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The impact of non-financial disclosure on labor investment: International evidence

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ABSTRACT

This study examines the impact of non-financial disclosure (NFD) on firms' labor investment efficiency. We analyze a broad sample of firms located across 44 countries and the period 2006–2019. Using regression analysis, the association between abnormal employment growth and environmental, social and governance (ESG) disclosure volume is evaluated. Preliminary evidence reveals that this association is, in general, negative, with NFD exerting a positive influence on labor investment efficiency. Importantly, we also find that the country's institutional and legal background modulates the association, in that the link is markedly stronger in countries with higher-quality investor protection, rule of law and anti-self-dealing devices. Finally, we document stronger effects of ESG disclosure in countries featuring higher labor market rigidities and unionization rates, even after controlling for the country institutional and legal background.

1. Introduction

Does the disclosure of non-financial information (NFD) affect labor market efficiency and firms' employment decisions? Do cross-country institutional factors shape such impact? This study addresses these research questions. The growing interest of shareholders and other firms' stakeholders in corporate social responsibility (CSR) issues has spurred the demand for environmental, social and governance (ESG) information.[1] At the same time, policymakers and regulators enacted new recommendations and regulations to force firms to produce and release a greater volume of non-financial information. The truth is that NFD is presently gaining enormous momentum as the growing number of firms already releasing such information reveals. A report by KPMG (2020) shows that 80% of 5200 leading companies (the 100 largest companies in 52 countries) release ESG reports. This proportion has increased steadily over time (73% in 2017), fueled by the rapid expansion in emerging markets and mandatory disclosure in some jurisdictions.

One important issue pertaining to these trends concerns the economic and financial consequences of NFD, which are still poorly understood by researchers and policymakers. In fact, a recent literature survey by Christensen, Hail, and Leuz (2019) urges the need to develop our understanding regarding the effects of NFD on financial and economic variables, with a view to informing the current debate about the benefits and disadvantages of mandatory reporting and worldwide standardization. The taxonomy and evaluation criteria, as well as the information included in mandatory reporting, are still under an intense debate among regulators, policymakers and the financial industry.[2]

Previous research concluded that transparency and reporting by firms could produce real effects on the economy. Several authors document a positive effect of financial disclosure on both firms' capital investments (Biddle, Hilary, & Verdi, 2009; Biddle & Hilary, 2006; Kanagaretnam, Kong, & Tsang, 2020) and employment decisions. The rationale behind these studies is that financial disclosure reduces market frictions, such as agency conflicts and information asymmetry, that constrain a firm's investment. However, it remains unsettled as to

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[1] Surveys conducted with shareholders, financial intermediaries, analysts, academics, and review organizations suggest that NFD conditions the decision-making process of market participants (Clarkson, Li, & Richardson, 2004; Hughes, 2000; Konar & Cohen, 2001; Solomon & Solomon, 2006).

[2] The European Commission led this process while approving mandatory NFD for large firms and financial services.

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whether those prior conclusions for financial reporting also apply to NFD, as this topic has been overlooked by the literature.

As opposed to financial reporting, studies discussing the effects of NFD on employment-related decisions are scant. Our work attempts to fill this gap by investigating links between NFD and employment decisions and exploring the role of a country's institutional background in such an association. In essence, there are reasons to believe that country-level characteristics, such as investor protection and the rule of law, weigh on the impact of NFD on labor outcomes. The guidance from theoretical research is ambiguous, and two opposing views emerge concerning the impact of firm-level governance and disclosure practices on real outcomes when the institutional background is poor.

One side stresses that countries with high-quality institutional frameworks are better positioned to take advantage of firm-level disclosure, as more effective legal infrastructures make it economically feasible to abide by good governance principles. Doidge, Karolyi, and Stulz (2007) argue that the country's institutional system frames firm-level attributes adopted by the firm, as it influences the net benefits of implementing good standards. The other side echoes that stronger and well-disciplined firm-level corporate governance could be more useful when legal systems are ineffective, the regulatory framework is poorer and investor rights are weak and badly enforced (Chen, Chen, & Wei, 2009; Denis & McConnell, 2003; Durnev & Kim, 2005). The bottom line is that in such countries, minority investors cannot rely on the country's institutions to discourage the self-interest behaviors of insiders. Along these lines, firm-level good governance and high-quality disclosure standards bound the self-interest behavior of managers and controlling shareholders when the legal system is weak.

In addition to the country legal infrastructures, we also consider labor market rigidities in the analysis. Unionization and labor market rigidities add important friction to firms' operations and could exacerbate the effects of agency conflicts and information asymmetry on investment. By reducing operating flexibility, unions can increase the systematic risk and cost of equity (subsequently leading to cuts in investment rates). Unions make wages sticky and layoffs costly, thereby elevating firms' operating leverage and making the adjustment of firms' employment more costly; moreover, they often interfere in firms' restructurings, thereby raising the cost of adjustment of physical capital stock.[3] Other labor market rigidities emanate from a country's laws and regulations (e.g., the difficulty of firing, the rigidity of hours, redundancy rules, layoff costs and redundancy costs). As labor market rigidities and unionization rates vary appreciably across countries, a cross-country analysis of the impact of NFD on labor investment efficiency is worthwhile. Drawing on the results from prior literature, we anticipate that countries featuring greater labor market frictions accrue more benefits from NFD compared to others.

To gather international evidence regarding the impact of NFD on labor outcomes, we assess a sample covering listed firms from 44 countries and the time span of 2006–2019. The analysis of this rich global dataset allows us to go beyond previous literature and gauge whether the association between the variables is shaped by country institutional and legal factors, as well as labor market rigidities. Labor investment inefficiency is the main dependent variable of our panel data regression models. As this variable is not directly observed, prior research is followed by defining it as the absolute difference between actual net hiring and the optimal level of employment growth justified by economic fundamentals (Pinnuck & Lillis, 2007). The explanatory variable of interest is ESG disclosure, which is retrieved by Bloomberg. This firm-level score represents the volume and completeness of NFD. Investors and academics broadly utilize Bloomberg's ESG disclosure score to capture the extensiveness and scope of reporting regarding ESG issues (Eccles, Serafeim, & Krzus, 2011), labelling this variable as a direct and reliable proxy for firms' transparency and accountability in NFD.

In the baseline model, abnormal labor investment is regressed against the lag of the proxy for ESG disclosure volume ($ESGDQ_{i,t-1}$), and a set of control variables used in prior research. Unobserved heterogeneity and period effects are ruled out by adding country, industry, and year fixed effects in the econometric specification. In a preliminary stage, the baseline regression is run using the full sample of countries. Remarkably, the point estimate on $ESGDQ_{i,t-1}$ is negative and statistically meaningful, implying that NFD curbs inefficiency in labor investment. Numerically, one standard deviation of *ESGDQ* reduces the proxy for abnormal net hiring by 1.8 percentage points (the average of abnormal net hiring stands at 10.5%).

Sample partitions are carried out using the rule of law, anti-self-dealing and investor protection as grouping variables to gain further insight into the role of the country's institutional background in the results.[4] Lower scores in these variables imply that managers can act more opportunistically and be self-interested at the expense of outside investors' wealth (e.g., they may divert funds from the firm more easily, or they face lower restrictions and penalties for misconduct). The baseline regression model is run separately on each subsample. Interestingly, we find that ESG disclosure curbs labor investment inefficiency in countries featuring above-median rule of law and investor protection but not in other countries. As for anti-self-dealing, a negative effect of ESG disclosure on labor investment inefficiency is found, irrespective of the partition considered. Still, the association is markedly stronger in countries with above-median anti-self-dealing scores. These results constitute the first piece of evidence showing the importance of a country's institutions in shaping the impact of NFD on economic outcomes.

Put simply, the benefits of NFD are underpinned by the quality of the institutional background. Labor market rigidity and unionization rates at the country level are also included in the analysis. Both variables are obtained from the World Bank and related institutions. While the unionization rate is a raw proxy for labor market frictions, the labor market rigidity index is a synthetic score that aggregates different information about the difficulty of hiring and firing, as well as associated costs. As expected, our inferences suggest a stronger impact of NFD on labor investment inefficiency in countries featuring higher labor market rigidity. Although this interaction effect is stronger when a high-quality institutional framework exists, it is also noticeable when that framework is poorer. These conclusions are aligned with Jung, Lee, and Weber (2014), who show that accounting quality moderates the negative effects of unionized labor on net hiring efficiency.

Finally, we assess the joint impact of NFD and country labor market frictions on both underinvestment and overinvestment in labor. We find stronger effects of NFD on overinvestment vis-à-vis underinvestment in countries with high-quality institutions, which is consistent with the reasoning of NFD producing effects by curtailing agency issues in these countries, and to a lesser extent by mitigating financial constraints. The reverse occurs in countries with poor institutional backgrounds, where the main effects lie in the reduction of adverse selection and underinvestment.

Overall, these conclusions add to others suggesting that NFD could drive superior corporate financial performance (Chen & Xie, 2022; Xie,

[3] Atanassov and Kim (2009) stress that worker-management alliances accentuate agency conflicts when investor protection is weak and union laws are powerful, concluding that strong union laws protect both workers and underperforming managers. Also, at the country level, Pagano and Volpin (2005b, 2005a) suggest that political alliances between workers and entrenched managers (or controlling shareholders) may emerge in countries with weak investor protection, hampering the interests of minority shareholders.

[4] These cross-country variables were found to be of paramount importance in studies by La Porta et al. (2002, 2006) and Djankov et al. (2008) as they affect financial and economic variables, such as equity valuation, access to finance and ownership dispersion.

Nozawa, Yagi, Fujii, & Managi, 2019). We go beyond those studies by pinpointing employment as a specific channel via which NFD matters for corporate outcomes. On the one hand, labor expenses represent a significant portion of firm costs. On the other hand, labor is a source of competitive advantages and central to a firm's success (Pfeffer, 1994). From a macro perspective, labor plays a prominent role in resource allocation, accounting for a large fraction of GDPs.

Our research makes several important contributions to the literature. To our knowledge, this study is one of the few, if not the first, to address the interplay between firm-level NFD and country-level institutional background and their joint impact on allocation efficiency. This assessment also advances our knowledge on the broader topic pertaining to the link between firm-level disclosure strategies, labor market rigidities and employment decisions. Lastly, we extend the growing literature that relates corporate finance and labor market outcomes (Gu, Ni, & Tian, 2022; Khedmati, Sualihu, & Yawson, 2020; Rezaei, Taghizadeh, Sadeghzadeh Maharlui, & Zeraatgari, 2022; Sualihu, Rankin, & Haman, 2021) by showing that NFD plays a role in enhancing labor investment efficiency and lessening adverse effects caused by labor market frictions. Although there is already some research on the association between investment efficiency and unionization, no studies address the international dimension of this phenomena. This makes our assessment timely and unique at this point.

The remainder of the study is set out as follows. Section 2 develops the research hypotheses; Section 3 depicts the sample and data sources. Section 4 sets forth the methodology and presents summary statistics. Results are reported and discussed in Section 5; Section 6 presents the conclusions, the main limitations of the study and avenues for future research.

2. Related literature and research hypotheses

ESG has moved to the top of the present-day business agenda. Currently, firms are encouraged to strike a balance between profitability and social good, whereby investment decisions are driven by social and environmental considerations, in addition to financial performance. Consequently, the demand for non-financial information by shareholders and other stakeholders has risen. The economic consequences of NFD are not well understood by researchers and policymakers (Christensen et al., 2019), so further evidence is necessary to inform ongoing debates about the implementation of mandatory NFD or worldwide standardization of reporting. This study adds to this stream of research by investigating the impact of NFD on employment decisions, and the role of country factors on the magnitude of the effects.

