher* product market and labor market competition disclose more A&R information, rather than trying to hide vulnerabilities from competitors. Firms with higher information demand and those that are more transparent overall disclose more A&R statements. Finally, firms that have stronger governance, proxied by a lower E-index value, provide more A&R disclosures.

Overall, the univariate relations are consistent with the notion that firms, on average, make good faith efforts to disclose A&R information—disclosing more employee information when such disclosure is likely to be more relevant. There is no evidence that proprietary costs induce fewer human capital disclosures; the opposite is true.

We next turn to a multivariate regression setup to understand which determinants are most important in influencing HCD. We employ a pseudo-Poisson maximum likelihood estimation, where the dependent variable is a count of the number of A&R sentences.[13] We include industry-year FE to control for time-varying industry-wide changes in the propensity

[13]For discrete count variables, the pseudo-Poisson maximum likelihood is an efficient, unbiased estimator and allows for high dimensional FE (Cohn et al., 2021).

to disclose information on human capital. Standard errors are double-clustered at the firm and year level.

[Insert Table 5 here]

Column (1) of Table 5 focuses on basic firm characteristics. Size, sales growth, and cash holdings positively predict increased A&R disclosure, while profitability and leverage are negatively related.

In Columns (2) to (6), we independently test our proxies for proprietary costs, information demand, firm transparency, and governance. Again we find that higher levels of labor and product market competition predict greater A&R disclosure. We also find that firms with greater information demand disclose more, while those with more complex 10-Ks provide fewer A&R sentences.

In Columns (7) and (8), we run a horse race of the potential determinants. We find that labor and product market competition, analyst following, and 10-K readability all remain statistically related to A&R disclosure intensity.

4.2 Disclosure and Human Capital

Our next question asks whether managers adjust human capital disclosures in response to changes in the underlying human capital of the firm. To answer this question, we estimate Poisson regressions of A&R sentences in the subsequent year with firm and year FE, where standard errors are double clustered at the firm and year levels. Our variables of interest are firm-level measures of employee separation and hiring rates, as well as average employee tenure in the year prior to the disclosure. For these regressions, we control for the basic firm characteristics and the determinants found to be significant in Table 5. The results are presented in Table 6 reports the results.

[Insert Table 6 here]

Columns (1) to (3) show that variation in each human capital measure is related to A&R disclosure intensity in the following year. This result is consistent with the notion that firms

alter their human capital disclosure to match the underlying changes in their workforce. The results are also economically meaningful. For example, in Column (1), we find a one standard deviation increase in the separation rate yields 2% more A&R sentences. We find a similar effect for hiring rate. In Column (3), we find that a one standard deviation increase in average employee tenure leads to a 7% relative decrease in A&R disclosure. Including all of the human capital variables together in Column (4), we find that separation rates and average employee tenure are the primary predictors of changes in A&R disclosure intensity.

Columns (5) and (6) repeat the same empirical exercise with slightly different regressors. In Column (5), we use the high-skilled analog for separation rate, hiring rates, and empoyee tenure. The results mimic those of the unconditional measures, but the economic magnitudes are slightly larger for high-skill separation and slightly smaller for high-skill tenure, representing a 2.2% increase and 5.5% decrease, respectively. The final column uses the residual separation rate and both the predicted and residual hiring rates. In this case, only residual separation and hiring rate are significantly related to A&R disclosure. This result highlights the fact that the sensitivity to increased disclosure is being driven by the idiosyncratic firm-level variation, and not some broader relationship to systematic changes in disclosure and changes in human capital.

Overall, these results support the notion that, on average, firms alter their disclosure to adjust to their underlying changes in human capital. Moreover, these changes are happening at an annual basis, therefore adjustments in human capital disclosure are both relevant and timely.

4.3 SEC Rule Changes

The SEC has twice changed disclosure rules that could potentially impact human capital disclosure during our sample period. We utilize these rule changes to better understand how firms respond to the increased disclosure mandates and whether the regulation helped increase the supply of human capital information for those firms that were likely under-

reporting based on proprietary dataset.

4.3.1 2005 SEC Rule Change

The 2005 rule change required firms include a section in their 10-K to highlight key risks of doing business (Item 1A). There was significant discretion afforded to firms about what types of information to include, so it is unclear whether firms would have responded by discussing the risk of attracting and retaining valuable human capital.

Using a Poisson regression, we first test how the regulation affected the overall level of A&R disclosure. We restrict the sample to the years 2003 to 2006, which balances the sample between two years before and two years after the SEC rule change. We create a variable, *post*, that equals 1 for the sample period 2005 and 2006, and 0 for the 2003 and 2004. We cluster standard errors at the firm level and report the results in Table 7.[14]

[Insert Table 7 here]

In Column (1), we employ firm FE. The coefficient on *post* is positive and significant, and represents an approximate 20% increase in A&R disclosure intensity following the 2005 SEC rule change. Given the nature of this rule, these results further validate that human capital is both a key risk and significant source of value for firms.

We also investigate whether the SEC rule change affected the firms that were previously under-reporting. To this end, we rely on our previous determinants model to predict whether firms are under-reporting. Specifically, we run the determinants model year-by-year to create a two-year moving average of the residual A&R disclosure.[15] We create an indicator variable, *treated*, which takes the value of 1 if the two-year moving average is less than zero in 2003, which predates the start of this experiment; and otherwise 0. We then study the interaction of $post \times treated$ using a Poisson regression with firm and year FE.

In Column (2) we find that, following the implementation of the 2005 rule, those firms which were not as forthcoming in their A&R disclosure as our model would predict increase

[14] Given the small number of years, we do not cluster along the time dimension. Clustering with too few clusters can lead to bias in the standard errors (Thompson, 2011).

[15] Results are robust to using a single year as well.

their disclosure more than average. Indeed, the coefficient on *post* × *treated* is positive and significant at the 5% level. We interpret these findings as evidence that the 2005 SEC rule change helped bring firms closer together in terms of their human capital disclosure policy.

