



The impact of employee satisfaction on company's labour investment efficiency

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ARTICLE INFO

JEL classifications:

D81

J54

G30

Keywords:

Labour investment efficiency

Employee satisfaction

Employee retention

Labour shortages

ABSTRACT

This study examines the impact of employee satisfaction on company's labour investment efficiency (CLIE) using a sample of 2,333 company-year observations associated with 302 companies listed in the UK between 2008 and 2020. Arguments based on human relations theory suggest that satisfied employees are likely to be motivated to exert greater efforts and exhibit lower turnover, thereby reducing employer's exposure to labour market frictions. In contrast, agency theory argues that satisfied employees may become entrenched and thus harm organisational outcomes, including CLIE. We measure satisfaction with employers across our sample companies using 164,341 employees' ratings posted on Glassdoor UK. We observe a positive impact of employee satisfaction on CLIE, demonstrating the validity of underlying human relations theory for the present business context characterised by labour shortages. We also find the positive impact of employee satisfaction on CLIE to be stronger for companies with higher labour intensity, more reliance on skilled labour, and more competitive industry environments. Our study contributes to research investigating the determinants of efficient investment in workforce. We also demonstrate the informational value of employee' online reviews for understanding a company's performance, particularly in assessing the efficiency of its employment decisions.

1. Introduction

Socio-economic developments subsequent to the COVID-19 pandemic have led to a significant upturn of labour markets nationally and internationally, in part due to unprecedented levels of government support during the pandemic for both employees and businesses. One unforeseen result of that support, in combination with the lockdowns, has been the high numbers of workers taking early retirement, both self-funded or as part of a company scheme (Forsythe, Kahn, Lange, & Wiczner, 2022). As a result, since economies reopened, many countries have experienced a tightening of the labour market and labour shortages (Causa, Abendschein, Luu, Soldani, & Sorio, 2022). Aging populations are also intensifying such shortages (World Health Organisation (WHO), 2015), as are higher rates of voluntary turnover (Peltokorpi, Allen, & Shipp, 2023). Against the backdrop of this volatile socio-economic environment, we set this study to investigate the impact of employee satisfaction on the efficiency of employment decisions made by companies.

On the one hand, there is a growing understanding among investors

and regulators that companies need to be more transparent about their employee treatment as a major factor for a company's long-term sustainability (e.g. Rosenbaum, 2021). This consideration is amplified by the stakeholders' increased interest in corporate environmental, social, and corporate governance (ESG) performance (Edmans, Pu, Zhang, & Li, 2024; Gillan, Koch, & Starks, 2021), prompting the recognition of employees as creators of corporate value and, therefore, strengthening companies' commitment to improve employee satisfaction (Brown, 2009). In addition, as recruitment of staff becomes more challenging and complex, many companies are strategising activities for attracting, motivating, and retaining staff, and are therefore publicly adopting employee treatment schemes aimed at improving employees' perception of workplace (Jack, 2022; Shan & Tang, 2023).

On the other hand, labour-related expenses are economically significant for companies, representing approximately two-thirds of production costs (Hamermesh, 1995; Jung, Lee, & Weber, 2014; Marshall, Nguyen, Nguyen, & Visaltanachoti, 2021), while the precise economic benefits of activities intended to boost employee motivation and satisfaction are difficult to examine and measure, and such spending can

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therefore be hard to justify. Given this, management often remains uncertain about whether and how employee satisfaction affects corporate performance and value (Edmans et al., 2024; Fauver, McDonald, & Taboada, 2018), and thus, tend to hesitate to invest in schemes designed to raise employees' level of job satisfaction.

Our study addresses this research problem by mobilising the concept of company's labour investment efficiency (CLIE) as a crucial measure of performance. More specifically, this study aims to better understand the contribution and effects of employee satisfaction on CLIE. CLIE has earned a reputation as an established measure of corporate financial performance when it comes to investment in labour forces (Ghadhab, Nizar, Benkraiem, & Lakhali, 2023; Ghaly, Dang, & Stathopoulos, 2020; Pinnuck & Lillis, 2007). The ultimate purpose of CLIE is to indicate how successfully companies tackle workforce-related challenges by measuring the difference between the actual and optimal levels of investment in labour. Understanding the informative value of employee' online reviews offers 'unsanctioned' employee perceptions independent of management or union control (Saqib, Allen, Martínez Lucio, & Allen, 2023; Walker, 2020). We therefore deploy the measure of employee satisfaction based on 164,341 ratings covering 302 UK companies posted online on Glassdoor UK over the period 2008–2020.

Existing research provides two competing perspectives on how employee satisfaction affects company performance (Jung et al., 2014; Pinnuck & Lillis, 2007). One stream of research, rooted in human relations theory (Bruce, 2006; Bruce & Nyland, 2011; Mayo, 1933), suggests that satisfied employees are motivated to exert greater efforts, leading to improvement in company performance and value (Chen, Chen, Hsu, & Podolski, 2016; Guo, Huang, Zhang, & Zhou, 2016). Moreover, satisfied employees are more likely to commit to their companies, reducing the latter's exposure to labour market frictions, ultimately leading to higher levels of CLIE (Cao & Rees, 2020; Harter, Schmidt, & Hayes, 2002).

In contrast, agency theory argues that employee empowerment may lead to satisfied but entrenched employees being overpaid or underworked, both of which would be detrimental to company performance and value (Atanassov & Kim, 2009), thus rendering organisational activities to nurture employee satisfaction counterproductive. This brings into question the effectiveness of corporate activities intended to enhance job quality for achieving higher levels of CLIE.

Our study takes this contradiction between the two opposite perspectives as its starting point for empirically investigating the impact of employee satisfaction on CLIE for a sample of 2,333 company-year observations related to 302 companies listed in the UK between 2008 and 2020. Our results show a positive relationship between employee satisfaction and CLIE. Specifically, our findings suggest that employee satisfaction reduces both forms of labour investment inefficiency: overinvestment and underinvestment. This provides evidence to support the argument grounded in human relations theory that higher employee satisfaction leads to more efficient labour investment decisions.