2.1. Information asymmetry, disclosure, and investment decisions

There is consensus in the literature that transparency and information disclosure can change a firm's investment behavior and produce real effects (Leuz & Wysocki, 2016). On the one hand, disclosure curbs adverse selection and agency costs, enhancing investment efficiency (Biddle & Hilary, 2006; McNichols & Stubben, 2008; Shroff, Verdi, & Yu, 2014). Contractual implications for managerial compensation or debt agreements linked to reporting alter a firm's investment policies and spending behavior (Choudhary, Rajgopal, & Venkatachalam, 2009; Dukes, Dyckman, & Elliott, 1980; Hayes, Lemmon, & Qiu, 2012; Holthausen & Leftwich, 1983). On the other hand, managers could learn from peer reporting and use that knowledge for benchmarking and adjusting investment policies (Beatty, Liao, & Yu, 2013; Shroff, 2017).

If capital markets were perfect and frictionless, financial policies would not affect investment decisions (Modigliani & Miller, 1958). This implies that a project is always accepted if marginal benefits equal or exceed marginal costs. Yet, capital markets' imperfections (e.g., information asymmetry and moral hazard) stoke investment inefficiencies (Hubbard, 1998; Stein, 2003). On the one hand, managers' opportunistic and self-interested behavior gives rise to overinvestment and empire building (Jensen & Meckling, 1976), in which managers scale up a firm's size beyond optimal level to conserve or increase private benefits stemming from compensation, power, or prestige. Such agency conflicts are amplified by the costs or incapacity of monitoring the activities of corporate insiders. Moral hazard influences investment in physical capital, as well as employment decisions.[5] The expansion of the workforce above the optimum level (overhiring) is an illustration of managers' opportunistic behavior in which they pursue security and power (Williamson, 1963). Managers may also retain (underfire) poorly performing employees if that decision brings them private benefits[6] or there is a reluctance to make hard decisions, such as downsizing operations and reduction of an unproductive workforce (Bertrand & Mullainathan, 2003).

On the other hand, adverse selection may cause underinvestment due to higher financing costs. Myers and Majluf (1984) and Fazzari, Hubbard, and Petersen (1988) show that the cost of capital required by outside investors increases when managers try to exploit their information advantage (a "lemons problem"). Underinvestment may also arise if outside capital suppliers internalize the potential for agency conflicts and price-protect themselves accordingly by raising the cost of capital. Either way, the rising cost of capital prompts the rejection of projects that otherwise would be accepted. The financing channel can affect employment because fixed costs related to labor – hiring, severance pay, training and firing – that require financing are involved. Risk or effort aversion, managers' "preference for a quiet life" (Bertrand & Mullainathan, 2003; Hölmstrom, 1979) and managerial myopia (Stein, 2003) could also dictate underinvestment.

A strand of the literature stresses that the detrimental effects of capital market imperfections are alleviated through high-quality financial disclosure (Bushman & Smith, 2001; Healy & Palepu, 2001; Lambert, Leuz, & Verrecchia, 2007), which enables a more effective monitoring of managers' activities and improves contracting between stakeholders. Accordingly, financial reporting prevents moral hazard – e.g., empire building activities by self-interested managers – and curbs adverse selection, pushing overall investment toward optimal levels. Empirical research attests to this view: Biddle and Hilary (2006), McNichols and Stubben (2008) and Biddle et al. (2009), inter alia, show that capital investment efficiency climbs along with the quality of financial reporting, and Bushman, Smith, and Wittenberg-Moerman (2010) highlight the role of a more timely accounting recognition of economic losses in disciplining managers and as a tool to avoid bad projects. Regarding employment, Jung et al. (2014) and Ha and Feng (2018) show that labor investment inefficiency decreases with accounting quality and conservatism, respectively.

2.2. The impact of NFD on labor decisions

There is consensus in the literature regarding the impact of financial reporting on investment efficiency. Yet, a gap subsists on whether those benefits also apply to NFD (e.g., information on board composition, carbon emission, welfares, relationships with stakeholders and

[5] Still, there are differences between capital expenditures and employment. First, labor expenses are fundamentally variable costs of production. Thus, smaller market frictions may be adjusted at a very low cost when compared to capital expenditures (Dixit, Dixit, Pindyck, & Pindyck, 1994). Second, as abnormal employment growth is more easily reverted to the optimal level than capital investment, managers have more discretion in employment decisions than in capital expenditures.

[6] Workers and management may create alliances at the expense of shareholders. Pagano and Volpin (2005a) show that when there is the risk of dismissal because of poor performance, top management and employees may create alliances to avoid large-scale layoffs and wage cuts. In return, managers gain workers' support. Landier, Nair, and Wulf (2007) report private benefits resulting from the CEO's interaction with workers and communities close to the corporate headquarters.

communities, etc.). NFD could reveal insights of a firm's operations and CSR-related activities that are not available in the financial statements (Brown, Helland, & Smith, 2006; Sharfman & Fernando, 2008). Information focusing firms' long-term development strategies and sustainability is not typically released in traditional reporting, although it could provide forward-looking guidance about the future growth of cash flows and risks (Kim, Park, & Wier, 2012a; Moser & Martin, 2012). To illustrate this view, Lev, Petrovits, and Radhakrishnan (2010) argue that NFD information can signal revenue prospects – and therefore, future investment in markets where consumers care about sustainability.

Likewise, non-financial information may help identify a firm's risk profile (e.g., potential unbooked liabilities, and revenues and costs without lasting economic benefits). This is consistent with anecdotal evidence that NFD is used by capital market participants as a risk-screening tool (Amel-Zadeh & Serafeim, 2018) or to assess management quality (Eccles et al., 2011; Goldman Sachs, 2009). NFD complements financial reporting by focusing on areas and stakeholders that the firm recognize as part of its overall strategy (Chen & Roberts, 2010). Du and Yu (2021) and Adams (2004) stress that some stakeholders help build intangible assets (e.g., brand value, customers' satisfaction and loyalty, and quality of human resources) that ultimately determine a firm's success. Therefore, in-depth knowledge about policies and practices of the firm involving these stakeholders is of paramount importance in understanding value creation.

There is substantial empirical evidence showing that NFD is value relevant, that it matters for investors and other stakeholders, and conveys incremental information relative to financial reporting (Du & Yu, 2021; Serafeim & Yoon, 2022).[7] NFD offers additional elements to external audiences to gauge how profits were obtained and how stakeholders contributed to value creation (Vurro & Perrini, 2011). Thus, shareholders and other stakeholders can develop a better understanding of a firm's value drivers with NFD (Aureli, Gigli, Medei, & Supino, 2020; Cuadrado-Ballesteros, Garcia-Sanchez, & Ferrero, 2016). If CSR practices/policies can improve firm profitability (Hasan, Kobeissi, Liu, & Wang, 2018; Khan, Serafeim, & Yoon, 2016; Lins, Servaes, & Tamayo, 2017; Margolis, Hillary, & Walsh, 2009) or if the performance on KPIs is linked to CSR performance,[8] then further information pertaining to CSR embedded in NFD will improve investors' assessments of opportunities and risks. Also meaningful is the fact that managers acknowledge benefits from preparing NFD information, as it allows them to gather and pinpoint information about risks and opportunities that they were unaware of in the past. Altogether, NFD could emerge as a monitoring tool, disincentivizing sub-optimal investment choices.

NFD could also reinforce reputation and legitimacy, help establish political connections and avoid adverse publicity (Blacconiere & Patten, 1994; Marquis & Qian, 2014; Matsumura, Prakash, & Vera-Munoz, 2014). A rise in the sense of trust with stakeholders is reached by building better communication and high-quality disclosure. NFD could signal credibility and reliability of management (Kim et al., 2012a), by promoting accountability about non-financial targets, achievements, and internal processes, and raising the level of transparency to external audiences (Hamrouni, Uyar, & Boussaada, 2020; Romero, Ruiz, & Fernandez-Feijoo, 2019). Leitoniene and Sapkauskiene (2015) add that NFD reinforces the credibility and reliability of other disclosures (e.g., financial reporting). Overall, commitment with its stakeholders results in better judgments about the firm; the resulting perception of fairness affects the extent to which financial and non-financial reporting items influence investment decisions (Brown-Liburd, Cohen, & Zamora, 2018). By gaining more investors' trust, firms alleviate financing constraints and obtain cheaper capital and better valuations (Elliott, Jackson, Peecher, & White, 2014).

From an ex ante perspective, NFD facilitates the evaluation of the firm's strategy, risk profile, and ultimately its ability to generate long-term value. In doing so, it curbs inbuilt information disadvantages and boosts valuation accuracy. Adverse selection elicits market frictions akin to financing policies which affect employment decisions. Effectively, there is a link between capital investment and employment. If capital expenditures decline via a surge in the cost of capital, underinvestment in labor is more likely. Moreover, the fixed costs in hiring, training, and firing decisions may involve direct financing. Cheng, Ioannou, and Serafeim (2014), Galbreath (2013) and Margolis and Walsh (2003) claim that transparency obtained via NFD reduces the cost of capital and financial constraints, whereas Cuadrado-Ballesteros et al. (2016), Dhaliwal, Li, Tsang, and Yang (2011) and Plumlee, Brown, Hayes, and Marshall (2015) conclude that NFD reduces information asymmetry and cost of capital. Gao, Dong, Ni, and Fu (2016) show that effects of CSR performance are compounded by higher quality NFD, namely with respect to valuations in SEOs, analyst coverage, levels of institutional ownership, stock liquidity, and cost of bond issuances.

Several studies report impacts of NFD on information asymmetry and information risk (perception of irregularities in other disseminated information). Bernardi and Stark (2018), Cui, Jo, and Na (2018), Egginton and McBrayer (2019) and Siew, Balatbat, and Carmichael (2016) find that the volume of NFD is associated with a decline in the level of opacity and an increase of equity market liquidity (via a reduction of information asymmetry). Other studies show that NFD improves analyst forecast accuracy (Dhaliwal, Radhakrishnan, Tsang, & Yang, 2012; Muslu, Mutlu, Radhakrishnan, & Tsang, 2019). Within this context, NFD emerges as a tool to mitigate the risks pertaining to limited or absent information in market transactions (García-Sánchez & Noguera-Gámez, 2017). Schiemann and Sakhel (2019) document a decline in information asymmetry for firms operating in high carbon-emitting sectors that report more (or more serious) physical risks.[9]

Ex post, NFD offers incremental information to investors regarding insiders' activities, thereby increasing accountability and reducing the perception of expropriation risk. The agency theory postulates that socially responsible activities promote lavish expenditures by managers motivated by personal benefit (e.g., public recognition), rather than the altruistic reasons of nonfinancial utility. In that sense, such expenditures could reduce shareholder value and financial performance (Barnea & Rubin, 2010). This is consistent with findings by Krüger (2015) of a negative response from investors to the announcement of socially responsible activities of firms with a high amount of liquidity, as it is regarded as wasteful investment. Cennamo, Berrone, and Gomez-Mejia (2009) argue that managers can use stakeholder considerations as a way of increasing their power (vis-à-vis shareholders) over the corporation. By the same token, ESG-related activities exhaust financial

[7] Industry surveys and reports indicate that market players use non-financial information as additional input in valuations and risk assessments. Yeldar (2012) concludes that analysts and individual investors gain in-depth knowledge of the opportunities and risks of a firm's projects with NFD. EY (2013) argue that credit rating agencies have already embedded CSR-related information into their valuation/risk models, whereas EY (2014) highlights that NFD is used by institutional investors and analysts in the appraisal of a firm's performance.