We next attempt to understand whether ex-ante characteristics of firms dictate the level of response to the 2005 SEC rule change. The SEC mandate likely imposes a constraint on firms by pushing firms away from what they previously believed was the optimal level of disclosure based on the costs and benefits. Thus, a differential response to the new risk factor mandates highlights channels through which the SEC regulation had an impact.

In Column (3), we interact *post* with each of these measures using the Poisson regression with firm and year FE. We find that firms with lower ex-ante disclosure increase subsequent A&R disclosure more in response to the SEC rule change. We interpret these findings as evidence that the 2005 SEC rule pushed firms to note human capital risks when they might have previously withheld this information from market participants.

4.3.2 2020 SEC Rule Change

The SEC's disclosure rule change in 2020 was substantially different from that of 2005. This rule explicitly focuses on strengthening human capital disclosure mandates and was seen as the first step in addressing a longstanding gap. Nevertheless, when the rule was implemented there was controversy as to whether the rule went far enough. For one, the disclosure framework was principles-based, again leaving significant discretion to managers as to what workforce information would be included in 10-Ks.

As before, we first test the level response to the regulation. In this case, we restrict the sample to be 2018 to 2021. Given the contemporaneous nature of the rule change, we rely on the first two quarters of 2021 to identify the effect. We believe that this period is a representative sample as just under 90% of SEC reporting firms file a 10-K in the first two calendar quarters. Table 8 presents the results.

[Insert Table 8 here]

Column (1) shows that firms responded to the SEC rule change by significantly increasing their human capital disclosures. The coefficient on *post* is positive and significant at the 1% level and corresponds to a 41% increase in A&R sentence frequency.

In Column (2), we attempt to understand whether the 2020 rule change had a differential impact on those firms who appear to be under-reporting human capital information. Because our human capital measures end in 2016, the model is predicted through 2017 to create our *treated* indicator variable, which equals 1 if firms had abnormally low disclosure in 2016 and 2017; and otherwise 0. Similar to the 2005 SEC rule change, we find in Column (2) that the 2020 SEC regulation increased human capital disclosure *more* for those firms who were predisposed to withhold information on employee turnover. Thus, the 2020 SEC rule change was also effective in "shocking" firms that were under-reporting human capital information based on our determinants model.

In Column (3), we use ex-ante firm characteristics to see which firms reacted differently to the 2020 rule change. The negative coefficient on the interaction of *post* and *ex-ante A&R disclosure* indicates that low disclosure firms react more strongly, which is consistent with the results in Column (2). Moreover, firms with high market-to-book values also react positively and more strongly to this rule change. Given that market-to-book tends to proxy for "new economy" firms that rely more on intangible assets, we interpret the latter findings as evidence that the 2020 SEC rule pushed human-capital-centric firms to disclose more human capital information to market participants.

Firms with larger analyst following also respond stronger to the 2020 rule change, suggesting that the principles-based approach might be influenced by market participants. Overall, the 2020 SEC rule change led firms who are more reliant on human capital to disclose additional information on its workforce.

5 Broad Employee Disclosure

We focus our main analysis on A&R disclosure because (1) it was the most frequent HCD topic and (2) we are able to compare disclosure to the potential true properties of the underlying stock and flows of the workforce. To determine whether human disclosure disclosure, more broadly, is affected by the regulatory changes, we redo our main analyses using a count of all 11 employee disclosure topics that were discussed in Subsection 3.3 and Table 2.

For these tests, we create a dependent variable, *aggregate human capital topic disclosure*, that counts the number of topic mentions, summed across all topics. We then separately test the relation with our human capital measures and the effects of the 2005 and 2020 SEC rule change on these 11 topics using a Poisson regression in Table 9.

[Insert Table 9 here]

We regress the aggregate disclosure on our human capital measures in Column (1). Similar to the relation with the A&R topic, we find that the separation rate and employee tenure significantly predict changes in overall HCD across all topics.

Next, we examine how firms respond to the SEC rule changes based on prior under-reporting. Thus, we re-estimate our determinants model on a yearly basis using the aggregate human capital disclosure measure as the dependent variable. We then generate the variable, *treated*, which equals 1 if the firm reports lower levels of HCD than predicted.

In Column (2), we examine the 2005 SEC rule change for the subsample period 2003 to 2006. For these tests, the *post* variable takes the value of one for the years 2005 to 2006, and otherwise 0. The results show that firms provide substantially more human capital disclosure across all topics. The coefficient on *post* translates to an 18% increase in HCD intensity. However, unlike the tests of A&R sentence frequency in Table 7, we see no differential response by low disclosure (i.e., treated) firms. We interpret this finding as the 2005 rule change leading to a strengthening of employee-related *risk factor* disclosures, but not necessarily other dimensions of human capital captured by the other 10 topics.

In Columns (4) and (5), we examine HCD across all topics around the 2020 SEC rule change. These tests are for the subsample period 2018 to 2021, where the variable *post* equals 1 for disclosures in 2021. The results in Column (4) indicate that firms strengthened HCD across all topics by 23% following this rule change. Thus, the effect of the 2020 SEC rule change across all HCD topics was approximately half of the effect on A&R sentences from Table 8.

In Column (5), we find a differential response for low disclosure firms to the 2020 rule change. Thus, managers that previously under-reported based on our measures of the stock and flow of human capital respond more strongly with HCD across all topics. This result differs from the response to the 2005 rule change in Column (3), likely because the 2020 rule focused on overall human capital disclosure and not just risk factors.

Overall, it appears the two SEC rule changes resulted in greater overall disclosure pertaining to human capital management, but only the most recent regulatory change induced firms that were less forthcoming to respond and disclose more information to market participants.

6 Conclusion

A growing literature shows that human capital is important for firm value. However, there are contemporaneous concerns that the SEC's human capital disclosure requirements have not adequately adjusted to reflect this importance. In this paper, we first characterize the information that managers provide to investors on their workforce. We find that managers tend to disclose a variety of details on employee-related topics, and the intensity of this disclosure varies based on its likely materiality to the business. While unique, these topics frequently reflect underlying dimensions of the stock and flow of human capital at the firm.