To further investigate our main findings, we examine whether the impact of employee satisfaction on CLIE varies in settings characterised by greater exposure to labour adjustment costs, such as expenses related to recruitment, training, retention, and dismissal (Dixit, 1997). Our results suggest a stronger impact for companies with higher labour intensity. These companies are more exposed to labour market frictions due to their reliance on manpower, and thus benefit more significantly from employee satisfaction. Additionally, our results show that the impact of employee satisfaction on CLIE is amplified for companies that rely more heavily on skilled labour. Labour adjustment costs tend to increase with worker expertise, and these costs are generally high for skilled workers (Dixit, 1997; Mortensen & Pissarides, 1994). Finally, we find that the impact of employee satisfaction is also stronger for companies operating in more competitive industries as intense industry competition increases a company's exposure to labour market frictions.

We conduct multiple tests to ensure the robustness of our main findings. Our results continue to withstand using different measures for

CLIE and after adding more control variables. To address concerns raised by Chen, Hribar, and Melessa (2018) about potential bias when using residuals as dependent variables as the case in our study, we follow their solution by including all first-step and second-step regressors in our models. Our results remain robust even after this adjustment. Additionally, we address endogeneity concerns through a battery of tests, including company fixed effects, a two-stage instrumental model, exogenous analysis, and change specification, all of which consistently support our main results.

This study makes two key contributions to the literature. Firstly, it adds to a growing body of research investigating the determinants of investment efficiency in workforce (Adwan, 2024; Boubaker, Dang, & Sassi, 2022; Ghadhab et al., 2023; Khedmati, Sualihu, & Yawson, 2020; Ma, Kong, & Liu, 2023), by evidencing the important role of employee satisfaction in determining corporate labour investments. Until now, very little attention has been paid to the role of employee perceptions of work in determining the efficiency of investment in labour with the notable exception of Cao and Rees (2020). Cao and Rees (2020) use variables from the database of the Kinder, Lydenberg, Domini & Co (KLD) to assess employee treatment, but these may not fully capture employee sentiments and perceptions, potentially limiting their ability to reflect motivation and commitment. Our paper instead utilises a direct measure of employee satisfaction to examine whether satisfaction affects the efficiency of companies' investment in one of the most crucial production factors, labour. The study thus adds to the current debates on the implications of employee perceptions of workplace (Chen et al., 2016; Edmans et al., 2024; Fauver et al., 2018) and contributes to the growing body of literature in accounting and finance focusing on the 'social' component of ESG performance (Dehaan, Li, & Zhou, 2023).

Our second contribution is related to empirical studies on employee satisfaction. Prior work has attempted investigating the relationship between employee satisfaction and corporate performance by examining company practices (Delery & Shaw, 2001; Ostroff & Bowen, 2000) and by relying on data collected from a relatively small number of surveyed employees (Chatzopoulou, Manolopoulos, & Agapitou, 2022; Harter et al., 2002; Peltokorpi et al., 2023). The present study takes a different approach acknowledging the informative value of 'unsanctioned' employee contributions on social media platforms that have a proven track-record of cultivating the sense of belonging and prompting employees to freely express their emotions and concerns (Saqib et al., 2023). Following emerging research (see Fu, Ji, & Jing, 2023; Rice, Taylor, Wang, Wei, & Ge, 2023; Xu, Dao, & Sun, 2023), we construct a measure of employee satisfaction based on employee perceptions of the workplace that are extracted from publicly available online ratings provided by employees for their respective employers. Thus, the approach this study deploys enables a comprehensive examination of job satisfaction, based on over 160,000 first-hand employee ratings, allowing extensive cross-sectional and time-series variations.

The remainder of the paper is structured as follows. The next section will review the literature and develop our hypotheses. The following sections will present the research method and report and discuss the empirical findings. The final section concludes the paper.

2. Literature review and development of hypotheses

2.1. Determinants of labour investment efficiency

In this section, we review prior research with the focus on CLIE. Earlier empirical studies operationalise CLIE by estimating an optimal level of labour investments (Ghadhab et al., 2023; Jung et al., 2014; Khedmati et al., 2020; Pinnuck & Lillis, 2007) indicating that any investment in labour force above the optimal level justified by the economic conditions represents extra costs and thus reduces financial resources (i.e. overinvestment). In contrast, an investment in labour force below the optimal level signals the underutilisation of available resources (i.e. underinvestment).

Prior studies have explored how CLIE is influenced by macro-level policy factors such as the implementation of a labour protection law as a major policy change (Guo, Tang, & Jin, 2021), changes in property rights (Fan, Weng, & Pan, 2022), political uncertainty (Luo, Li, & Chan, 2020), and the labour-oriented nature of the institutional environment (Jung, Kang, Lee, Zhou, & Stephen., 2022). Researchers have also examined industry characteristics, observing that industry competition (in the form of product market competition) has a negative impact on CLIE (Boubaker et al., 2022). Other studies have investigated the effects of company-level factors, such as ownership characteristics (Adwan, 2024; Ghaly et al., 2020), human resource practices (Anagnostopoulou & Avgoustaki, 2023), cross-listing (Ghadhab et al., 2023), and leadership factors (Tong, Tian, & Cao, 2023) on CLIE. It has been also documented that changes to corporate governance arrangements in companies and the level of stock liquidity affect CLIE (Ee, Hasan, & Huang, 2022; Le & Tran, 2022).

However, despite extensive research consideration of CLIE, little attention is given in existing studies to the role of employee satisfaction in determining the efficiency of investment in labour. The one exception is the work of Cao and Rees (2020), which addresses whether companies that have a healthy workplace environment (based on an indicator of employee treatment) invest more efficiently in labour¹. Therefore, there is still a need for research to address this topic focusing on the perceptions of individual employees (Budhwar & Cumming, 2020).

To formulate our hypothesis regarding the impact of employee satisfaction on CLIE, our review explores the documented evidence of association between employee satisfaction and company performance and value. We present first arguments indicating positive association, followed by those suggesting negative association.