[8] From the revenues-side, high-performing CSR firms tend to display higher brand equity (Torres, Bijmolt, Tribó, & Verhoef, 2012), and greater customer satisfaction and loyalty (Ailawadi, Neslin, Luan, & Taylor, 2014; Torres et al., 2012). Likewise, these firms have advantages in attracting, motivating, and retaining talented employees (Greening & Turban, 2000; Surroca, Tribó, & Waddock, 2010; Turban & Greening, 1997), in line with the notion that CSR can bolster firm productivity (Hasan et al., 2018) and innovation (Luo & Du, 2015).

[9] Also, a tax on carbon, the implementation of emission caps and licenses or related regulation can oblige firms to make investments to curb carbon emissions, which subsequently reduces earnings in the short run and eventually over the long run. Consequently, information about a firm's exposure to carbon emissions may be value-relevant to investors and influence future investments undertaken by the firm.

resources that could be used in profitable investments. In a similar fashion, labor-friendly practices can be used by insiders to promote their own goals at the expense of outside shareholders. Some labor friendly policies can create an entrenched management-friendly workforce that disregards managerial excesses and impairs managerial discipline, e.g., by supporting the insiders in takeovers, proxy contests and other corporate control events (Pagano & Volpin, 2005a; 2005b).

In the context of the agency theory paradigm, transparency obtained via NFD lessens the information gap and curbs the opportunistic behavior of insiders (Cho, Lee, & Pfeiffer, 2013). Lu, Shailer, and Yu (2017) show that NFD mitigates value destruction by opportunistic actions of insiders. Specifically, the issuance of a standalone CSR report raises the marginal value of cash holdings, particularly in less transparent information environments and where external monitoring is weaker. Christensen (2016) argues that NFD changes managers' conduct, increasing their effort in the sense that "what gets measured, gets managed".[10] Dai, Gao, Lisic, and Zhang (2023) establish an association between NFD and CEOs' labor market potential. Christensen, Floyd, Liu, and Maffett (2017) conclude that NFD improves operational management, while showing that employee-related injuries decreased between 12% and 16% after the Securities and Exchange Commission (SEC) required mining firms to report mine-safety records. Relatedly, Dube and Zhu (2021) infer that NFD creates public awareness resulting in real-world effects for stakeholders.

In sum, there are several arguments in favor of a positive effect of NFD on labor investment efficiency. As with financial reporting, firms are expected to change their behavior whenever stakeholders use the newly disclosed information to exert meaningful pressure on firms. Managers may adjust their conduct with respect to overinvestment, entrenchment, and empire building if investors can monitor their actions more closely with the new information available.[11] Previous research has underscored a decline in adverse selection with NFD, so that cheaper funding to finance fixed costs relative to hiring, training, and firing decisions, inter alia, is available. Given the above, we formulate the following first research hypothesis:

RQ1. NFD augments labor investment efficiency.

2.3. The role of country institutional factors

We take a step forward by assessing the potential effects of country-specific factors on the association between NFD and labor investment. The bottom line is that countries diverge in many respects, including political, institutional, and legal frameworks, economic development, levels of corruption, and culture, and such differences may weigh on the impact of NFD on labor investment.[12] Prior research has emphasized that the impact of firm-level attributes (e.g., governance, disclosure quality, etc.) on financial variables is framed by those country factors. Ball, Kothari, and Robin (2000), Ball, Robin, and Wu (2003), Doidge et al. (2007), da Silva (2022) and Berkowitz, Pistor, and Richard (2003), inter alia, claim that the adoption of firm-level good practices generates sharper impacts in countries with strong institutional infrastructures. This is consistent with the reasoning that the adoption of higher-quality accounting standards is insufficient to enhance the quality of (accounting) information unless the enforcement mechanisms of a country work properly (Christensen, Hail, & Leuz, 2016) or firms have incentives to voluntarily release higher-quality information to the market (Ball et al., 2000).

In a literature survey, Bushman and Landsman (2010) conclude that the significant cross-country variation in regulatory regimes affects the properties of reported accounting numbers, whereas Bushman, Piotroski, and Smith (2004b) find that firm-level governance transparency is primarily related to a country's legal/judicial regime. Lang, Raedy, and Wilson (2006) document more earnings management among non-US cross-listed firms from countries with weaker investor protection, suggesting that US regulation does not supplant the effect of the local environment. Leuz, Nanda, and Wysocki (2003) predict a negative association between earnings management and investor protection because strong protection curbs insiders' capacity to acquire private control benefits, reducing incentives to mask firm performance. Bushman and Piotroski (2006), Hope (2003) and Burgstahler, Hail, and Leuz (2006) show that firm-level reporting incentives and country legal factors are self-reinforcing. Overall, these studies question the existence of a positive effect of firm-level adoption of good governance and reporting practices without supporting institutional infrastructures.

Without prejudice, the benefits of NFD, such as improvement in control mechanisms and mitigation of adverse selection, can be less evident in emerging markets due to the weak institutional setting, but not muted. In effect, another strand of research claims that firm-level practices prompt desirable economic consequences even without a good institutional background because country- and firm-level governance mechanisms are substitutes or independent (Durnev & Kim, 2005; Francis, Khurana, & Pereira, 2005). Lel and Miller (2008) document stronger effects of bonding by US listing for firms in countries with the weakest investor protection framework. Firms in these countries are likely to go further in NFD by adopting reporting guidelines, assurances, and so on, so that NFD becomes a comparatively relevant element of information in decision-making.

In view of the above, our second research hypothesis is as follows:

RQ2. Country legal and institutional factors weigh on the association between NFD and labor investment efficiency.

2.4. The role of labor rigidities

Probing deeper into social and political dimensions, unionization and labor market rigidity are also considered in the assessment. In fact, labor-unionized firms and industries record lower investment rates, affecting the demand for labor (Baldwin, 1983; Grout, 1984; Krol & Svorny, 2007). In Jensen and Meckling (1976) and Montgomery (1989), entrenched employees or unions capture excessive rents and deplete resources that would otherwise be utilized to boost employment. Collective bargaining agreements raise the rigidity of employees' compensation and the cost of layoffs. Serfling (2016) indicates that employee firing costs can exert an influence on corporate financial policy decisions, whereas Chen, Kacperczyk, and Ortiz-Molina (2011) claim that collective bargaining agreements can decrease managers' flexibility to make tough decisions. These rigidity sources raise the operating risk for labor; if firms anticipate higher costs for hiring and firing, they will decrease employment (Hamermesh, 1989).

In keeping with this, Guo, Tang, and Jin (2021) find that raising labor protection lessens the efficiency of employment growth in labor-intensive enterprises in China, whereas Bai, Fairhurst, and Serfling (2020) report that greater employment protection discourages investment by making projects more irreversible. In contrast, Cao and Rees

[10] He documents a 24.8% decline in the rate of high-profile misconduct when managers report on their corporate accountability activities, which conforms to the relevance of the reporting process in bolstering operations and risk management quality.

[11] Investors can better scrutinize managerial behavior and exert discipline by (the threat of) selling shares or, more directly, through shareholder votes and activism.

[12] Pagano and Volpin (2005b) contend that weak country-level protection of minority investors promotes political alliances between workers and controlling shareholders, harming minority shareholders. Pagano and Volpin (2005a) find that a similar alliance may arise between entrenched managers and employees at the expense of shareholders. Atanassov and Kim (2009) stress that worker-management alliances accentuate agency conflicts when investor protection is weak and union laws are powerful. Weak investor protection, coupled with strong union laws, favors worker–management alliances that protect both workers and underperforming managers.

(2020) show that employee-friendly treatment enhances labor investment efficiency, whereas Stuebs & Sun (2010) find that reputation achieved via NFD raises labor efficiency and productivity.

The role of unionization as a determinant of labor investment inefficiency at the industry level is emphasized by Jung et al. (2014) and Ben-Nasr and Alshwer (2016). Hilary (2006) finds a positive link between organized labor and information asymmetry, concluding that the presence of unionized labor forces management to conceal information to weaken unions' bargaining power (Frost, 2000; Kleiner & Bouillon, 1988; Scott, 1994). Jung et al. (2014) present evidence that accounting quality moderates the negative effects of unionized labor on net hiring efficiency for firms in good financial health. Non-financial information could improve the ability of outsiders to monitor insiders, and hence boost labor efficiency. However, the impact could be the opposite if it raises the union's bargaining power and forces managers to make further concessions that amplify labor rigidity.

Drawing on the above, we formulate our last research hypothesis as follows:

RQ3. Labor rigidity weighs on the association between NFD and labor investment efficiency.

Next, we proceed with the description of the sample.

3. Sample and data sources

This assessment uses data from various sources. The volume of ESG disclosure is retrieved from Bloomberg, whereas stock prices, returns and trading volumes are assembled from Datastream. Financial and accounting data are collected from Worldscope, whereas analyst coverage is gathered from I/B/E/S. CSR/sustainability performance metrics are provided by Refinitiv/ASSET4.

The sample contains listed firms from 44 countries in the time span 2006–2019. Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Israel, Korea (South), Malaysia, Mexico, Nigeria, Pakistan, Philippines, Poland, Russian Federation, South Africa, Taiwan, Thailand, and Turkey form the group of EMDEs. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States are in the subsample of developed countries. Statistics about the number of firm-year observations for each country and filters can be found as online supplementary material.

The data from Bloomberg, Datastream/Worldscope, ASSET4 and I/B/E/S are merged into a single dataset. Several data filters are applied to the sample. Following prior research, firms in financial and utilities industries (SIC 6000–6999 and 4900–4949, respectively) are dropped from the sample, as they must comply with stricter transparency standards defined by regulators. In addition, firm-year observations with total assets worth less than 10 million USD (measured at year 2000 constant prices), negative book equity value and net losses above the previous year's book equity value are also removed. Finally, we exclude stocks with no trades in more than 50% of trading sessions in a given year.