We exploit a unique database of individual-level employee career histories to understand the determinants of firms' human capital disclosure policies. First, we find that proprietary

costs do not seem to mitigate human capital disclosures. Instead, demand by market participants induces managers to be more forthcoming about human capital. Focusing on disclosures related to attracting and retaining key talent, we find that managers alter their human capital disclosure in response to important changes in their workforce.

Next we aim to understand how two significant SEC rule changes on human capital disclosure impact the amount of human capital disclosure and the types of firms that respond. Neither rule change was prescriptive in requiring specific data points and some market participants continue to question the adequacy of disclosure. We show that firms respond to both SEC rule changes by increasing their human capital disclosure intensity. These findings suggest that, despite the flexibility afforded to managers, the SEC regulations were effective at increasing human capital disclosure. Importantly, both SEC actions tended to increase disclosure more amongst firms that were previously reporting less than predicted given their characteristics. Thus, it appears that the rules both affected the intended group and give incentives to provide informative human capital disclosures.

Overall, our paper adds to the limited but growing literature on human capital disclosure. Our results have timely and important policy implications for what information is relevant to investors. We show that human capital disclosures capture value-relevant aspects of the underlying stock and flow of human capital. Our analyses also introduce novel measures of the flow of human capital beyond simple turnover,utilizing various measures that reflect the firm's stock of knowledge capital. Together, these metrics should help inform the SEC on specific workforce statistics that are important to investors. Thus, we believe our findings have important implications for academics, policymakers, and practitioners.

References

Agrawal, A. K., I. Hacamo, and Z. Hu. 2021. Information dispersion across employees and stock returns. *Review of Financial Studies* 34:4785–4831.

Aobdia, D., and L. Cheng. 2018. Unionization, product market competition, and strategic disclosure. *Journal of Accounting and Economics* 65:331–357.

Armstrong, C. S., J. E. Core, and W. R. Guay. 2014. Do independent directors cause improvements in firm transparency? *Journal of Financial Economics* 113:383–403.

Balakrishnan, K., M. B. Billings, B. Kelly, and A. Ljungqvist. 2014. Shaping liquidity: On the causal effects of voluntary disclosure. *Journal of Finance* 69:2237–2278.

Ball, C., G. Hoberg, and V. Maksimovic. 2015. Disclosure, business change and earnings quality. Working paper, University of Southern California. https://ssrn.com/abstract=2260371.

Bebchuk, L., A. Cohen, and A. Ferrell. 2009. What matters in corporate governance? *Review of Financial Studies* 22:783–827.

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

Boone, A. L., and J. T. White. 2015. The effect of institutional ownership on firm transparency and information production. *Journal of Financial Economics* 117:508–533.

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

Cai, K. N., K. W. Hanley, A. G. Huang, and X. Zhao. 2021. The pricing of new corporate debt issues. Working paper, Georgetown University. https://ssrn.com/abstract=3700162.

Campbell, J. L., H. Chen, D. S. Dhaliwal, H.-m. Lu, and L. B. Steele. 2014. The information content of mandatory risk factor disclosures in corporate filings. *Review of Accounting Studies* 19:396–455.

Chen, A., G. Hoberg, and V. Maksimovic. 2021. Life cycles of firm disclosures. Working paper, University of Southern California. https://ssrn.com/abstract=3703931.

Cohen, L., C. Malloy, and Q. Nguyen. 2020. Lazy prices. *Journal of Finance* 75:1371–1415.

Cohn, J., Z. Liu, and M. Wardlaw. 2021. Count data in finance. Working paper, University of Texas. https://ssrn.com/abstract=3800339.

Dey, A., and J. T. White. 2021. Labor mobility and antitakeover provisions. *Journal of Accounting and Economics* 71:101388.

Diamond, D. W., and R. E. Verrecchia. 1991. Disclosure, liquidity, and the cost of capital. *Journal of Finance* 46:1325–1359.

Dyer, T., M. Lang, and L. Stice-Lawrence. 2017. The evolution of 10-K textual disclosure: Evidence from Latent Dirichlet Allocation. *Journal of Accounting and Economics* 64:221–245.

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

Edmans, A. 2012. The link between job satisfaction and firm value, with implications for corporate social responsibility. *Academy of Management Perspectives* 26:1–19.

Glaeser, S. 2018. The effects of proprietary information on corporate disclosure and transparency: Evidence from trade secrets. *Journal of Accounting and Economics* 66:163–193.

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

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

Hanley, K. W., and G. Hoberg. 2010. The information content of IPO prospectuses. *Review of Financial Studies* 23:2821–2864.

He, Z. 2018. Money held for moving stars: Talent competition and corporate cash holdings. *Journal of Corporate Finance* 51:210–234.

Heinle, M. S., K. C. Smith, and R. E. Verrecchia. 2018. Risk-factor disclosure and asset prices. *The Accounting Review* 93:191–208.

Hoberg, G., and G. Phillips. 2010. Product market synergies and competition in mergers and acquisitions: A text-based analysis. *Review of Financial Studies* 23:3773–3811.

Hoberg, G., G. Phillips, and N. Prabhala. 2014. Product market threats, payouts, and financial flexibility. *Journal of Finance* 69:293–324.

Klemesh, S., B. Neill, and J. Smith. 2019. How and why human capital disclosures are evolving. Harvard Law Forum on Corporate Governance. https://corpgov.law.harvard.edu/2019/11/15/how-and-why-human-capital-disclosures-are-evolving/.

Kravet, T., and V. Muslu. 2013. Textual risk disclosures and investors' risk perceptions. *Review of Accounting Studies* 18:1088–1122.

Leuz, C., and P. D. Wysocki. 2016. The economics of disclosure and financial reporting regulation: Evidence and suggestions for future research. *Journal of Accounting Research* 54:525–622.

Lev, B., and A. Schwartz. 1971. On the use of the economic concept of human capital in financial statements. *The Accounting Review* 46:103–112.

Li, Q., B. Lourie, A. Nekrasov, and T. J. Shevlin. 2021. Employee turnover and firm performance: Large-sample archival evidence. *Management Science*, forthcoming.