2.2. Arguments suggesting a positive relationship between employee satisfaction and CLIE

The human relations theory, centred on the social aspects of the workplace and rooted in the contributions of industrial theorist Elton Mayo, posits a positive correlation between employee satisfaction and organisational performance (Bruce, 2006; Bruce & Nyland, 2011; Mayo, 1933). Even though Mayo's theory originated in times of unprecedented recession and high unemployment rates in the 1920s (Mayo, 1933), many contemporary studies approach the relationship between employee satisfaction and organisational performance relying on the work of Mayo and his successors (e.g. Deming, Orsini, & Cahill, 2012; Dickson & Roethlisberger, 1966). Given this, there is the need to re-examine the stands of human relations theory in today's business world as its original context no longer pertains. To the contrary, current state of the labour market presents companies with challenges associated with labour shortages and high employee turnover (Ali, Arslan, Chowdhury, Khan, & Tarba, 2022; Hancock, Allen, Bosco, McDaniel, & Pierce, 2013).

There are two potential channels through which job satisfaction can drive company performance and value: motivation and retention. In a traditional manufacturing work environment, employees' outputs were measurable and observable allowing the use of monetary incentives to maximise these outputs (Bonner & Sprinkle, 2002). However, in most contemporary companies, individual employee outputs are increasingly less identifiable. Output-tied incentives can therefore be ineffective or

¹ Cao and Rees (2020) utilise a specific set of variables sourced from KLD database to approximate employee treatment. These variables reflect whether a company has undertaken certain actions or has been associated with concerns pertaining to employee welfare. However, it is important to note that these variables may not necessarily capture the sentiments and perceptions of employees towards their workplace, thus potentially limiting the ability of the variables to fully reflect employee motivation and commitment to their employer.

even destructive in many companies (Kohn, 1993). As argued by Edmans (2011), the role for intrinsic motivators, such as job satisfaction, becomes more important with the reduced effectiveness of extrinsic motivators. Therefore, job satisfaction is crucial to motivate employees to increase their efforts. Thus, 'excess' job satisfaction tends to increase employees' efforts, as they fear being dismissed from jobs with a satisfying work environment (Akerlof, Yellen, & Eds., 1986). 'Excess' job satisfaction is then perceived as a gift by employees who respond by increasing their efforts beyond the job requirements (Akerlof, 1982). Moreover, satisfied employees tend to identify with their employer and internalise their company's objectives, and therefore increase their efforts (Rousseau, 1998). This in turn leads to improvement in company performance and value. The empirical findings by Ji, Guthrie, and Messersmith (2014) and Edmans (2011) indicate that companies deemed to prioritise employee satisfaction in the workplace tend to gain better performance and market value, respectively. Similarly, employee satisfaction is positively associated with lower cost of capital (Fu et al., 2023).

In our paper, we argue that satisfied employees who are more motivated to increase their efforts will result in improvement in CLIE. This is because reduced motivation associated with job dissatisfaction could result in overemployment, as companies might compensate for this by expanding their workforce unnecessarily. Conversely, reduced motivation may also lead to overfiring, causing a deviation from the optimal level of workforce.

Another channel through which job satisfaction can drive company performance and value is retention as satisfied employees are less likely to leave their jobs and search for opportunities elsewhere (Guo et al., 2016). Employee turnover can be expensive for companies as it increases expenditure on recruitment and replacement. There are other indirect costs related to employee turnover, such as leakage of proprietary information, loss of competitive advantage, and customer loss (Bendapudi & Leone, 2002). Furthermore, companies known for maintaining satisfied employees can attract and retain talents and fulfil their workforce requirements without experiencing underemployment or the necessity of excessive staff retention (Qiu, Shaikat, & Tharyan, 2016). Therefore, employee satisfaction can play an important role in reducing costs associated with employee turnover and allow companies to invest in labour at an efficient level.

Taking the above arguments together, it is suggested that employee satisfaction positively affects CLIE.

2.3. Arguments suggesting a negative relationship between employee satisfaction and CLIE

In contrast, another stream of research grounded in agency theory challenges the positive relationship between job satisfaction and organisational performance. For instance, Iaffaldano and Muchinsky (1985) report a poor relationship between job satisfaction and job performance, while Judge, Thoresen, Bono, and Patton (2001) find mixed evidence. The agency theory argues that employee-friendly workplace may result in satisfied but entrenched employees and so exacerbate the agency problems in a company (Holmström, 1979). The argument here revolves around the conflicting interests between self-interested shareholders (the principal), who desire employees to increase their efforts, and self-interested employees/managers (the agent), who seek to obtain benefits with minimum possible efforts. This is because effort comes at a cost on agents and therefore it reduces the agent's utility (e.g. job satisfaction). Hence, the agency problems in a company may lead to the entrenchment of satisfied employees who become overpaid (or underworked), thereby undermining company performance and value (Atanassov & Kim, 2009). For example, seeking to maximise their private benefits, entrenched employees may exert insufficient effort and enjoy excessive pay at the expense of shareholders (ibid.). In such case, companies may experience overinvestment in labour due to overemployment. Furthermore, employee satisfaction may motivate

managers to ‘enjoy a quiet life’ and bypass new, profitable investments that would require employees to adapt to a new setting and therefore shake the existing power dynamics (Bertrand & Mullainathan, 2003). This would result in investment in labour at a level below the optimal level (i.e. underinvestment).

In the light of these arguments, one might also argue that employee satisfaction negatively affects CLIE.

2.4. Hypotheses development

2.4.1. Main hypothesis

Drawing upon human relations theory, one can posit that employee satisfaction plays a pivotal role in improving company performance through motivation and retention. Satisfied employees are more motivated to exert greater efforts, contributing to an enhancement in CLIE. This is because insufficient employee motivation can lead to over-employment through unnecessary workforce expansion, while reduced motivation may result in overfiring, deviating from the optimal labour investment level. Similarly, satisfied employees are more committed to their employers and exhibit lower turnover, reducing a company’s exposure to labour market frictions and enabling efficient labour investment.

Conversely, from the standpoint of agency theory, an alternate argument could be advanced, suggesting that employee satisfaction may exacerbate agency problems. In this view, a workplace environment centred on employee satisfaction might lead to employee entrenchment. This in turn may lead to overinvestment in labour due to underworking or overpayment. Also, the agency problems may lead to underinvestment in labour if managers who seeks “quiet life” avoid profitable projects that would require employee adaptation.