4. Research design and methodology

4.1. Dependent variable: labor investment inefficiency

The aim of this study is to evaluate the impact of NFD on labor investment efficiency in an international context. Our first concern with the research design is that the dependent variable, labor investment efficiency, is not directly observable. To cope with this issue, we follow prior research and compute a proxy for labor investment inefficiency, which is defined as the departure of actual net hiring from optimal levels given the economic fundamentals of the firm. Specifically, we follow Pinnuck and Lillis (2007), inter alia, and estimate the optimal change in the number of employees of a firm in a given year while running the following regression:

$$NH_{i,t} = \gamma_0 + \gamma_1 \times R_{i,t} + \gamma_2 \times MVrank_{i,t-1} + \gamma_3 \times ROA_{i,t} + \gamma_4 \times QR_{i,t-1} + \gamma_5 \times LEV_{i,t-1} + \sum_{j=0}^{1} \delta_j \times SG_{i,t-j} + \sum_{j=0}^{1} \varphi_j \times \Delta ROA_{i,t-j} + \sum_{j=0}^{1} \omega_j \times \Delta QR_{i,t-j} + \sum_{j=1}^{5} \vartheta_j \times PLOSS_{i,t-1,j} + IND_{EFFECTS} + \varepsilon_{i,t} \quad [1]$$

where subscripts i and t denote firm and year, respectively. $NH_{i,t}$ refers to net hiring in year t, computed as the percent change in the number of employees; $R_{i,t}$ is the annual stock return in year t; $MVrank_{i,t-1}$ is the relative rank of the firm's market capitalization in year t-1; $ROA_{i,t}$ refers to return on assets (net profits scaled by total assets) in year t; $QR_{i,t-1}$ is the quick ratio in year t-1; $LEV_{i,t-1}$ denotes leverage in year t-1, computed as total debt divided by total assets; $SG_{i,t-j}$ corresponds to sales growth in year t-j; $PLOSS_{i,t-1,j}$ respects to piecewise binary variables that assume the value of one if $ROA_{i,t-1}$ is comprised in a specific interval from 0 to −0.005, −0.005 to −0.010, −0.01 to −0.015, −0.015 to −0.020, and −0.020 to −0.025. $\Delta ROA_{i,t-j}$ and $\Delta QR_{i,t-j}$ corresponds to the annual change in ROA and in the quick ratio, respectively in year t-j. Additionally, industry fixed effects (Fama-French 48 industries) are included in the empirical model to capture industry-specific unobserved heterogeneity.

Equation (1) is run separately by country, unless stated otherwise. Indeed, we expect the sensitivity of the optimal net hiring to the economic fundamentals to be country specific. There is cross-country heterogeneity with respect to economic and financial market structures, whereby the response of real economic variables to financial variables should vary across jurisdictions. Abnormal changes in employment ($aNH_{i,t}$), i.e., the deviation of employment growth from the optimum level, are captured by the residuals of Equation (1), where positive and negative deviations receive the same weight. The absolute value of abnormal changes ($|aNH_{i,t}|$) denotes labor investment inefficiency. A large (small) shortfall from the expected net hiring, as envisaged by fundamentals, indicates lower (higher) labor investment efficiency.

4.2. Main explanatory variable: ESG disclosure volume

The volume of ESG disclosure (*ESGDQ*) is a score computed by Bloomberg about the extent, breadth and completeness of a firm's environmental (emissions, water, waste, energy, and the environmental impact of operational policies), social (employees' security and satisfaction, quality of products and impact on communities), and governance disclosure (board structure and function, a firm's political involvement, and executive compensation). Bloomberg compiles ESG information on more than 10 000 listed firms worldwide, which is used to guide investment decisions by professional investors/the financial community (N. S. Eccles & Viviers, 2011) and in academic research (see, for example, Baldini, Maso, Liberatore, Mazzi, & Terzani, 2018).[13]

Bloomberg's data is comprehensive, standardized and collected using a consistent methodology across countries. The main score uses 100 out of 219 raw data points that Bloomberg gathers. A greater weight is assigned to the most disclosed data fields. The scoring system is

[13] ESG reporting does not follow a standardized format, thereby varying appreciably across firms, even within the same sector. Bloomberg ESG data are not estimated or derived from mathematical models, and raw points can be linked to original sources. Other providers (e.g., ASSET4 or KLD) focus on performance-oriented measures, rather than reporting metrics. Bloomberg scoring methods are aligned with the underlying concept, as opposed to other data sources whose ESG concepts used are non-consistent and do not converge (Dorfleitner, Halbritter, & Nguyen, 2015).

comprised between 100 (full disclosure) and zero (null disclosure), thereby reflecting the completeness of reporting.[14]

4.3. Baseline econometric specification

The absolute departure from optimal net hiring ($|aNH_{i,t}|$) is the dependent variable from the baseline regression model. $|aNH_{i,t}|$ is regressed against the proxy for ESG disclosure, and a set of firm-specific control variables used by prior research:

$$|aNH_{i,t}| = \alpha_0 + \alpha_1 \times ESGDQ_{i,t-1} + FIRM_{CONTROLS} + INDUSTRY_{EFFECTS} + COUNTRY_{EFFECTS} + YEAR_{EFFECTS} + \varepsilon_{i,t} \quad [2]$$

with $|aNH_{i,t}|$ and $ESGDQ_{i,t}$ as previously defined. The set of controls comprises the following variables: $SIZE_{i,t-1}$ (log of market capitalization in USD), $LEV_{i,t-1}$, $MB_{i,t-1}$ (market-to-book ratio), $NPPE_{i,t-1}$ (net plant, property and equipment scaled by total assets), $QR_{i,t-1}$, $LOSS_{i,t-1}$ (binary variable specifying whether the firm had a profit loss), $DIVP_{i,t-1}$ (binary variable specifying whether the firm paid dividends to shareholders), labor intensity – number of employees divided by total assets (USD) ($LABINT_{i,t-1}$), institutional holdings (IO_{t-1}), $CFVOL_{i,t-1}$, $SGVOL_{i,t-1}$, and $NHVOL_{i,t-1}$ (standard deviation of the past five-year cash-flow scaled by total assets, sales growth and net hiring, respectively). Industry (two-digit SIC), country and year-fixed effects are added to the regression to control for industry-specific, country-specific and time unobserved heterogeneity.

The aforementioned set of controls is extended with the inclusion of proxies for firm investment (in physical capital) inefficiency, accruals quality and CSR performance. These covariates are removed from baseline regressions because their inclusion causes a loss of observations and sample attrition. Concerning firm investment inefficiency, the approach put forward by Biddle et al. (2009) is carried out to retrieve the abnormal capital investment ($|aIE_{i,t}|$). To accomplish that, cross-sectional regressions of investment (scaled by total assets) on lagged one-year sales growth are run separately on different country-industry-year bins. A minimum of 20 observations per regression is required. For each regression, the absolute value of the residuals – which constitute the proxy for $|aIE_{i,t}|$ – are saved.

Accruals quality ($AQ_{i,t-1}$) is also included in the extended regression model. $AQ_{i,t-1}$ is obtained using the modified Jones model (Dechow, Sloan, & Sweeney, 1995). In a first stage, total accruals (scaled by beginning-of-the-year total assets) are regressed against the inverse of beginning-of-the-year total assets, variation of sales and PPE (both scaled by beginning-of-the-year total assets). Cross-sectional regressions are run by country-industry-year group provided that at least 20 observations are available. The residuals of the regressions are saved and constitute the proxy for discretionary annual accruals.[15] After that, the average of the absolute value of the annual discretionary accruals over the previous five-year period is computed. The descending relative rank of that variable within year and country groups is utilized to proxy for accruals quality (AQ).

Finally, regarding CSR performance, four proxies are considered: (i) *CSRPerf* – Refinitiv/ASSET4 CSR score (ii) *OECD* – a binary variable specifying whether a firm complies with OECD guidelines for multinational corporations, (iii) *GlobalComp*– a binary variable specifying whether a firm is a Global Compact signatory, and (iv) *UNPRI* – a binary variable specifying whether a firm is a UNPRI signatory.

As a cross-country analysis is at the core of the assessment, five country variables are also used. The first three variables are investor protection, the rule of law and an anti-self-dealing score. These are obtained from the online databases of Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), La Porta, Lopez-De-Silanes, and Shleifer (2006) and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2002). The inclusion of these three variables rests on the fact that they present a clear association (theoretical and empirical) with information asymmetry and moral hazard, based on the research by Djankov et al. (2008), La Porta et al. (2006), (2002). These countries scores relate with moral hazard issues (e.g., anti-self-dealing copes with the expropriation risk by insiders) and adverse selection (e.g., prior studies reveal that firms in countries with strong investor protection have greater disclosure and higher transparency (Bushman, Chen, Engel, & Smith, 2004a; Durnev & Kim, 2005; Hope, 2003), which curbs adverse selection). Strong legal protection of suppliers of capital improves the efficiency of capital markets, easing firms' access to external finance (Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997). The other two variables are the unionization rate at the country level (from World Bank/International Labor Organization; earlier observation in the period 2006–2009) and a labor market rigidity index ("Employing Workers Index"/Doing Business Indicators – World Bank; earlier observation in the period 2006–2009).

4.4. Summary statistics

Our sample covers around 45 271 firm-year observations (6175 firms). We winsorize all continuous variables at the 1st and 99th percentiles within country-year cells. The average net employment growth is 6.4%, but the median is 2.4%, which reveals some skewness in the empirical distribution (see Table 1). The median absolute value of abnormal net hiring is 6.2%. The average disclosure score stands at 21, but dispersion is high (interquartile range is approximately 14). The average sales growth is 10.1%, whereas the average ROA hovers around 3.9%. The average quick ratio is 1.7, whereas the median leverage is 8.4%. About 72.6% of the firms pay dividends to shareholders, whereas 16.4% present accounting losses. The average market-to-book ratio stands at 2.7, whereas the average tangibility is 29.9%. The median variabilities of net hiring, sales growth and cash flows are around 7.8%, 11.4% and 3.7%, respectively. Finally, the market capitalization of the median firm in the sample amounts to USD 862 million.

Next, we move on to the empirical analysis.

5. Empirical results

We start our investigation by running Equation (1) for each country subset of observations to obtain firms' abnormal net employment growth ($|aNH_{i,t}|$). Next, we move on to the estimation of Equation (2). Specifically, abnormal net employment growth ($|aNH_{i,t}|$) is regressed against a lag of the ESG disclosure score ($ESGDQ_{i,t-1}$) and a set of firm-level control covariates used by prior research. The set of controls includes $SIZE_{i,t-1}$, $LEV_{i,t-1}$, $MB_{i,t-1}$, $NPPE_{i,t-1}$, $QR_{i,t-1}$, $LOSS_{i,t-1}$, $DIVP_{i,t-1}$, $CFVOL_{i,t-1}$, $SGVOL_{i,t-1}$, labor intensity ($LABINT_{i,t-1}$), institutional holdings (IO_{t-1}) and $NHVOL_{i,t-1}$. For now, we exclude variables pertaining to financial reporting quality, CSR performance and physical capital investment inefficiency, as previously mentioned, because their introduction leads to a sizable loss in the number of observations. To control for unobserved group heterogeneity, industry, country, and period fixed effects are added to the model. Unless stated otherwise, heteroscedasticity-consistent standard errors clustered by firm are employed to conduct statistical inference.

[14] The scores are based on data points gathered from multiple sources, including annual reports, standalone sustainability reports, public corporate presentations and company websites. They also include data from Bloomberg proprietary surveys and the carbon disclosure project (CDP). Scores are adjusted by factoring in the most relevant data points to each industry. Cross-sector metrics are also employed. Data points are drawn from GRI, but Bloomberg uses a proprietary weighting system to weight them in terms of importance, i.e., accounting for the relative relevance of each category. See Bloomberg (2019). Bloomberg Impact Report. https://data.bloomberglp.com/company/sites/48/2019/04/Impact-Report-WEB.pdf.

[15] The standard "modification" of the Jones model entails correcting variation of sales by subtracting variation of receivables.

Table 1
Descriptive statistics.
The table below traces the sample used in the analysis. The number of observations, average, median, standard deviation, quantiles 1 and 3 (Q1 and Q3, respectively), and percentiles 10 and 90 (P10 and P90, respectively) of the main variables are presented. In the bottom table, the Pearson correlation of |aNH| with other variables is shown.