Li, Y., Y. Lin, and L. Zhang. 2018. Trade secrets law and corporate disclosure: Causal evidence on the proprietary cost hypothesis. *Journal of Accounting Research* 56:265–308.

Lopez-Lira, A. 2019. Risk factors that matter: Textual analysis of risk disclosures for the cross-section of returns. Working paper, The Wharton School. https://ssrn.com/abstract=3313663.

Loughran, T., and B. McDonald. 2014. Measuring readability in financial disclosures. *Journal of Finance* 69:1643–1671.

Muslu, V., S. Radhakrishnan, K. Subramanyam, and D. Lim. 2015. Forward-looking MD&A disclosures and the information environment. *Management Science* 61:931–948.

Ouimet, P., and R. Zarutskie. 2020. Acquiring labor. *Quarterly Journal of Finance* 10:2050011.

Qiu, Y., and T. Wang. 2021. Skilled labor risk and corporate policies. *Review of Corporate Finance Studies* 10:437–472.

Thompson, S. B. 2011. Simple formulas for standard errors that cluster by both firm and time. *Journal of Financial Economics* 99:1–10.

Verrecchia, R. E. 1983. Discretionary disclosure. *Journal of Accounting and Economics* 5:179–194.

Zingales, L. 2000. In search of new foundations. *Journal of Finance* 55:1623–1653.

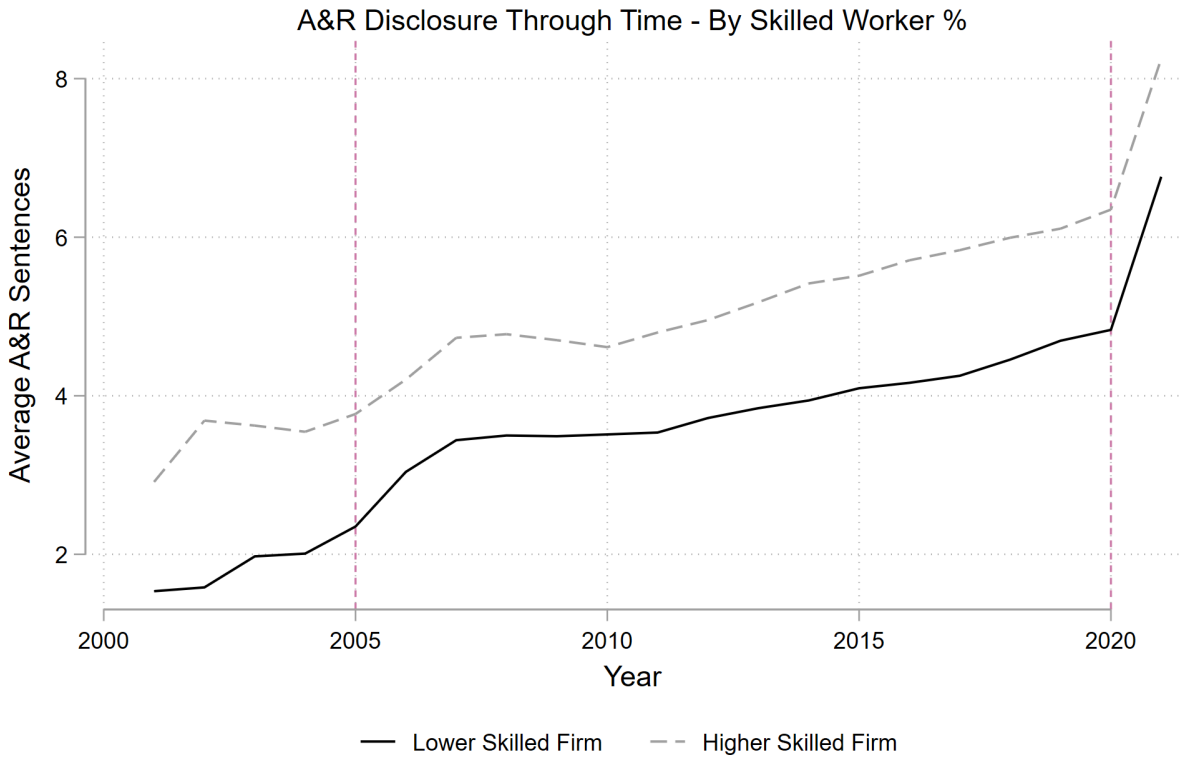


Figure 1. Time Series of A&R Disclosure by Firm-Level Skills
This figure presents the average annual disclosure of attract and retain (A&R) sentences over the years 2001-2021. We partition the sample into those with above and below median values of high-skill workers, which are those with occupations in BLS Job Zone 4 or 5. The dotted red lines indicae the 2005 and 2020 SEC rule changes, which are discussed in Subsection 2.1.