Given these contrasting perspectives and mixed results reported by prior studies, we consider the impact of employee satisfaction on CLIE to be an open empirical question. Therefore, we formulate our main hypothesis in a non-directional form as follows:

H1: Employee satisfaction affects company’s labour investment efficiency.

2.4.2. Additional hypotheses

As the association between employee satisfaction and CLIE might vary with different factors, we develop a set of additional hypotheses to test this variation.

We first consider labour intensity. Employees’ perceptions of the workplace will have a greater impact on employment decisions in contexts where companies face higher levels of labour adjustment costs. Labour adjustment costs include expenses incurred for recruitment, training, retention, and dismissal in addition to wages (Dixit, 1997). Specifically, we investigate whether variations in the impact of employee satisfaction occur with the degree to which a company’s business model relies on labour. This is because labour-intensive companies tend to invest more in human capital than their less labour-intensive counterparts. Consequently, companies with greater reliance on labour in their operations are more exposed to labour market frictions and will be more affected by changes in employee motivation and behaviour driven by their satisfaction.

In line with this argument, prior studies, such as Faleye and Trahan (2011) and Cao and Rees (2020), find that the improved performance associated with better employee treatment is more salient for more labour-intensive companies. Therefore, we argue that the effect of employee satisfaction is expected to be stronger for companies that are more reliant on human capital. We formulate the following hypothesis:

H2: The impact of employee satisfaction on company’s labour investment efficiency is stronger for companies that are more labour intensive.

We then develop a hypothesis testing whether the reliance particularly on skilled labour affects the association between employee satisfaction and CLIE. This analysis is motivated by prior research claims that labour adjustment costs tend to increase with labour expertise and these

costs in general are high for skilled workers (Dixit, 1997; Mortensen & Pissarides, 1994). That is, companies in skilled industries are more exposed to labour market frictions given the fierce competition between rivals over talent (Nguyen, 2022). This in turn increases labour adjustment costs as it is challenging for companies to adjust their labour investment in an efficient manner. In line with this view, existing empirical literature shows that companies in skilled sectors have more financial commitments and tend to hold more precautionary cash. For example, Ghaly, Anh Dang, and Stathopoulos (2017) and Nguyen (2022) observe that companies with a higher share of skilled workers tend to hold more precautionary cash and make tax savings in order to generate more cash. Thus, employee satisfaction is expected to be more important for companies with a higher reliance on skilled workers as satisfied skilled employees will be motivated and committed to their employer, reducing a company’s exposure to labour market frictions. Therefore, the effect of employee satisfaction on CLIE is likely to be stronger for companies with a higher reliance on skilled labour. The hypothesis is formulated as follows:

H3: The impact of employee satisfaction on company’s labour investment efficiency is stronger for companies that are more reliant on skilled labour.

Finally, we develop a hypothesis to investigate whether the relationship between employee satisfaction and CLIE varies with factors other than the reliance on human capital. Specifically, we examine the impact of industrial competition in line with the argument that, with more competition, companies face a greater risk of losing talent and proprietary information to their rivals (Younge & Marx, 2016). Thus, intense industry competition is thought to increase a company’s exposure to labour market frictions, leading to higher labour adjustment costs. As a result, sustaining a high level of employee satisfaction is particularly pertinent for long-term business success in a competitive industry environment (Edmans, 2011; Fu et al., 2023). Zingales (2000) argues that competition increases the demand for innovation and quality improvement, which require talented workers. Therefore, companies in competitive industries are likely to invest in employee-friendly practices to boost employee satisfaction. Chang and Jo (2019) find indeed a positive association between employee friendliness and product market competition. As a result, the relationship between employee satisfaction and CLIE is expected to be stronger for companies operating in highly competitive industries. We develop our final hypothesis accordingly:

H4: The impact of employee satisfaction on company’s labour investment efficiency is stronger for companies in more competitive industries.

Fig. 1 presents a graphical framework to illustrate the impact of employee satisfaction on CLIE. It also shows the heterogeneous impact in terms of labour intensity, reliance on skilled worker, and industry competition.

3. Research design

3.1. Model specification

To test the hypotheses, this study requires a measure for a company’s labour investment efficiency (CLIE). Following earlier research (Adwan, 2024; Boubaker et al., 2022; Ee et al., 2022), our study measures this variable in a two-step process by firstly estimating the net hiring of a company, i.e. the difference between the observed level of labour investment and the level that is justified by economic fundamentals. Specifically, the following model is estimated:

$$\begin{aligned} \text{Net_hire}_{it} = & a_0 + a_1 \text{Sales_growth}_{it} + a_2 \text{Sales_growth}_{it-1} + a_3 \Delta \text{ROA}_{it} \\ & + a_4 \Delta \text{ROA}_{it-1} + a_5 \text{ROA}_{it} + a_6 \text{Return}_{it} + a_7 \text{Size_P}_{it} \\ & + a_8 \text{Liquidity}_{it-1} + a_9 \Delta \text{Liquidity}_{it-1} + a_{10} \Delta \text{Liquidity}_{it} \\ & + a_{11} \text{Leverage_L}_{it-1} + a_{12} \text{LOSSBIN1}_{it-1} + a_{13} \text{LOSSBIN2}_{it-1} \\ & + a_{14} \text{LOSSBIN3}_{it-1} + a_{15} \text{LOSSBIN4}_{it-1} + a_{16} \text{LOSSBIN5}_{it-1} \\ & + \text{Industry dummies} + e_{it} \end{aligned} \quad (1)$$

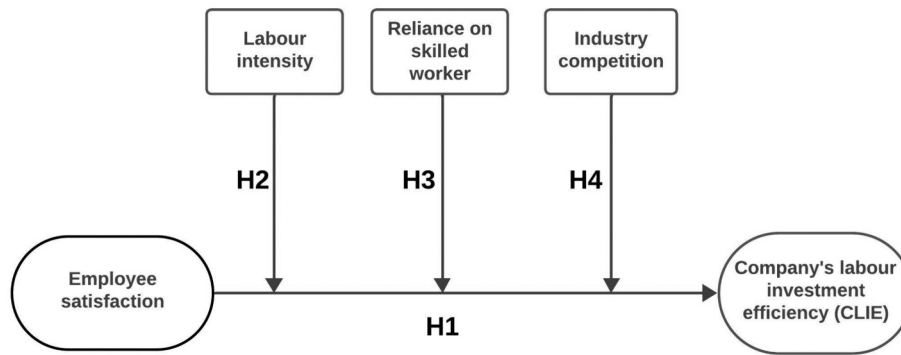


Fig. 1. Graphical framework.