	# Obs	Mean	Standard dev.	P10	Q1	Median	Q3	eP90
|aNH|	45271	10.5%	15.7%	1.1%	2.9%	6.2%	12.0%	22.9%
NH	45271	6.4%	20.8%	−8.1%	−1.8%	2.4%	9.5%	23.7%
ESGDQ	45271	21.0	11.8	10.3	12.0	16.9	26.0	39.7
SG	45271	10.1%	36.8%	−12.0%	−1.9%	5.6%	15.8%	32.8%
ROA	45271	3.9%	9.8%	−3.8%	1.2%	4.0%	7.9%	13.3%
QR	45271	1.7	1.7	0.5	0.8	1.2	1.9	3.3
LEV	45271	13.1%	14.6%	0.0%	0.3%	8.4%	21.2%	34.2%
MB	45271	2.7	3.1	0.6	1.0	1.7	3.2	5.7
NPPE	45271	29.9%	24.2%	4.3%	11.1%	24.3%	42.1%	65.1%
DIV	45271	72.6%	44.6%	0.0%	0.0%	100.0%	100.0%	100.0%
NHVOL	45271	13.2%	18.5%	2.0%	3.8%	7.8%	16.0%	29.4%
SGVOL	45271	19.3%	51.1%	3.2%	5.9%	11.4%	21.6%	38.8%
CFVOL	45271	5.4%	6.0%	1.3%	2.1%	3.7%	6.5%	10.8%
LOSS	45271	16.4%	37.0%	0.0%	0.0%	0.0%	0.0%	100.0%
LABINT	45271	0.0042	0.0046	0.0007	0.0014	0.0027	0.0050	0.0091
SIZE (millions USD)	45271	3525	8152	92	248	862	286	8684
Analyst Fol.	45271	6.4	7.6	0.0	1.0	4.0	10.0	17.0

Correlation	*|aNH|*
NH	0,64
SG	0,27
ROA	−0,05
QR	0,07
LEV	0,03
MB	0,09
SIZE	0,01
DIV	−0,10
NPPE	0,07
LOSS	0,08
LABINT	−0,02
ESGDQ	−0,08
NHVOL	0,18
SGVOL	0,13
CFVOL	0,20

The equation is estimated using all available observations from 2006 to 2019. Interestingly, $ESGDQ_{i,t-1}$ has predictive power over the dependent variable (see regression [1] of Table 2). The point estimate is negative, which conforms to the notion that ESG disclosure volume brings labor investment inefficiency downwards. With respect to the other covariates of the model, the signs of the estimates are aligned with those found by previous research. Lags of the market-to-book ratio, quick ratio, leverage, accounting losses, and volatilities of operating cash flows, employment growth, and sales growth fuel labor investment inefficiency, while size, dividend policy, and labor intensity push the dependent variable downward.

These preliminary findings suggest that NFD boosts labor investment efficiency. However, our goal is also to ascertain whether country-institutional variables – investor protection, rule of law and anti-self-dealing mechanisms, as well as labor market frictions – exert influence on that association. We start with investor protection using the proxy developed by La Porta et al. (2006), (2002). The sample is split into two groups of countries based on whether that index is above or below the median. Remarkably, the point estimate on $ESGDQ_{i,t-1}$ is negative and statistically significant (at the 1% level) in the top partition of investor protection. The point estimate is almost three times larger in this subsample (column [3]), compared to the full sample (column [1]). However, the estimated coefficient is positive and non-significant in countries with below-median investor protection (see regression [2] from Table 2).

We rerun Equation (2) in the top and bottom partitions by rule of law and reach similar inferences: labor investment efficiency does not seem to respond to improvements in NFD in countries with weaker legal institutions (see regressions [4] and [5] from Table 2). With respect to the anti-self-dealing index (ASD, henceforth) of Djankov et al. (2008), $ESGDQ_{i,t-1}$ displays explanatory power regardless of the subsample analyzed, but the magnitude of the coefficient is strikingly larger (almost four times) when the country's ASD is above the median, which is in keeping with the previous findings.

These findings confirm that country-institutional variables affect the association between NFD and labor investment inefficiency. As the dependent variable is likely to be also influenced by factors pertaining to the country's labor market, two additional variables are added to the analysis: the country-unionization rate ($union_c$) and a labor market rigidity index (LMR_C). To avoid breaking down the sample of countries further, these variables are introduced directly in the baseline regression via the interaction with $ESGDQ_{i,t-1}$. Therefore, the sample is divided by the anti-self-dealing index of Djankov et al. (2008) and $ESGDQ_{i,t-1} * union_c$ (alternatively, $ESGDQ_{i,t-1} * LMR_C$) is added to the regressions. Notice that $union_c$ and LMR_C are not directly introduced in the model specifications to avoid collinearity issues, as country-fixed effects are also at play.

The regression outcomes are displayed in Table 3. Looking at columns [1] and [2], the estimated loading for $ESGDQ_{i,t-1}$ is negative and statistically meaningful in both top and bottom partitions by ASD. Nevertheless, the point estimate continues to be markedly larger (in absolute terms) in the top partition. To evaluate the full impact of NFD on labor investment inefficiency, the interaction between unionization and $ESGDQ_{i,t-1}$ must also be factored in. Notably, the estimated coefficient for that interaction is negative in both subsets, although only statistically meaningful in the top partition by ASD.

Alternatively, one could consider the index for labor market rigidity in lieu of unionization rates in regressions (i.e., $ESGDQ_{i,t-1} * LMR_C$ is added to the baseline regression). It can be seen in columns [3] and [4] that the estimated loading for $ESGDQ_{i,t-1}$ remains negative and statis-

Table 2
Labor investment inefficiency, ESG disclosure and the role of cross-country institutional variables.
The table reports the results of regressing $|aNH|$ against a lag of *ESGDQ* and a set of control variables. The econometric model also includes country, industry, and year fixed effects. The full sample is considered in regression [1]. Regressions [2]– [7] are run on subsamples based on country-institutional variables (IP – investor protection; RL – rule of law; ASD – anti-self-dealing). Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
$MB_{i,t-1}$	0.003***	0.004***	0.001***	0.001***	0.003***	0.001**	0.003***
	(7.32)	(6.10)	(3.92)	(2.72)	(7.93)	(2.32)	(8.03)
$SIZE_{i,t-1}$	−0.002***	0.003***	−0.002**	0.003***	−0.006***	0.003***	−0.006***
	(-2.62)	(5.56)	(-2.23)	(5.91)	(-5.60)	(6.53)	(-5.43)
$QR_{i,t-1}$	0.005***	0.002***	0.007***	0.002***	0.005***	0.002***	0.005***
	(6.46)	(3.39)	(7.42)	(3.16)	(5.51)	(3.23)	(5.64)
$LEV_{i,t-1}$	0.015**	0.064***	−0.004	0.062***	−0.012	0.070***	−0.011
	(2.31)	(9.96)	(-0.60)	(9.00)	(-1.40)	(10.17)	(-1.39)
$DIVP_{i,t-1}$	−0.010***	−0.003	−0.005**	−0.004*	−0.007**	−0.004*	−0.007**
	(-4.63)	(-1.49)	(-1.98)	(-1.65)	(-2.33)	(-1.89)	(-2.51)
$NPPE_{i,t-1}$	0.012**	0.002	0.015*	−0.001	0.020**	−0.002	0.018**
	(2.19)	(0.36)	(1.94)	(-0.12)	(2.51)	(-0.42)	(2.37)
$LOSS_{i,t-1}$	0.016***	0.023***	0.011***	0.019***	0.011***	0.020***	0.011***
	(7.58)	(12.87)	(3.67)	(9.93)	(3.64)	(10.71)	(3.66)
$IO_{i,t-1}$	0.000	0.000	0.000**	0.000	0.000**	0.000	0.000**
	(-0.88)	(0.12)	(-2.18)	(0.94)	(-2.21)	(0.28)	(-2.00)
$LABINT_{i,t-1}$	−1.356***	−0.564**	−0.899***	−0.289	−2.291***	−0.282	−2.176***
	(-6.59)	(-1.99)	(-4.28)	(-1.36)	(-6.82)	(-1.26)	(-6.84)
$ESGDQ_{i,t-1}$	−0.016**	0.001	−0.043***	−0.007	−0.050***	−0.011**	−0.044***
	(-2.34)	(0.27)	(-3.95)	(-1.23)	(-3.90)	(-2.03)	(-3.56)
$NHVOL_{i,t-1}$	0.065***	0.111***	0.111***	0.108***	0.055***	0.099***	0.057***
	(6.76)	(10.45)	(6.72)	(5.73)	(5.24)	(5.15)	(5.50)
$SGVOL_{i,t-1}$	0.007	0.055***	0.004	0.054***	0.005	0.065***	0.005
	(0.90)	(5.82)	(0.41)	(4.65)	(0.69)	(5.69)	(0.68)
$CFVOL_{i,t-1}$	0.219***	0.097***	0.185***	0.122***	0.192***	0.086***	0.197***
	(7.80)	(4.12)	(5.49)	(4.85)	(5.93)	(3.61)	(6.13)
# obs	45 271	20 179	25 092	16 907	20 872	19 023	26 248
AdjR2	10.8%	9.4%	12.2%	18.1%	8.2%	10.8%	9.0%
# firms	6175	1924	3307	2543	3631	2378	3796
Sample	All Countries	Low IP	High IP	Low RL	High RL	Low ASD	High ASD

tically meaningful, regardless of the country's ASD. As to $ESGDQ_{i,t-1} * LMR_C$, the estimated coefficient is negative and statistically significant in the two partitions, although larger in countries featuring higher ASD. Taken jointly with the results of columns [1] and [2], the effect of NFD on the dependent variable is affected by labor market characteristics. The results of the analysis are qualitatively the same when the sample is disaggregated by investor protection (see columns [5] and [6]) or rule of law (for brevity, the results are not reported).

On balance, two major conclusions stand out from this analysis. First, the impact of the volume of NFD is stronger in countries with high-quality institutions. Second, these effects ramp up with labor market rigidities, regardless of the quality of institutions. Up to this point, we overlooked the effect of accounting quality, capital investment inefficiency and CSR performance on the dependent variable. We omitted these additional covariates from the main regressions because their inclusion dictates a loss of observations and may cause sample attrition. We start by including accounting quality ($AQ_{i,t-1}$) and capital investment inefficiency ($|aIE_{i,t}|$) in the model. Recall that both these proxies require at least 20 observations in country-industry-year cells.

The baseline regression is extended with the inclusion of $AQ_{i,t-1}$, $AQ_{i,t-1} * LMR_C$ and $|aIE_{i,t}|$ in the set of controls. As before, the regression is run separately in countries with above- and below-median ASD. A quick perusal of columns [1] and [2] of Table 4 confirms that our conclusions hold when $AQ_{i,t-1}$, $AQ_{i,t-1} * LMR_C$ and $|aIE_{i,t}|$ are added to the model specification. In effect, statistical inferences with respect to $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_C$ remain almost intact when new control variables are introduced. $AQ_{i,t-1}$ and $AQ_{i,t-1} * LMR_C$ lack explanatory power in both partitions.

Going forward, we also consider CSR performance in additional regressions. Effectively, CSR performance and NFD could be highly correlated if firms with greater CSR performance signal their accomplishments via better reporting, aiming to enhance credibility, image, and reputation.[16] Managers of high-performing CSR firms have strong incentives to be more forthcoming with company news that reflect their achievements in this field. Supportively, Gelb and Strawser (2001) and Dhaliwal et al. (2011) document greater voluntary disclosure for firms engaged in CSR activities. A firm's commitment to CSR activities and practices is found to spur information transparency (Kim, Park, & Wier, 2012b). In parallel, Benlemlih and Bitar (2018), Khediri (2021) and Cook, Romi, Sánchez, and Sánchez (2019) find a positive association between CSR and investment efficiency.