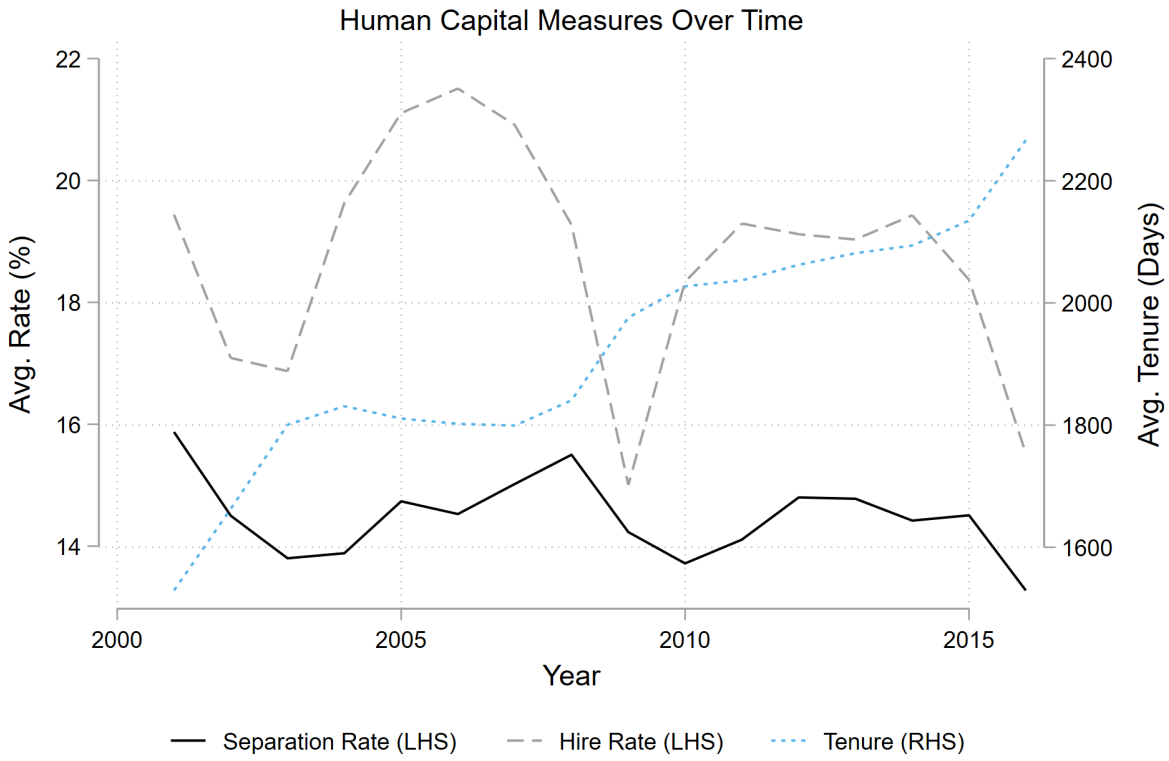


Figure 2. Time Series of Human Capital Measures
This figure presents the average annual level of human capital measures over the years 2001-2016. Separation Rate is defined as the number of separations scaled by the number of employees in the previous year. Hiring rate is defined as the number of new hires divided by the number of employees in the previous year. Average tenure is firm-level average of employee tenure, measured in days.

Table 1. Summary Statistics

This table presents summary statistics of our key variables for the sample period 2001 to 2017. For each variable, we compute the mean, standard deviation (SD), minimum, maximum, and the 25th, 50th, and 75th percentile values. All variables are annual firm-level values, winsorized at the 1% level in each tail. Appendix B provides variable definitions.

Variable	Obs.	Mean	SD	Min.	25%	Median	75%	Max.
Human capital disclosure								
Attract and Retain Sentences	15,572	3.9	3.3	0.0	1.0	3.0	6.0	17.0
Aggregate Human Capital Topic Disclosure	15,572	34.5	25.8	0.0	17.0	29.0	46.0	266.0
Human capital								
Separation Rate (%)	15,572	14.4	6.8	0.0	10.1	13.2	17.2	88.9
Hiring Rate (%)	15,572	18.2	7.7	0.0	13.1	17.4	22.5	78.2
Employee Tenure (years)	15,572	5.6	2.0	1.2	4.0	5.3	6.9	16.6
High-Skill Workers (%)	15,572	57.1	16.0	4.0	46.8	58.2	68.9	94.2
Basic characteristics								
Log(Market Capitalization)	15,565	13.4	1.9	8.1	12.2	13.4	14.7	17.7
Cash-to-Assets (%)	15,329	20.8	22.1	0.0	3.7	12.8	30.8	95.1
ROA (%)	15,567	-0.5	19.7	-199.1	-1.3	3.8	7.6	32.5
Market-to-Book	15,564	2.7	4.3	-14.7	1.2	1.8	3.1	33.6
Leverage (%)	15,329	20.8	20.6	0.0	0.8	17.3	33.0	100.0
Sales Growth (%)	15,552	10.8	37.6	-84.1	-2.5	6.5	17.5	394.3

Table 2. Employee-Related Topic Overview

This table presents summary statistics for common employee-related topics. Panel A presents key words from the non-negative matrix function (NMF) topic modeling of employee-related paragraphs in 10-K disclosures. Panel B presents tests of each topic across a firm- or industry-level observable which should be relevant. Differences are tested for statistical significance using regressions with an indicator variable with standard errors double-clustered at the firm and year levels. Appendix B provides variable definitions.

Topic	Key Phrase Examples	Firm Years (%)	Average Count
1. Attract and Retain	attract top talent; key personnel; retain qualified	83.2	9.198
2. Integration	personnel of the acquired; combining corporate cultures	77.5	4.430
3. Workforce Reductions	restructuring plans; employee attrition; business disruption	63.2	3.341
4. Unions	collective bargaining, labor union; employees are represented	58.6	3.022
5. Data Security	personally identifiable information; confidential information	52.9	3.417
6. Health and Safety	workers compensation; claims incurred; liability claims	51.0	3.587
7. Trade Secrets	trade secrets; trade secrecy; proprietary information	43.4	4.471
8. Competition	greater financial resources, highly competitive	33.6	1.207
9. Bribery	engaging in bribery, foreign corrupt; suffer severe penalties	9.2	0.649
10. Morale	maintaining employee morale; morale and performance	9.4	0.189
11. Diversity	diverse team; diverse and inclusive; equity and inclusion	6.8	0.191

Table 3. The Cross-section of Topics

This table presents summary statistics for common employee-related topics. Panel A presents key words from the non-negative matrix function (NMF) topic modeling of employee-related paragraphs in 10-K disclosures. Panel B presents tests of each topic across a firm- or industry-level observable which should be relevant. Differences are tested for statistical significance using regressions with an indicator variable with standard errors double-clustered at the firm and year levels. Appendix B provides variable definitions.