In the above model, Net_hire is the percentage change in the number of employees of company *i* from year *t*-1 to year *t*. The independent variables are a company’s fundamentals that are expected to determine the optimal level of investment in labour. Sales_growth is the percentage change in a company’s total sales; ROA is net income divided by lagged total assets. Return is total share return over the past 12 months; Size_P is the company’s percentile rank of the natural log of market value of equity at the beginning of the year. Liquidity is the quick ratio. Leverage_L is the lagged ratio of debt to total assets; LOSSBIN1 through LOSSBIN5 are five dummy variables that indicate losses ranging between zero and - 0.025, where each variable refers to a specific loss interval of 0.005 (i.e. LOSSBIN1 equals 1 if ROA ranges between zero and - 0.005, LOSSBIN2 equals 1 if ROA ranges between -0.005 and - 0.010, etc.); and ‘industry dummies’ are industry-fixed effects. Detailed definitions of all the variables are provided in Appendix A.

The study, second, uses absolute value of the residuals from model (1) as proxy for a company’s labour investment efficiency (CLIE). Specifically, Investment_Inefficiency which is the residuals from model (1) capturing the deviations from the optimal level of investment in labour. Investment inefficiency is the ‘other side of the coin’ of investment efficiency. This means that higher values of Investment_Inefficiency reflect greater deviation from the level of investment in labour that is suggested by the fundamentals (i.e. a lower level of CLIE).

To test the main hypothesis in this paper (H1), we follow existing empirical work on CLIE (Boubaker et al., 2022; Ee et al., 2022; Jung et al., 2014) and estimate the following company fixed effects model²:

$$\text{Investment_Inefficiency}_{it} = \beta_0 + \beta_1 \text{Satisfaction}_{it} + \text{Control}_{n,it} + e_{it} \quad (2)$$

Satisfaction is the mean value of individual employees’ overall ratings of their employing company in a fiscal year. Employee ratings are extracted from the website of Glassdoor UK. The coefficient β_1 is expected to be negative (positive), indicating a reduction (increase) in labour investment inefficiency with higher level of employee satisfaction. To facilitate comparability with previous studies on labour investment efficiency (Adwan, 2024; Boubaker et al., 2022; Ghadhab et al., 2023; Khedmati et al., 2020), the study uses an array of control variables that could affect labour investment efficiency including:

² We conduct the Durbin-Wu-Hausman (DWH) test for endogeneity (Hausman, 1978; Schmid & Walter, 2012) to assess whether instrumental variable methods are necessary for estimating the equation, as opposed to Ordinary Least Squares (OLS) with fixed effects models, ensuring unbiased and consistent estimates. The results obtained (Chi-squared = 0.945 and *P* = 0.331) suggest that we cannot reject the use of OLS-based estimation over instrumental variable estimation. Therefore, we report our findings using OLS with fixed effects models. However, as an additional analysis, we rerun instrumental variable estimation, as detailed in Section 4.6. This section also provides an explanation of the instrumental variable used in the analysis—the three-year lagged value of pension expenses per employee—along with other steps taken to mitigate endogeneity concerns in our paper.

market-to-book ratio (MTB), the natural logarithm of total assets (Size), the quick ratio (Liquidity), leverage (Leverage), a dummy variable equal to one if a company pays dividends to common shareholders (Dividend), the ratio of tangible assets to total assets (Tangibility), a dummy variable equal to one if ROA is negative (Loss), the ratio of number of employees to total assets (Labour_intensity), volatility of cash flow (σ CFO), volatility of sales (σ Sales), volatility of net hiring (σ Hiring), and the abnormal nonlabour investments (Abs_other_investments). The model also includes company- and year-fixed effects. Appendix A provides detailed definitions of all the variables used in this paper.

To test each of the additional hypotheses in the paper, we follow prior studies (Ghadhab et al., 2023; Le & Tran, 2022), and include interaction variables in Model (2) that interacts with the variable Satisfaction. Specifically, to assess whether the impact of employee satisfaction varies with labour intensity (H2), we run the following model:

$$\begin{aligned} \text{Investment_Inefficiency}_{it} = & \mu_0 + \mu_1 \text{Satisfaction}_{it} + \mu_2 \text{Labour_Rank}_{it} \\ & + \mu_3 \text{Labour_Rank}_{it} * \text{Satisfaction}_{it} + \text{Control}_{n,it} \\ & + e_{it} \end{aligned} \quad (3)$$

Labour_Rank represents the yearly quartile rank of the ratio of the number of employees to total assets. This rank ranges from 0 to 3, which is then scaled by 3 to normalise the range from 0 (indicating the least labour-intensive companies) to 1 (representing the most labour-intensive companies). This normalisation allows for easier interpretation. The ratio of the number of employees to total assets has been commonly employed in prior studies to capture labour intensity (see Devos & Rahman, 2023). Similarly, we use a quartile rank of intangible assets intensity (Intangible_Rank) as an alternative proxy for labour intensity. Bowen, DuCharme, and Shores (1995) explain that companies with more intangible assets in their balance sheets rely more on human capital rather than tangible assets, such as machines or equipment, for their operations. Intangible assets intensity is calculated as one minus the ratio of gross property, plant, and equipment divided by total assets. A statistically significant coefficient on the interaction term, μ_3 , suggests that the association between employee satisfaction and CLIE is stronger for companies that are more labour-intensive.