To ascertain whether our inferences are not driven by the association between CSR performance and the volume of NFD, we add the former's proxies to the setting. We start by including a CSR performance score ($CSRPerf_{i,t-1}$) produced by Refinitiv/ASSET4 in the regressions and used in previous assessments, such as Ferrell, Liang, and Renneboog (2016). However, we caution that including that score reduces the sample size dramatically because the coverage of Bloomberg is slightly larger than Refinitiv/ASSET4, and they do not always overlap. Columns [3] and [4] of Table 4 present the results for the top and bottom partitions by ASD, respectively. Notably, the explanatory power of $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ is retained in the two subsets. Nevertheless, three other outcomes caught our attention. First, the statistical significance of the variables declines sharply. Second, differences in the size of point estimates in the two subsamples become smaller. Finally, we find a negative impact of $CSRPerf_{i,t-1}$ on labor investment inefficiency.

Columns [5] and [6] of Table 4 exhibit results in which $CSRPerf_{i,t-1}$

[16] High-performing CSR firms have incentives to signal their type via direct voluntary disclosures that cannot be easily reproduced by poorly performing CSR firms, according to signaling theory. Such disclosures curb information asymmetry about social and environmental performance (Dhaliwal et al., 2011).

Table 3
Labor investment inefficiency, ESG disclosure and the role of cross-country institutional variables and labor market frictions.
The table reports the results of regressing $|aNH|$ against a lag of *ESGDQ*, the interaction of *ESGDQ* with proxies for labor market rigidities/unionization rate and a set of control variables. The econometric model also includes country, industry, and year fixed effects. Regressions are run on subsamples based on country-institutional variables (ASD – anti-self-dealing; IP – investor protection). Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

	[1]	[2]	[3]	[4]	[5]	[6]
$MB_{i,t-1}$	0.001**	0.003***	0.001**	0.003***	0.001***	0.003***
	(2.32)	(7.68)	(2.39)	(7.65)	(2.58)	(7.56)
$SIZE_{i,t-1}$	0.003***	−0.006***	0.003***	−0.006***	0.003***	−0.006***
	(6.45)	(-5.84)	(6.43)	(-5.90)	(6.13)	(-6.09)
$QR_{i,t-1}$	0.002***	0.005***	0.002***	0.005***	0.002***	0.005***
	(3.24)	(5.61)	(3.25)	(5.57)	(3.20)	(5.44)
$LEV_{i,t-1}$	0.070***	−0.013	0.070***	−0.013	0.062***	−0.014
	(10.20)	(-1.58)	(10.24)	(-1.62)	(9.04)	(-1.63)
$DIVP_{i,t-1}$	−0.004*	−0.008***	−0.004*	−0.007***	−0.004*	−0.007**
	(-1.83)	(-2.71)	(-1.78)	(-2.66)	(-1.72)	(-2.50)
$NPPE_{i,t-1}$	−0.002	0.018**	−0.002	0.018**	−0.001	0.020**
	(-0.43)	(2.33)	(-0.45)	(2.33)	(-0.27)	(2.47)
$LOSS_{i,t-1}$	0.020***	0.011***	0.020***	0.011***	0.019***	0.011***
	(10.69)	(3.67)	(10.71)	(3.65)	(9.94)	(3.64)
$IO_{i,t-1}$	0.000	0.000	0.000	0.000	0.000	0.000*
	(0.30)	(-1.63)	(0.28)	(-1.60)	(0.53)	(-1.80)
$LABINT_{i,t-1}$	−0.284	−2.216***	−0.321	−2.231***	−0.320	−2.341***
	(-1.27)	(-6.94)	(-1.43)	(-6.99)	(-1.50)	(-6.95)
$ESGDQ_{i,t-1}$	−0.016**	−0.104***	−0.043***	−0.178***	−0.030***	−0.178***
	(-2.04)	(-5.04)	(-2.77)	(-5.52)	(-2.97)	(-5.50)
$ESGDQ_{i,t-1} * UNION_C$	−0.001	−0.004***				
	(-0.97)	(-4.84)				
$ESGDQ_{i,t-1} * LMR_C$			−0.003**	−0.012***	−0.002***	−0.011***
			(-2.30)	(-5.24)	(-2.68)	(-5.12)
$NHVOL_{i,t-1}$	0.098***	0.055***	0.099***	0.055***	0.107***	0.053***
	(5.12)	(5.35)	(5.18)	(5.33)	(5.75)	(5.07)
$SGVOL_{i,t-1}$	0.065***	0.005	0.065***	0.005	0.053***	0.005
	(5.70)	(0.68)	(5.69)	(0.70)	(4.63)	(0.71)
$CFVOL_{i,t-1}$	0.085***	0.198***	0.083***	0.198***	0.120***	0.193***
	(3.54)	(6.17)	(3.48)	(6.17)	(4.79)	(5.96)
# obs	19 023	26 246	19 023	26 246	20 179	25 090
AdjR2	10.8%	9.1%	10.9%	9.2%	18.1%	8.4%
# firms	2378	3796	2378	3796	2543	3631
Sample	Low ASD	High ASD	Low ASD	High ASD	Low IP	High IP

and $CSRPerf_{i,t-1} * LMR_c$ are added to the model specification. As shown, the explanatory power of $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ declines further under this setting ($ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ lack significance in the bottom partition, but not in the top partition by ASD). As for $CSRPerf_{i,t-1}$ and $CSRPerf_{i,t-1} * LMR_c$, both lack statistical significance, irrespective of the subsample considered. In light of these results, NFD has incremental explanatory power over CSR performance, at least in countries with high-quality institutions. Columns [7] and [8] reproduce results using alternative proxies for CSR performance, namely binary variables indicating whether the firm is a UNPRI signatory, follows OECD Guidelines for Multinational Enterprises or complies with the Global Compact. In addition, we include a CSR country-industry aggregated score (the average of the CSR score in country-industry-year cells).[17] Crucially, statistical significance of $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ is conserved under these other settings in both partitions of the sample by ASD.

On balance, introducing the additional controls does not change our inference that NFD enhances labor investment efficiency. The analysis proceeds with the evaluation of impacts on over- and underinvestment in labor. To do so, we conduct a double sample partition of the sample: first, the sample is split into two bins by ASD and then by the firm-level labor investment inefficiency (above and below-average $aNH_{i,t}$, which correspond to the overinvestment and underinvestment subsets, respectively).

The results for each partition are presented in Table 5. Columns [1] and [2] exhibit regression results for the bottom partition by ASD. Again, our interest lies in the sign and statistical significance of the point estimates for $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$. Surprisingly, we find explanatory power for both variables in the underinvestment subsample but not in the overinvestment subsample. Accordingly, NFD deters underinvestment in labor when institutional infrastructures are weak, with that effect augmenting with rigidities in the labor market. However, NFD seems to exert no influence with respect to overinvestment inefficiencies.

The regression outputs for the top partition in terms of ASD are displayed in columns [3] and [4]. $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ display explanatory power in both regressions, but point estimates are markedly larger in the overinvestment subsample. In all, NFD is effective in curtailing overinvestment when country institutions are strong. Country institutions compound the effect of firm-level NFD when labor market rigidities are sizable.

We dig deeper into this issue by considering alternative double sample partitions. Rather than splitting the sample according to the sign of $aNH_{i,t}$, both $aNH_{i,t}$ and $\widehat{NH}_{i,t}$ (expected net hiring) are factored in. Correspondingly, four subsamples are formed: firm-year observations with overfiring ($aNH < 0$ and $\widehat{NH} < 0$); firm-year observations with underfiring ($aNH > 0$ and $\widehat{NH} < 0$); firm-year observations with overhiring ($aNH > 0$ and $\widehat{NH} > 0$); and firm-year observations with underhiring ($aNH < 0$ and $\widehat{NH} > 0$).

Panel A of Table 6 presents regression results for countries with weak institutional background (low ASD). Rows [1] and [2] display the results for the overfiring and underhiring subsets. In both cases, $ESGDQ_{i,t-1}$ and

[17] Cai, Pan, and Statman (2016) provide evidence that firm CSR ratings are conditioned by country stages of economic development, culture, and institutions.

Table 4
Controlling for other dimensions of transparency and CSR performance.
The table reports the results of regressing $|aNH|$ against a lag of *ESGDQ*, the interaction of *ESGDQ* with proxies for labor market rigidity and a set of control variables. The econometric model also includes country, industry, and year fixed effects. Regressions are run on subsamples based on country-institutional variables. Additional controls are added to the regressions, including a proxy for accruals quality (*AQ*), capital investment inefficiency ($|aIE|$), and proxies for CSR performance. Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$MB_{i,t-1}$	0.001**	0.003***	0.000	0.001**	0.000	0.001**	0.001**	0.003***
	(2.07)	(6.79)	(-0.36)	(2.21)	(-0.36)	(2.22)	(2.43)	(6.61)
$SIZE_{i,t-1}$	0.003***	−0.005***	0.005***	0.001	0.005***	0.001	0.003***	−0.005***
	(6.56)	(-5.21)	(3.25)	(0.86)	(3.25)	(0.86)	(6.52)	(-4.80)
$QR_{i,t-1}$	0.002***	0.005***	0.003**	0.005***	0.003**	0.005***	0.002***	0.006***
	(3.26)	(5.67)	(2.03)	(4.15)	(2.05)	(4.15)	(3.29)	(6.16)
$LEV_{i,t-1}$	0.069***	−0.009	0.078***	0.001	0.078***	0.000	0.070***	−0.008
	(10.03)	(-1.16)	(6.51)	(0.05)	(6.57)	(0.03)	(9.96)	(-0.98)
$DIVP_{i,t-1}$	−0.004	−0.006*	−0.006	−0.002	−0.006	−0.002	−0.004*	−0.005*
	(-1.58)	(-1.96)	(-0.96)	(-0.58)	(-0.99)	(-0.60)	(-1.74)	(-1.74)
$NPPE_{i,t-1}$	−0.003	0.017**	0.016	0.025**	0.016	0.025**	−0.002	0.018**
	(-0.70)	(2.28)	(1.07)	(2.29)	(1.08)	(2.30)	(-0.45)	(2.44)
$LOSS_{i,t-1}$	0.020***	0.010***	0.022***	0.008*	0.022***	0.008*	0.021***	0.011***
	(10.55)	(3.24)	(4.80)	(1.65)	(4.78)	(1.68)	(10.82)	(3.61)
$IO_{i,t-1}$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.33)	(-1.11)	(0.38)	(1.03)	(0.38)	(0.99)	(0.32)	(-1.27)
$LABINT_{i,t-1}$	−0.299	−2.031***	0.685	0.013	0.683	0.008	−0.369	−1.891***
	(-1.30)	(-6.33)	(1.09)	(0.04)	(1.09)	(0.02)	(-1.62)	(-6.08)
$ESGDQ_{i,t-1}$	−0.040**	−0.171***	−0.047*	−0.077*	−0.048	−0.100*	−0.040**	−0.166***
	(-2.46)	(-5.15)	(-1.88)	(-1.75)	(-1.41)	(-1.75)	(-2.34)	(-4.86)
$ESGDQ_{i,t-1} * LMR_C$	−0.003**	−0.011***	−0.003*	−0.005*	−0.003	−0.007*	−0.003*	−0.011***
	(-1.99)	(-5.02)	(-1.81)	(-1.82)	(-1.29)	(-1.85)	(-1.94)	(-4.62)
$NHVOL_{i,t-1}$	0.099***	0.053***	0.032	0.089***	0.032	0.089***	0.095***	0.057***
	(5.18)	(4.84)	(0.94)	(3.80)	(0.94)	(3.79)	(5.15)	(5.05)
$SGVOL_{i,t-1}$	0.064***	0.008	0.092***	0.004	0.092***	0.005	0.067***	0.008
	(5.47)	(0.78)	(3.18)	(0.43)	(3.20)	(0.43)	(5.75)	(0.74)
$CFVOL_{i,t-1}$	0.049*	0.169***	0.050	0.109**	0.050	0.109**	0.050*	0.174***
	(1.66)	(4.70)	(0.69)	(2.39)	(0.69)	(2.38)	(1.66)	(4.92)
$AQ_{i,t-1}$	−0.008	−0.013	−0.002	−0.006	−0.002	−0.006	−0.007	−0.008
	(-0.99)	(-1.29)	(-0.21)	(-0.33)	(-0.21)	(-0.35)	(-0.97)	(-0.83)
$AQ_{i,t-1} * LMR_C$	0.000	−0.001	0.000	0.001	0.000	0.001	0.000	0.000
	(-0.41)	(-1.12)	(0.22)	(0.66)	(0.20)	(0.63)	(-0.42)	(-0.65)
$\lvert aIE_{i,t-1}\rvert$	0.092***	0.205***	−0.048	0.203***	−0.048	0.203***	0.085***	0.201***
	(3.17)	(7.22)	(-1.04)	(4.55)	(-1.04)	(4.55)	(2.84)	(7.47)
$CSRPerf_{i,t-1}$			0.000**	0.000**	0.000	0.000		
			(-2.12)	(-2.51)	(-0.51)	(-0.05)		
$CSRPerf_{i,t-1} * LMR_C$					0.000	0.000		
					(0.04)	(0.62)		
$UNPRI_{i,t-1}$							0.004	0.005
							(0.40)	(0.15)
$OECD_{i,t-1}$							−0.004	0.003
							(-0.66)	(0.44)
$GlobalComp_{i,t-1}$							−0.001	−0.001
							(-0.39)	(-0.27)
$CSRP_{C,t-1}$							0.000	0.000
							(0.47)	(1.16)
# obs	18 867	25 806	4106	11 046	4106	11 046	18 682	25 299
AdjR2	10.9%	9.7%	11.2%	14.1%	11.2%	14.1%	10.9%	10.0%
# firms	2368	3761	474	2088	474	2088	2356	3761
Sample	Low ASD	High ASD	Low ASD	High ASD	Low ASD	High ASD	Low ASD	High ASD