Topic	Partitioning Variable	High value	Low value	Difference	t-statistic
1. Attract and Retain	High-skill workforce %	11.057	8.861	2.196***	3.42
2. Integration	Industry acquisition rate	4.466	4.415	0.050	0.13
3. Workforce Reductions	YoY employee change pct.	3.235	3.473	-0.239	1.25
4. Unions	Industry unionization	6.208	2.073	4.135***	15.18
5. Data Security	Customer data-intensive industry	5.766	3.104	2.662***	6.87
6. Health and Safety	Employee death indicator	5.938	2.211	3.727***	12.94
7. Trade Secrets	SEC filing redactions	6.902	2.010	4.892***	9.33
8a. Competition	Product market competition	1.229	0.784	0.445***	4.83
8b. Competition	Labor market competition	1.231	0.882	0.349***	3.79
9. Bribery	Foreign sales	1.307	0.324	0.982***	6.28
10. Morale	Glassdoor ratings	0.314	0.301	0.013	0.68
11. Diversity	SASB material industry	0.343	0.176	0.167***	4.30

Table 4. Human Capital Disclosure and Firm Characteristics

In this table, we sort the sample into quintiles based on yearly firm-level characteristics. We then compute the average number of attract and retain (A&R) sentences within each quintile. We present the difference in the highest and lowest quintile (Q5−Q1) for each variable. We test that this difference is statistically different from zero and report the associated p-value with standard errors double-clustered by year and 3-digit NAICS industry code.

Variable	Lowest	Q2	Q3	Q4	Highest	Q5−Q1	p-value
Human capital							
Separation Rate	3.31	3.17	3.45	3.90	4.64	1.33	0.000
Hiring Rate	3.38	3.06	3.35	3.84	4.96	1.58	0.000
Employee Tenure	3.18	2.91	3.21	3.74	4.50	-3.07	0.000
High-Skill Workers	3.28	2.77	3.07	3.90	5.43	2.15	0.000
Basic characteristics							
Log(Market Capitalization)	3.32	3.87	4.08	3.62	2.98	-0.34	0.316
Cash-to-Assets	2.80	2.99	3.43	4.37	5.72	2.92	0.000
Return-on-Assets	5.22	3.92	3.28	3.34	3.57	-1.65	0.001
Market-to-Book	3.18	2.91	3.21	3.74	4.50	1.32	0.000
Leverage	4.80	3.61	3.19	3.14	3.01	-1.79	0.000
Sales Growth	3.56	2.94	3.10	3.54	4.35	0.79	0.000
Proprietary disclosure costs							
Product Market Competition	2.51	3.44	4.00	3.86	4.00	1.49	0.084
Labor Market Competition	2.68	3.31	3.86	4.22	4.39	1.71	0.000
Information demand							
Institutional Ownership	2.91	3.21	3.55	3.57	3.64	0.73	0.150
Analyst Following	3.07	3.66	4.12	3.81	3.70	0.63	0.045
SASB Labor Indicator	3.31				4.72	1.41	0.001
Firm transparency							
Manager Forecasts (count)	3.48	3.64	3.75	4.23	4.31	0.84	0.037
Manager Forecasts (indicator)	3.39				3.88	0.49	0.188
10-K overall readability							
Flesch Reading Ease	4.76	4.13	3.49	2.87	2.30	-2.46	0.000
Coleman Readability	2.93	3.52	3.75	3.89	3.64	0.70	0.043
Governance							
Takeover Delays	3.48	2.03	3.08	2.77	3.38	-0.10	0.743
E-Index	3.28	2.75	3.32	2.63	2.84	-0.44	0.059

Table 5. Determinants of Human Capital Disclosure

This table presents panel Poisson regression estimates from the regression of attract and retain sentences on measures of potential determinants in the year prior to disclosure. Variable definitions can be found in Appendix B. We include industry-year fixed effects (FE). Standard errors are double-clustered at the firm and year level and included in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Attract and Retain Sentences (t+1)							
Prod. Mkt. Competition		0.047***					0.037***	0.036***
		(0.006)					(0.010)	(0.008)
Labor Mkt. Competition		2.686***					2.107**	2.216***
		(0.391)					(1.042)	(0.671)
Instl. Ownership			0.128**				0.056	-0.003
			(0.056)				(0.167)	(0.101)
Analyst Following			0.015***				0.012**	0.012***
			(0.003)				(0.005)	(0.004)
Manager Forecasts				0.002			0.000	-0.000
				(0.001)			(0.002)	(0.002)
Delay Provisions					0.008		-0.013	
					(0.020)		(0.026)	
E-Index					-0.018		-0.023	
					(0.018)		(0.025)	
Flesch Reading Ease						-0.045***	-0.043***	-0.031***
						(0.004)	(0.009)	(0.007)
Log(Market Cap.)	0.020***	0.001	-0.077***	-0.018*	-0.019	-0.003	-0.112***	-0.077***
	(0.008)	(0.009)	(0.014)	(0.011)	(0.013)	(0.008)	(0.030)	(0.022)
Cash-to-Assets	0.700***	0.512***	0.728***	0.780***	0.955***	0.629***	0.796***	0.654***
	(0.053)	(0.063)	(0.065)	(0.078)	(0.109)	(0.055)	(0.142)	(0.107)
ROA	-0.243***	-0.131***	-0.206***	-0.300***	-0.448***	-0.218***	-0.372**	-0.159*
	(0.031)	(0.037)	(0.039)	(0.057)	(0.072)	(0.028)	(0.183)	(0.092)
Market-to-Book	-0.001	0.001	0.002	0.005**	0.001	0.000	0.002	0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.005)	(0.003)
Leverage	-0.130**	-0.196***	-0.217***	-0.280***	-0.216**	-0.142**	-0.294*	-0.443***
	(0.058)	(0.073)	(0.069)	(0.098)	(0.097)	(0.057)	(0.170)	(0.125)
Sales Growth	0.001***	0.001***	0.001***	0.002***	0.001***	0.001***	0.002**	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,218	20,995	20,674	10,775	12,273	29,171	4,202	6,668
Pseudo R^2	0.151	0.165	0.170	0.177	0.180	0.159	0.213	0.197