Moving to the following hypothesis to test whether the impact of employee satisfaction varies with companies’ reliance on skilled labour (H3), we run the following model:

$$\begin{aligned} \text{Investment_Inefficiency}_{it} = & \gamma_0 + \gamma_1 \text{Satisfaction}_{it} + \gamma_2 \text{R\&D}_{it} \\ & + \gamma_3 \text{R\&D}_{it} * \text{Satisfaction}_{it} + \text{Control}_{n,it} + e_{it} \end{aligned} \quad (4)$$

R&D is a dummy variable that takes the value of one if a company reports research and development (R&D) expenses in its financial statements, and zero otherwise. The idea here is that R&D and innovation activities increase the demand for skilled labour to create additional

value for companies. This approach is consistent with that taken in earlier research (e.g. Cao & Rees, 2020; Ghaly, Dang, & Stathopoulos, 2015). A statistically significant coefficient γ_3 suggests that the association between employee satisfaction and CLIE is stronger for companies that are more reliant on skilled labour.

Finally, to examine whether the impact of employee satisfaction on CLIE varies with industry competition, we utilise the following model:

$$\text{InvestmentInefficiency}_{it} = \delta_0 + \delta_1 \text{Satisfaction}_{it} + \delta_2 \text{HHIRank}_{it} + \delta_3 \text{HHIRank}_{it} * \text{Satisfaction}_{it} + \text{Control}_{n,it} + e_{it} \tag{5}$$

HHI_Rank represents the yearly quartile rank of the inverse value of the Herfindahl–Hirschman Index (HHI), which measures product market competition at the industry level. We use the inverse because a higher HHI value indicates lower competition. HHI is calculated by summing the squared market shares of companies within each industry, where market share is determined by a company’s sales relative to total industry sales for the same year. We transform the inverse of HHI into quartile ranks, normalising it to range from zero (indicating the least competitive industries) to one (indicating the most competitive industries). A statistically significant coefficient on the interaction term, δ_3 , indicates that the relationship between employee satisfaction and CLIE varies significantly depending on the level of industry competition. Specifically, a statistically significant coefficient suggests that the association between employee satisfaction and CLIE is stronger for companies operating in more competitive industries.

3.2. Sample and data sources

Our paper draws on information available for companies listed in the FTSE 350 Index. Data on employee satisfaction were collected from the Glassdoor UK website. Glassdoor is a job and recruiting website that solicits employees’ reviews on their employing companies. The data on this site has been increasingly used by researchers from various disciplines who recognised the informative value, the rapid development, and utilisation of social media platforms can bring for exploring employee perspectives on workplace environment (Campbell & Shang, 2022; Hope, Li, Lin, & Rabier, 2021). Glassdoor reviews contain rich information about the working conditions and job satisfaction provided by rank-and-file employees. Ratings on social media platforms, such as Glassdoor, reveal a direct and unfiltered perception of a company from its employees’ perspective (Saqib et al., 2023). Teoh (2018) highlights the importance of employee contributions on Glassdoor as they reveal information about workplace conditions unavailable from other sources. Glassdoor’s aggregation of a large number of ratings for each company provides a more reliable gauge of employee satisfaction. Besides, the availability of ratings for several companies over multiple years allows us to explore issues related to employee satisfaction across companies over time. Among other aspects of employment, Glassdoor UK requests employees to provide an overall rating of their employer based on a scale from 1 to 5. In our study, we follow Rice et al. (2023) and Xu et al. (2023) in using this rating as a measure of employee satisfaction.

To justify the measure we deployed, we have also checked for its potential vulnerabilities. For instance, social media platforms might become a channel for frustrated employees to vent their job dissatisfaction and associated concerns (Richards, 2008). In addition, management might attempt engaging in practices to manipulate online reviews by incentivising employees to post high ratings and positive reviews (Winkler & Fuller, 2019). It is important to notice that in order to address the above concerns and mitigate possible risks, Glassdoor has developed several mechanisms. As explained by Dube and Zhu (2021), the Glassdoor’s give-to-get policy mandates that users contribute to the platform to access it, encouraging a more balanced review system. It also utilises a combination of technology and human resources to reduce incentivised reviews (see Chamberlain & Smart, 2017). Therefore, we

Table 1
Sample selection.

Sample selection process	Number of companies
Companies included in FTSE 350 over 2008–2020	759
Excluding:	
Companies not found on Glassdoor	(131)
Companies with fewer than 10 reviews on Glassdoor	(128)
Financial sector companies	(80)
Companies with missing data on Refinitiv database	(118)
Study sample	302

believe that average employee ratings on Glassdoor reflect a well-rounded perception of job satisfaction among employees, providing this study with a suitable measure of job satisfaction.

Table 1 delineates the sample selection process. Our study identifies unique companies that are included in the FTSE 350 between 2008 and 2020 (759 companies in total). We manually match these companies with those listed on the Glassdoor UK platform. In this process, 628 companies are found with employee ratings on Glassdoor UK. Companies with fewer than 10 individual ratings over the study period are excluded (128 companies). In addition, we drop financial companies from the sample (80 companies) due to their unique fundamentals and performance measures. This process results in a sample of 420 companies. Their financial and corporate governance data are extracted from the Refinitiv database. We exclude observations with missing data required to run the estimations in eq. (1) and (2). The analysis sample comprises 2,333 company-year observations relating to 302 non-financial companies that received 164,341 employee ratings in total between 2008 and 2020. We use the extracted individual ratings to calculate the average of yearly rating for each company in our sample over the study period. Table 2 provides descriptive statistics for the key variables used in the main regression in eq. (2). The mean of abnormal labour investment efficiency is 0.078 over the study period. The average rating of employee satisfaction stands at 3.1840. This number is consistent with that reported by Fu et al. (2023) for their sample of US companies.

4. Results

4.1. The results of testing the main hypothesis (H1)

The results of testing our main hypothesis (H1) are reported in Table 3. Column (1) shows that the estimated coefficient on employee satisfaction is negative and statistically significant ($p < 0.01$). It indicates that companies that are highly rated by their employees tend to have investment in labour that is closer to the optimum level of labour investment suggested by the company’s fundamentals. In other words, the statistical findings suggest that employee satisfaction determines

Table 2
Descriptive statistics.