$ESGDQ_{i,t-1} * LMR_c$ have predictive power, aligned with the inferences from Table 5 that NFD mitigates underinvestment. The effect is conserved regardless of the business cycle, although it is stronger in down states (i.e., overfiring). The results for the underfiring and overhiring subsamples are displayed in rows [3] and [4]. In both cases, NFD barely affects labor investment inefficiency. Indeed, if anything, NFD exacerbates underfiring when market rigidities are high.

The results pertaining to the countries with high-quality institutions (top partition by ASD) are presented in panel B and indicate a negative, meaningful impact of NFD in the four subsamples. A closer inspection at the magnitude of the point estimates on $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ reveals stronger impacts in the overhiring and overfiring subsets. Taking everything into account, the impact of NFD is stronger on underinvestment than overinvestment in countries with poor legal/governance institutions, and on overhiring and overfiring in countries with stronger institutions.

5.1. Results from subsample analysis

Now, we move our focus to the interaction of labor investment inefficiency, capital investment efficiency and NFD. Along the lines of Jung et al. (2014) and Ben-Nasr and Alshwer (2016), it is important to clarify whether our inferences are driven by inefficient capital investment. In fact, some of the regressions displayed previously confirm its relevance as driver of labor investment inefficiency. We conduct a double partition of the sample to account for positive and negative abnormal investment in labor and in capital separately. As before, we start by decomposing the sample by ASD. Then, for each partition, other sub-groups are created based on the existence of underinvestment or overinvestment in labor and capital, respectively. Thus, Equation (2) is

Table 5
Underinvestment versus overinvestment.
The table reports the results of regressing $|aNH|$ against a lag of *ESGDQ*, the interaction of *ESGDQ* with proxies for labor market rigidities/unionization rate and a set of control variables. The econometric model also includes country, industry, and year fixed effects. Regressions are run on subsamples based on a country-institutional variable (ASD – anti-self-dealing) and on the sign of *aNH* (overinvestment vs. underinvestment). Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

	[1]	[2]	[3]	[4]
$MB_{i,t-1}$	0.000	0.002**	0.001***	0.005***
	(0.82)	(1.99)	(3.02)	(7.03)
$SIZE_{i,t-1}$	0.005***	0.000	−0.004***	−0.010***
	(10.42)	(0.32)	(-4.72)	(-5.25)
$QR_{i,t-1}$	0.003***	0.000	0.006***	0.005***
	(5.15)	(0.19)	(7.90)	(2.84)
$LEV_{i,t-1}$	0.081***	0.041**	−0.015**	−0.020
	(13.08)	(2.25)	(-2.42)	(-1.41)
$DIVP_{i,t-1}$	−0.006**	0.000	−0.003	−0.006
	(-2.40)	(0.04)	(-1.37)	(-1.23)
$NPPE_{i,t-1}$	0.008*	−0.018*	0.022***	0.014
	(1.93)	(-1.69)	(3.25)	(0.98)
$LOSS_{i,t-1}$	0.028***	0.002	0.028***	−0.006
	(14.79)	(0.31)	(9.64)	(-1.08)
$IO_{i,t-1}$	0.000	0.000	0.000***	0.000
	(-0.53)	(1.40)	(-2.67)	(-0.61)
$LABINT_{i,t-1}$	0.639***	−2.175***	−0.394*	−3.804***
	(2.62)	(-5.55)	(-1.82)	(-6.16)
$ESGDQ_{i,t-1}$	−0.061***	−0.018	−0.121***	−0.219***
	(-3.57)	(-0.60)	(-5.35)	(-4.11)
$ESGDQ_{i,t-1} * LMR_C$	−0.005***	0.000	−0.009***	−0.015***
	(-3.20)	(0.21)	(-5.71)	(-3.96)
$NHVOL_{i,t-1}$	0.068***	0.156***	0.056***	0.057***
	(6.25)	(3.04)	(8.13)	(3.05)
$SGVOL_{i,t-1}$	0.051***	0.089***	0.005	0.008
	(5.70)	(3.20)	(0.75)	(0.92)
$CFVOL_{i,t-1}$	0.086***	0.060	0.187***	0.187***
	(3.65)	(1.20)	(5.95)	(3.71)
# obs	13 755	5268	14 310	11 936
AdjR2	16.7%	8.8%	15.4%	8.2%
# firms	2281	1933	3419	3443
Sample	Low ASD UnderInv	Low ASD OverInv	High ASD UnderInv	High ASD OverInv

run in the following subsets: (i) underinvestment in capital and underinvestment in labor; (ii) underinvestment in capital and overinvestment in labor; (iii) overinvestment in capital and underinvestment in labor; and (iv) overinvestment in capital and overinvestment in labor.

The results are reported in Table 7. For simplicity, only point estimates (and corresponding t-statistics) for $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ are shown. With respect to the countries with lower ASD, both $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ present negative and statistically meaningful point estimates when underinvestment in labor and in capital exists, but not in any other alternative bins. Accordingly, NFD could curb underinvestment in labor indirectly, via a reduction of underinvestment capital, as these two variables tend to move together.

As for countries with above-median ASD, $ESGDQ_{i,t-1}$ exhibits a negative and statistically meaningful estimated loading irrespective of the subsample considered. This means that NFD could reduce overinvestment (underinvestment) in labor when there is underinvestment (overinvestment) in capital. Regarding $ESGDQ_{i,t-1} * LMR_c$, the interaction variable has explanatory power in three subsets of the data. The exception is the subset of observations regarding underinvestment in capital and overinvestment in labor. Collectively, these results contradict the idea that the impact of NFD on labor investment inefficiency is entirely mediated by capital investments.

Our next task is to assess the role of firm-level attributes on the results, namely those pertaining to bankruptcy risk, agency conflicts and financial constraints (see Table 8). The idea is to clarify the role of alternative finance theories in the conclusions. According to DeAngelo and DeAngelo (1991), firms in good financial health have less labor-related incentives in improving transparency to gain advantage in negotiation with unions. As for those in financial distress, managers can leverage their bargaining power with the release of bad news. Hence, the net advantages of NFD could differ according to a firm's financial health.

To tackle this issue, we further split the subsamples according to the Altman z-score. Starting with the subset of firms in greater financial distress located in countries with poor institutions (bottom partition by ASD), the point estimate on $ESGDQ_{i,t-1}$ is negative and statistically significant, but that pertaining to $ESGDQ_{i,t-1} * LMR_c$ lacks statistical significance. Regarding firms in good financial condition, both estimated coefficients are negative and statistically meaningful. The effect of NFD is more pronounced for those in good financial conditions, given the different magnitude of the estimates in the two regressions. In countries in the top partition by ASD, the impact of NFD is slightly larger for firms facing higher bankruptcy risk (yet results not reported indicate that estimated loadings on $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ are not statistically different in the two subsamples).

Concerning financing constraints, we start by calculating the KZ-index (Kaplan-Zingales index), which gauges the relative dependence of a firm on external financing. A higher KZ-index signifies that a firm is more likely to face additional stress when financial conditions tighten, given its greater reliance on external funding to finance ongoing operations. A double partition of the sample drawn on the ASD and the KZ-index is carried out, and four bins of observations are created.