Table 6. Human Capital and Disclosure

This table presents panel Poisson regression estimates from the regression of attract and retain sentences on measures of human capital in the previous year. Variable definitions can be found in Appendix B. We include firm and year fixed effects (FE). Standard errors are double-clustered at the firm and year level and included in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Attract and Retain Sentences (t+1)					
Separation Rate	0.257***			0.211*		
	(0.093)			(0.117)		
Hiring Rate		0.269***		0.133		
		(0.097)		(0.118)		
Employee Tenure			-0.047***	-0.039***		
			(0.013)	(0.015)		
High-Skill Separation					0.231**	
					(0.091)	
High-Skill Hiring					0.143	
					(0.088)	
High-Skill Tenure					-0.059***	
					(0.020)	
Residual Separation Rate						0.348***
						(0.097)
Predict Hiring Rate						0.059
						(0.309)
Residual Hiring Rate						0.387***
						(0.107)
Log(Market Cap.)	0.036**	0.030**	0.021	0.022	0.023*	0.031**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Cash-to-Assets	0.080	0.079	0.091*	0.090	0.089	0.080
	(0.056)	(0.056)	(0.055)	(0.055)	(0.055)	(0.055)
ROA	-0.110**	-0.130***	-0.119***	-0.111**	-0.108**	-0.112**
	(0.044)	(0.045)	(0.043)	(0.044)	(0.044)	(0.045)
Market-to-Book	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Leverage	0.004	0.012	-0.004	-0.004	0.000	0.007
	(0.046)	(0.046)	(0.047)	(0.047)	(0.047)	(0.046)
Sales Growth	0.000**	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Labor Market Competition	-0.064	0.261	0.022	-0.157	-0.076	0.176
	(0.324)	(0.313)	(0.313)	(0.317)	(0.304)	(0.318)
Product Market Competition	0.023***	0.023***	0.022***	0.022***	0.022***	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Institutional Ownership	-0.105	-0.112*	-0.113*	-0.110	-0.111*	-0.108
	(0.066)	(0.067)	(0.067)	(0.067)	(0.067)	(0.068)
Analyst Following	-0.000	0.000	-0.001	-0.001	-0.001	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Flesch Reading Ease	-0.002	-0.003	-0.002	-0.002	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,329	15,329	15,329	15,329	15,329	15,329
Pseudo R^2	0.391	0.391	0.391	0.391	0.392	0.391

Table 7. SEC Rule Change 2005

This table presents Poisson regression estimates of attract and retain (A&R) sentences around the 2005 SEC disclosure rule change over the period of 2003-2006. The *Post* variable takes the value of one for years where the SEC risk disclosure was intact, 2005-2006. *Treated* is an indicator variable if the firm had abnormally low human capital disclosure, as determined by the previous determinants model. Additional variable definitions can be found in Appendix B. We include firm and year fixed effects (FE) as denoted below the coefficient estimates. Standard errors are clustered at the firm level and included in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)
	Attract and Retain Sentences (t+1)		
Post	0.182***		
	(0.024)		
Post × Treated		0.283**	
		(0.137)	
Post × Ex-ante A&R Disclosure			-0.095***
			(0.014)
Post × Log(Market Cap.)			-0.000
			(0.000)
Post × Cash-to-Assets			-0.076
			(0.105)
Post × ROA			0.020
			(0.062)
Post × Market-to-Book			0.002
			(0.006)
Post × Leverage			0.041
			(0.111)
Post × Sales Growth			-0.000*
			(0.000)
Post × Labor Market Competition			1.298
			(0.963)
Post × Product Market Competition			-0.007
			(0.008)
Post × Institutional Ownership			-0.019
			(0.092)
Post × Analyst Following			0.001
			(0.005)
Post × Flesch Reading Ease			-0.012
			(0.008)
Post × Employee Tenure			0.025
			(0.019)
Post × High-Skill Workers			-0.127
			(0.161)
Firm FE	Yes	Yes	Yes
Year FE	No	Yes	Yes
Observations	2,275	2,275	2,275
Pseudo R^2	0.382	0.386	0.403

Table 8. SEC Rule Change 2020

This table presents Poisson regression estimates of attract and retain (A&R) sentences around the 2020 SEC disclosure rule change over the period of 2018-2021. The *Post* variable takes the value of one for years where the SEC disclosure rule was in place, specifically 2021. *Treated* is an indicator variable if the firm had abnormally low human capital disclosure, as determined by the previous determinants model. Because our human capital measures stop in 2016, abnormal measures are captured for the years 2015 and 2016. Additional variable definitions can be found in Appendix B. We include firm and year fixed effects (FE) as denoted below the coefficient estimates. Standard errors are clustered at the firm and included in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)
	Attract and Retain Sentences (t+1)		
Post	0.345***		
	(0.017)		
Post × Treated		0.239***	
		(0.034)	
Post × Ex-ante A&R Disclosure			-0.045***
			(0.004)
Post × Log(Market Cap.)			0.000
			(0.000)
Post × Cash-to-Assets			0.047
			(0.099)
Post × ROA			-0.032
			(0.110)
Post × Market-to-Book			0.006***
			(0.002)
Post × Leverage			0.061
			(0.077)
Post × Sales Growth			-0.000
			(0.000)
Post × Labor Market Competition			-1.168
			(0.759)
Post × Product Market Competition			-0.008
			(0.005)
Post × Institutional Ownership			0.077
			(0.068)
Post × Analyst Following			0.004*
			(0.002)
Post × Flesch Reading Ease			0.002
			(0.006)
Post × Employee Tenure			0.002
			(0.008)
Post × High-Skill Workers			0.095
			(0.100)
Firm FE	Yes	Yes	Yes
Year FE	No	Yes	Yes
Observations	2,290	2,290	2,290
Pseudo R^2	0.392	0.395	0.401