Variable	Mean	SD	p25	Median	p75
Investment_Inefficiency	0.078	0.095	0.022	0.048	0.098
Satisfaction	3.184	0.701	2.833	3.196	3.586
MTB	3.539	5.617	1.338	2.451	4.452
Size	14.727	1.703	13.501	14.597	15.783
Liquidity	0.922	0.625	0.544	0.815	1.124
Leverage	0.210	0.166	0.074	0.199	0.307
Dividend	0.865	0.342	1	1	1
Tangibility	0.270	0.233	0.075	0.204	0.403
Loss	0.149	0.356	0	0	0
Labour_intensity	0.008	0.009	0.002	0.005	0.009
σCFO	0.232	0.510	0.020	0.053	0.159
σSales	0.090	0.199	0.007	0.021	0.073
σHiring	0.114	0.113	0.043	0.074	0.141
Abs_other_investments	0.057	0.050	0.027	0.050	0.073

Note: All variables are defined in Appendix A.

Table 3
Main hypothesis: The impact of employee satisfaction on labour investment efficiency.

Variables	(1) Investment_Inefficiency (Absolute Net_hire)	(2) Investment_Inefficiency (overinvestment)	(3) Investment_Inefficiency (underinvestment)
Satisfaction	-0.009*** [0.003]	-0.012** [0.006]	-0.009** [0.004]
MTB	0.001 [0.001]	0.001 [0.002]	-0.000 [0.000]
Size	0.003 [0.008]	0.021 [0.015]	-0.006 [0.007]
Liquidity	0.005 [0.008]	-0.009 [0.009]	0.028** [0.013]
Leverage	-0.016 [0.025]	-0.027 [0.038]	-0.021 [0.035]
Dividend	-0.008 [0.007]	0.001 [0.011]	-0.010 [0.009]
Tangibility	-0.012 [0.046]	-0.049 [0.096]	0.029 [0.051]
Loss	0.008 [0.007]	0.001 [0.011]	0.014 [0.010]
Labour_intensity	-2.720*** [0.950]	1.096 [1.621]	-4.539*** [1.184]
σCFO	-0.009 [0.021]	-0.021 [0.018]	0.006 [0.016]
σSales	-0.006 [0.024]	0.039 [0.037]	-0.035 [0.033]
σHiring	0.302*** [0.041]	0.413*** [0.068]	0.169*** [0.055]
Abs_other_investments	0.029 [0.072]	0.027 [0.073]	0.089 [0.138]
Constant	0.061 [0.119]	-0.230 [0.242]	0.192* [0.112]
Observations	2,333	1,091	1,242
R-squared	0.105	0.167	0.118
Company fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes

Notes: In this table, column (1) shows the main results regarding the impact of employee satisfaction on labour investment inefficiency. Column (2) reports the results of testing the impact of employee satisfaction on labour investment inefficiency for companies that exhibit labour overinvestment. Column (3) reports the results of testing the impact of employee satisfaction on labour investment inefficiency for companies that exhibit labour underinvestment. All variables are defined in Appendix A. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The robust standard errors are reported in brackets and clustered by company.

CLIE positively, lending support to *HI* based on the arguments by human relations theory. Necessarily, then, the results do not support the contrary arguments as suggested by agency theory.

Our results are not only statistically significant but also economically meaningful. For example, a one standard deviation increase in employee satisfaction as measured by Glassdoor rating is associated with a 8 % decrease in the divergence from the optional level of labour investment. Likewise, our results suggest that increasing the Glassdoor rating from 2 to 4 would lead to a 18 % decrease in the deviation from the optimal level of labour investment.³

As investment inefficiency can take two forms – overinvestment and underinvestment – we divide up the residuals from eq. (1) based on whether they are positive or negative. Specifically, positive residuals indicate an investment in labour above the level explained by fundamentals. In contrast, negative residuals signal an investment level in labour below that predicted by fundamentals. The results in column (2) of Table 3 suggest that for the subsample of companies that are over-investing, there is a reduction in overinvestment in labour when there is a higher level of employee satisfaction. Similarly, the results reported in column (3) indicate that a higher level of employee satisfaction is associated with a reduction in underinvestment for the subsample of underinvesting companies. Put another way, companies with a higher rating from their employees have an investment level closer to that justified by economic fundamentals. Overall, the findings for both

subsamples continue to support the hypothesis that employee satisfaction positively affects CLIE.

The main results indicate that Glassdoor ratings by employees negatively impact a company's abnormal net hiring, suggesting that employee satisfaction facilitates more efficient labour investments. These results are in line with the view that satisfied employees are more motivated to increase their efforts and more committed to their employers, leading to an improvement in company performance. This main finding is consistent with previous research, such as Fu et al. (2023), which also demonstrates that employee satisfaction is associated with a reduction in equity capital. Additionally, it supports studies like Cao and Rees (2020), which document an association between employee-friendly practices and CLIE.

4.2. The results of testing the perception of agency theory

In this section, we delve into the agency perspective regarding employee satisfaction. According to this viewpoint, high employee satisfaction arises from a conflict of interests between principal and agent. If this contention holds true, the impact of employee satisfaction on abnormal net hiring should be more evident in contexts with greater agency issues. Thus, we explore two scenarios where managers may act opportunistically to the detriment of shareholders (i.e. higher agency problems).

The first scenario involves companies with a lower proportion of independent directors on their boards (i.e. lower board independence). Previous studies have demonstrated that independent directors can

³ Investment_Inefficiency decreases from 0.099 to 0.081 as the average employee rating improves from 2 to 4.

significantly mitigate agency problems and dissuade managers from taking actions detrimental to shareholders' wealth (Adams, Hermalin, & Weisbach, 2010). Therefore, we introduce an interaction term in eq. (2), *Independ_Rank*, which interacts with employee satisfaction. Similar to the previous cross-sectional analyses, *Independ_Rank* represents yearly quartile ranks based on the inverse of the percentage of independent directors on a company's board. It ranges from zero (for companies with the highest level of board independence) to one (for companies with the lowest level of board independence). The agency perspective predicts that the impact of employee satisfaction on investment inefficiency (the inverse measure of CLIE) would be positive (i.e. it increases deviation from the optimal level of workforce investment) with lower board independence. However, the results reported in column (1) of Table 4 do not support this notion. While the estimated coefficient on the interaction terms is positive, it is not statistically significant.