The first (second) bin encompasses firms located in countries in the bottom partition by ASD and with below-median (above-median) KZ-index. Notably, both $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ lack statistical significance in the first partition (see panel B of Table 8), while in the second, $ESGDQ_{i,t-1}$ is statistically significant, but $ESGDQ_{i,t-1} * LMR_c$ is

Table 6
Underinvestment versus overinvestment: accounting for the business cycle.
The table reports the results of regressing $|aNH|$ against a lag of *ESGDQ*, the interaction of *ESGDQ* with a proxy for labor market rigidity and a set of control variables. The econometric model also includes country, industry, and year fixed effects. Regressions are run on subsamples based on a country-institutional variable (ASD – anti-self-dealing) and on the sign of $aNH/\widehat{NH}$. To save space, only point estimates and corresponding t-statistics for $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_C$ are reported. Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

		$ESGDQ_{i,t-1}$		$ESGDQ_{i,t-1} * LMR_C$			
		Estimate	t-stat	Estimate	t-stat	N	Adj-R2
Panel A:	[1] Overfiring	−0.094***	(-3.67)	−0.006***	(-3.00)	6152	20.5%
Low ASD	[2] Underhiring	−0.037***	(-2.81)	−0.002*	(-1.66)	7603	22.3%
	[3] Underfiring	0.015	(0.68)	0.004*	(1.78)	476	28.3%
	[4] Overhiring	−0.010	(-0.31)	0.001	(0.34)	4791	9.1%
Panel B:	[5] Overfiring	−0.173***	(-5.81)	−0.010***	(-4.80)	8872	16.3%
High ASD	[6] Underhiring	−0.058***	(-2.70)	−0.003**	(-2.23)	5438	24.6%
	[7] Underfiring	−0.056***	(-2.58)	−0.004*	(-1.86)	1361	35.0%
	[8] Overhiring	−0.216***	(-3.67)	−0.017***	(-4.08)	10 575	9.7%

Table 7
Underinvestment versus overinvestment: accounting for capital investment inefficiency.
The table reports the results of regressing |*aNH*| against a lag of *ESGDQ*, the interaction of *ESGDQ* with a proxy for labor market rigidity and a set of control variables. The econometric model also includes country, industry, and year fixed effects. Regressions are run on subsamples based on a country-institutional variable (ASD – anti-self-dealing) and on the sign of *aNH* and *aIE*. To save space, only point estimates and corresponding t-statistics for $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_C$ are reported. Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

		$ESGDQ_{i,t-1}$		$ESGDQ_{i,t-1} * LMR_C$			
		Estimate	t-stat	Estimate	t-stat	N	Adj-R2
Panel A:	[1] Underinv. in Capital and Underinv. in Labor	−0.089***	(-4.45)	−0.006***	(-3.90)	7917	17.0%
Low ASD	[2] Underinv. in Capital and Overinv. in Labor	−0.002	(-0.06)	0.002	(0.76)	3171	8.9%
	[3] Overinv. in Capital and Underinv. in Labor	−0.013	(-0.58)	−0.001	(-0.76)	5838	17.1%
	[4] Overinv. in Capital and Overinv. in Labor	−0.011	(-0.22)	0.000	(0.02)	2097	10.5%
Panel B:	[5] Underinv. in Capital and Underinv. in Labor	−0.095***	(-3.50)	−0.007***	(-3.71)	9803	16.2%
High ASD	[6] Underinv. in Capital and Overinv. in Labor	−0.155**	(-2.17)	−0.008	(-1.63)	7445	7.3%
	[7] Overinv. in Capital and Underinv. in Labor	−0.149***	(-4.02)	−0.011***	(-4.44)	4507	15.2%
	[8] Overinv. in Capital and Overinv. in Labor	−0.273***	(-3.52)	−0.023***	(-4.44)	4491	10.8%

Table 8
Firm-level characteristics and the impact of NFD.
The table reports the results of regressing |*aNH*| against a lag of *ESGDQ*, the interaction of *ESGDQ* with a proxy for labor market rigidity and a set of control variables. The econometric model also includes country, industry, and year fixed effects. Regressions are run on subsamples based on a country-institutional variable (ASD – anti-self-dealing) and firm-level characteristics (Altman z-score, financial slack, and KZ index). To save space, only point estimates and corresponding t-statistics for $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_C$ are reported. Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

		$ESGDQ_{i,t-1}$		$ESGDQ_{i,t-1} * LMR_C$			
		Estimate	t-stat	Estimate	t-stat	N	Adj-R2
Panel A:	**Altman z-score**						
Low ASD	Low Alt-Z	−0.048**	(-2.08)	−0.003	(-1.43)	7949	11.2%
	High Alt-Z	−0.054**	(-2.43)	−0.004**	(-2.20)	11073	10.9%
High ASD	Low Alt-Z	−0.188***	(-4.99)	−0.012***	(-4.47)	11947	8.3%
	High Alt-Z	−0.169***	(-2.76)	−0.011**	(-2.48)	14299	10.6%
Panel B:	**KZ index**						
Low ASD	Low KZ	−0.032	(-1.52)	−0.002	(-1.20)	9812	10.0%
	High KZ	−0.046*	(-1.91)	−0.003	(-1.43)	9156	11.6%
High ASD	Low KZ	−0.110**	(-2.50)	−0.008***	(-2.73)	12640	10.7%
	High KZ	−0.143***	(-3.27)	−0.008***	(-2.72)	12145	9.6%
Panel C:	**Financial slack**						
Low ASD	Low Fin. Slack	−0.031	(-1.04)	−0.002	(-0.76)	9326	11.6%
	High Fin. Slack	−0.048***	(-2.71)	−0.003**	(-2.12)	9677	10.1%
High ASD	Low Fin. Slack	−0.159***	(-3.61)	−0.010***	(-3.45)	14114	9.6%
	High Fin. Slack	−0.191***	(-4.01)	−0.013***	(-4.11)	12125	10.5%

not. These results are consistent with previous inferences that NFD attenuates underinvestment in countries with a poor institutional background; the effect of NFD rises for firms in greater necessity of external finance. The third (fourth) bin contains the firms located in countries in the top partition by ASD and with below-median (above-median) KZ-index. Interestingly, both $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ are statistically meaningful, regardless of the financial constraints faced by the firm.

Finally, we discuss the effects of financial slack on the conclusions. Along the lines of Biddle et al. (2009), a composite metric of financial slack is constructed using two variables: cash (deflated by total assets) and leverage (*LEV*). In the first stage, relative ranks for each firm based on cash holdings and (inverse of) leverage within country-year bins are calculated. The composite metric corresponds to the average percentile rank of the variables. Again, the sample is broken down first by ASD and then by the average rank score. Noteworthy, the point estimates for $ESGDQ_{i,t-1}$ and $ESGDQ_{i,t-1} * LMR_c$ are negative and statistically meaningful when financial slack is high in countries with below-median ASD, but not when financial slack is low. The two variables display negative signs and are statistically meaningful in countries in the top partition by ASD, irrespective of financial slack.

5.2. Abnormal investment in labor and future profitability

In the following, we ask whether the abnormal labor investment influences future profitability. To do so, we follow Bhandari and Javakhadze (2017) and da Silva (2020). Three-year-ahead average ROA is regressed on abnormal investment inefficiency (|*aIe*|), abnormal employment growth (|*aNH*|), the lag of log sales (in USD), Tobin's Q, Kaplan-Zingales (KZ4) financial constraints' index and the Herfindal index. Firm and year fixed effects are added to the model specification. Table 9 presents the results from that regression. The first column presents results for the full sample, whereas the second and third display regression outcomes for subsets of firms located in countries in the bottom and top partitions by ASD, respectively. Remarkably, we find the point estimate on |*aNH*| to be negative and statistically significant in the full sample and in countries in the top partition by ASD, but not for those in the bottom partition.

In non-tabulated analysis, we tried to gauge the impact of abnormal employment growth (|*aNH*|) on future ROA via NFD. For that purpose, a two-stage (instrumental variables) regression procedure is run. In the first regression, |*aNH*| is regressed against a lag of *ESGDQ*, a set of control variables comprising exogenous variables of the second-stage regression and firm and year fixed effects. In the second stage, the three-year-ahead average ROA is regressed on abnormal investment inefficiency (|aIe|), the estimated abnormal employment growth ob-

Table 9
Future performance and labor investment inefficiency.
The table reports the results of regressing $\overline{ROA_{t+1,t+3}}$ against |*aNH*|, and a set of control variables (|*aIE*| – capital investment efficiency; *KZ4*; *lnSales* – log of sales; *lnQ* – log of Tobin's Q; and *HHI* – Herfindahl–Hirschman index concentration index). The econometric model also includes firm and year fixed effects. Regressions are run on the full sample and on subsamples based on a country-institutional variable (ASD – anti-self-dealing). Statistical inference is conducted by means of heteroscedasticity-consistent standard errors clustered by firm. (***), (**), and (*) indicate statistical significance at the 1, 5 and 10% level.

	[1]	[2]	[3]
|aNH|	−0.002**	0.000	−0.005*
	(-2.17)	(-0.27)	(-1.72)
|aIE|	−0.012	0.016	−0.016
	(-1.24)	(1.44)	(-1.39)
KZ4	−0.002***	−0.003***	−0.002***
	(-4.45)	(-4.34)	(-3.10)
lnSales	−0.003**	−0.017***	0.002
	(-2.00)	(-8.75)	(1.19)
lnQ	0.042***	0.030***	0.048***
	(24.05)	(15.74)	(21.31)
HHI	0.236***	−0.002	0.289***
	(5.82)	(-0.08)	(4.80)
F	62.2	51.2	47.4
N	45 271	19 023	26 248
R2-Adj	14.0%	10.3%	9.0%

tained in the first pass regression (|aNH|), the lag of log sales (in USD), Tobin's Q, Kaplan-Zingales (KZ4) financial constraints' index and the Herfindal index. Firm and year fixed effects are also added to the model specification. In neither of the subsamples considered is the estimated abnormal employment growth found to be statistically significant. Therefore, these results do not allow the conclusion that NFD produces effects on profitability via reduction in abnormal employment growth. However, we caution that the statistical power of this procedure to detect such effects is likely low.

6. Conclusions

Are the economic implications of NFD equal across countries and jurisdictions? More specifically, are the effects of NFD on labor investment efficiency conditioned by the country institutional infrastructure? Does NFD help alleviate frictions emanating from labor market rigidities? We try to answer to these inquires while assessing a large database comprising information for 44 countries and the period 2006–2019. These research questions are addressed using panel data methodologies where a proxy for labor investment inefficiency is regressed on ESG disclosure volume and several control variables employed in prior research.

Our preliminary findings indicate that the volume of ESG disclosure curbs labor investment inefficiency, with that effect being economically material. A step forward is taken by examining whether the effect is homogeneous across countries, using institutional background characteristics such as investor protection, rule of law and an anti-self-dealing index as grouping variables. Interestingly, firms located in countries with high-quality investor protection, rule of law, and anti-self-dealing mechanisms display a stronger association between the volume of ESG disclosure and labor investment efficiency. These outcomes inform that a country's institutional background underpins the economic benefits of ESG disclosure. This finding is consistent with arguments by Doidge et al. (2007) that the country's institutional system frames the benefits obtained via corporate governance and disclosure practices adopted by the firm.

In a similar vein, we investigate the role of labor market frictions on the association between NFD and labor investment inefficiency, after controlling for the effect of the country institutional background. Interestingly, the strength of the association between ESG disclosure and labor investment inefficiency increases in countries featuring more pronounced labor market rigidities and higher average unionization rates. These findings are aligned with the notion that NFD is effective in curbing negative effects of labor market frictions on investment efficiency. These results apply to countries with a stronger and weaker institutional background, although the effect is, in general, more pronounced among the former.

As far as we are aware, this is the first study addressing the impact of NFD on investment efficiency using an international dataset and exploring interactive effects with cross-country variables. Our findings are novel to the literature and highlight the relevance of factoring in country characteristics when evaluating the impact of NFD. Emphasis should be also placed on labor market frictions when assessing the link between these variables. Overall, the absence of a strong institutional background impairs the net benefits of high-quality ESG disclosure. This also implies that a one-size-fits-all approach across countries regarding the implementation of mandatory disclosure may not be advisable, as net benefits vary across jurisdictions. These novel insights make our contribution noteworthy.

As with other empirical assessments, our conclusions present some caveats. This also opens new avenues for future research. The first concern pertains to the proxy for ESG disclosure volume. Specifically, aggregated scores, such as the one used, capture the quantity, breadth, and extensiveness of reporting. Future research could focus instead on measures of disclosure akin to the quality of ESG reporting, or on specific ESG datapoints, which are deemed as more material. Second, the concept of labor investment efficiency used in the study also presents limitations. In lieu of net hiring, future research could address alternative definitions of labor efficiency, namely those akin to labor productivity or incorporate heterogeneity in labor skills in the analysis.

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Conflicts of interest

The author reports no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.bir.2023.12.004.

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