Table 9. SEC Rule Changes and Human Capital Disclosure

This table presents Poisson regression estimates of human capital disclosure around SEC rules changes. For these tests, the dependent variable is the aggregate number of human capital disclosure sentences. Column (1) presents tests for the full sample. In Columns (2) and (3), we examine the 2005 SEC rule change for the subsample period 2003 to 2006. For these tests, the *post* variable takes the value of one for years where the SEC risk disclosure was intact, 2005-2006. In Columns (4) and (5), we examine the subsample period 2018 to 2021, where the variable *post* equals 1 for disclosures in 2021. *Treated* is an indicator variable that equals 1 if the firm had abnormally low human capital disclosure, as determined by the previous determinants model, prior to the rule change. Additional variable definitions can be found in Appendix B. Controls are included in column (1) analysis but omitted from the table for brevity. We include firm and year fixed effects (FE) as denoted below the coefficient estimates. Standard errors are clustered at the firm level and included in parentheses, except column (1) which is double-clustered at the firm and year levels. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	Aggregate Human Capital Topic Disclosure (t+1)				
Separation Rate	0.296**				
	(0.120)				
Hiring Rate	-0.054				
	(0.114)				
Employee Tenure	-0.028**				
	(0.013)				
Post		0.193***		0.196***	
		(0.014)		(0.010)	
Post × Treated			0.114		0.076**
			(0.094)		(0.030)
Sample	Full	2003-2006	2003-2006	2018-2021	2018-2021
Controls	Yes	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No	Yes
Observations	15,304	9,370	7,047	6,553	2,493
Pseudo R^2	0.602	0.674	0.672	0.726	0.685

Appendix A: Additional Figures and Tables

Table A1. Correlation Matrix of Human Capital Measures

This table presents the correlation coefficients of our measures of human capital. For this table, each measure is calculated at the annual level. Variable definitions can be found in Appendix B.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Employee Tenure	Separation Rate	Hiring Rate	Predicted Separation Rate	Residual Separation Rate	Predicted Hiring Rate	Residual Hiring Rate	Attract & Retain Sentences	Aggregate Human Capital Topic Disclosure
Employee Tenure	1.00								
Separation Rate	-0.37	1.00							
Hire Rate	-0.65	0.11	1.00						
Predicted Separation Rate	-0.42	0.55	0.30	1.00					
Residual Separation Rate	-0.20	0.88	-0.03	0.11	1.00				
Predicted Hiring Rate	-0.54	0.25	0.62	0.50	0.03	1.00			
Residual Hiring Rate	-0.43	-0.04	0.82	0.02	-0.06	0.08	1.00		
Attract & Retain Sentences	-0.23	0.14	0.13	0.19	0.07	0.12	0.08	1.00	
Aggregate Human Capital Topic Disclosure	-0.06	0.08	0.02	0.08	0.05	-0.03	0.04	0.56	1.00

Appendix B: Variable Definitions

Variable	Definition
Disclosure	
Employee words	Count of words describing employees in 10-K
Employee paragraphs	Count of paragraphs describing employees in 10-K
Attract & retain sentences	Count of "attract and retain" (A&R) employee sentences in 10-K
Human capital	
Separation rate	Number of separations divided by number of employees in prior year
Hiring rate	Number of new hires divided by number of employees in prior year
Predicted rate	Firm average of individual-level predicted separation or hiring rates
Residual rate	Firm average of actual minus predicted values of separation or hiring rates
Employee tenure	Firm average of the number of years employee has worked at the company
High-skill workers	Workers with occupations in BLS Job Zone 4 or 5, divided by total number of em
Firm	
Market Capitalization	Shares outstanding times price 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	Average growth in total sales over the prior quarter
Determinants	
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
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
SASB labor indicator	Equals 1 if SASB considers HCD material to a firm's indsutry; else 0
Manager forecasts count	Count of management earnings or sales forecasts during the year
Manager forecasts indicator	Equals 1 if managers provide a sales or earnings forecast; else 0
Flesch reading ease	The Flesch readability ease index value for the 10-K filing
Coleman readability	The Coleman readability ease index value for the 10-K filing
Takeover delays	Count of takeover delay provisions from Dey and White (2021)
E-index	Entrenchment index value from Bebchuk et al. (2009)

Appendix C: Construction of Attract and Retain Measures

1. Isolate any paragraph with any "employee"-related word from each firm's 10-k over the period 2001-2021 (List 1 in main text)
2. Further isolate any paragraph which contains "attract" (not "attractive" or "attraction"), "retain", or some combination of "A + B":
    - A&R words (A): attract, retain, recruit, hire, hiring, turnover
        - Exclude if the next word is: supplier, client, customer, contract, creditor, business, segment, subscriber, right
    - Employee-related words (B): employee, personnel, talent, team member, worker, labor, workforce
3. Break the paragraph into sentences
4. Remove duplicate sentences across entirety of the 10-k disclosure
5. Repeat the initial process (step 2) at the sentence level. We require the sentence to contain at least one word from (A), still excluding non-employee related words, and at least one word from (B).
6. Verify attract and retain are being used in the right way
7. Aggregate the count over the entirety of the 10-k to the firm-year level.

Appendix D: Detailed Data Description of Emsi Data

In this section we describe the data obtained through Economic Modeling Specialists Inc (Emsi), as well as provide additional details on how we utilize the data. Emsi provides a host of services to recruiters, colleges, and job seekers. Emsi recently merged with Burning Glass Technologies to form a new company, Emsi Burning Glass. Emsi uses a blend of public and proprietary data from a third-party data aggregator to create a database of individual-level data. The data is constructed from self-reported online resumes and other public information. Individual level data is cleaned and anonymized.

The data set is comprised of three main data sets: (1) history of all occupations, (2) education history, and (3) location histories. 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.

In terms of the job history, the data contains information on the start date, end date, company name, and title pulled from the resumes. Emsi performs a cleaning to create consistency for company names and titles. Moreover, the company runs a statistical analysis to classify jobs into O*NET codes, an 8-digit occupational code that classifies jobs into approximately one thousand unique occupations. These O*NET codes can be merged with data provied BLS to capture various occupational features such as activities, skills, and activities. Moreover, it allows the user to merge in the wage distribution data from the MSA-year-occupation level. Emsi's cleaning program also classifies the firm into a NAICS industry code.

In terms of their educational history, Emsi 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 Satistics (NCES).

Finally, location histories contain the last known location of the individual. This allows us to observe where the individual was last working. We independently use this information to determine the most common location of firms. Using the name, location, and industry we create a fuzzy

match to match firms with public companies. We create strict filters and verify all matches. Our conservative approach may limit the number of matched firms but guarantees that we have a correct match across Compustat and Emsi.