The second scenario is based on the level of free cash flow within a company. Free cash flow refers to the surplus cash flow a company

Table 4
Examining the impact variation with the percentage of independent directors and free cash flow.

Variable	(1) Independent directors	(2) Free cash flow
Satisfaction	-0.011** [0.005]	-0.011* [0.005]
Independ_Rank	-0.011 [0.025]	
Independ_Rank*Satisfaction	0.007 [0.008]	
Freecash_Rank		-0.003 [0.027]
Freecash_Rank*Satisfaction		0.003 [0.008]
MTB	0.001 [0.001]	0.001 [0.001]
Size	0.017* [0.009]	0.004 [0.008]
Liquidity	0.007 [0.008]	0.005 [0.008]
Leverage	-0.018 [0.026]	-0.015 [0.025]
Dividend	-0.010 [0.008]	-0.009 [0.007]
Tangibility	0.008 [0.048]	-0.014 [0.046]
Loss	0.010 [0.008]	0.009 [0.007]
Labour_intensity	-1.587 [1.074]	-2.706*** [0.948]
σCFO	-0.010 [0.021]	-0.008 [0.021]
σSales	-0.008 [0.024]	-0.006 [0.024]
σHiring	0.289*** [0.040]	0.303*** [0.041]
Abs_other_investments	0.043 [0.078]	0.031 [0.073]
Constant	-0.148 [0.139]	0.056 [0.127]
Observations	2,201	2,333
R-squared	0.1	0.105
Company fixed effect	Yes	Yes
Year fixed effect	Yes	Yes

Notes: This table presents the findings from testing whether the relationship between employee satisfaction and labour investment inefficiency varies with percentage of independent directors in column (1) and free cash flow in column (2). Number of observations drops in column (1) due to missing data on independent directors in the Refinitiv database. All variables are defined in Appendix A. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The robust standard errors are reported in brackets and clustered by company.

possesses beyond what is necessary to fund all projects with positive net present values (Jensen, 1986). It is calculated as net cash flow from operating activities minus capital expenditures divided by total assets. Earlier research has suggested that high levels of free cash flow incentivise managers to act opportunistically and overinvest in labour beyond the optimal level to enhance their reputation (Cao & Rees, 2020; Jensen, 1986). Managers might exploit the excess free cash flow to over-hire employees to create workplaces with strong employee relations. While this could contribute to higher employee satisfaction, it could be detrimental to the efficiency of labour investment. For this argument to hold, the impact of employee satisfaction on labour investment inefficiency (the inverse of CLIE) would become more positive and statistically significant as the level of free cash flow in a company rises. However, as reported in column (2) of Table 4, the estimated coefficient on the interaction between employee satisfaction and the quartile rank of free cash flow, *Freecash_Rank*Satisfaction*, is positive but not statistically significant.

Overall, the results of analyses using the percentage of independent directors and free cash flow do not support the agency view, i.e. employee satisfaction does not increase the agency problems in the company and determine efficiency of labour investment negatively.

4.3. The results of testing the additional hypotheses (H2, H3, and H4)

To further investigate the impact of employee satisfaction on efficient labour investment, we test additional hypotheses addressing cross-sectional variations in this impact.

Columns (1) and (2) of Table 5 present the results of H2, testing whether the association between employee satisfaction and CLIE varies with labour intensity. The estimated coefficients on the interaction terms between *Labour_Rank* and *Satisfaction*, as well as between *Intangible_Rank* and *Satisfaction*, are both negative and statistically significant ($p < 0.05$). Since higher values of *Labour_Rank* and *Intangible_Rank* indicate greater labour intensity, our findings suggest that the influence of employee satisfaction on CLIE is stronger for companies with higher labour intensity, supporting H2. This is consistent with previous research indicating that factors related to employee welfare play a more significant role in labour-intensive companies (e.g. Bowen et al., 1995; Fu et al., 2023).

In column (3) of Table 5, we report the results of testing H3, examining whether the association between employee satisfaction and CLIE varies with the extent to which a company relies on skilled labour. The negative and statistically significant coefficient on the interaction between *R&D* and *Satisfaction* ($p < 0.05$) suggests that the negative impact of employee satisfaction on investment inefficiency is more pronounced for companies with R&D expenses in their financial statements compared to those without. Since higher R&D expenses indicate a greater reliance on skilled workers (Ghaly et al., 2015), our results support H3, indicating that the association between employee satisfaction reflected by ratings on Glassdoor and CLIE is stronger for companies more reliant on skilled labour. This stronger association aligns with the notion that labour adjustment costs tend to be higher for more skilled workers (Dixit, 1997; Mortensen & Pissarides, 1994).

Moving to the final hypothesis, as reported in column (4) of Table 5, the estimated coefficient on the interaction between *HHI_Rank* and *Satisfaction* is negative and statistically significant ($p < 0.05$). This lends support to H4, suggesting that the impact of employee satisfaction is more pronounced for companies in more competitive industries. This result also aligns with empirical evidence reported by Chang and Jo (2019), indicating that companies invest more in employee-friendly practices when they belong to more competitive industries, as increasing employee satisfaction is crucial to attracting and retaining employees in such industries.

Table 5

Additional Hypotheses: examining the impact variation with labour intensity, reliance on skilled labour, and industry competition.

Variables	Labour intensity		Skilled labour	Industry competition
	(1)	(2)	(3)	(4)
Satisfaction	0.006 [0.005]	0.000 [0.004]	-0.005 [0.004]	-0.001 [0.004]
Labour_Rank	0.071** [0.035]			
Labour_Rank*Satisfaction	-0.027*** [0.010]			
Intangible_Rank		0.060 [0.037]		
Intangible_Rank*Satisfaction		-0.019** [0.009]		
R&D			0.039 [0.026]	
R&D*Satisfaction			-0.011** [0.005]	
HHI_Rank				0.061* [0.033]
HHI_Rank*Satisfaction				-0.016** [0.008]
MTB	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]
Size	0.002 [0.008]	0.004 [0.008]	0.003 [0.007]	0.004 [0.007]
Liquidity	0.005 [0.008]	0.005 [0.008]	0.005 [0.008]	0.005 [0.008]
Leverage	-0.014 [0.025]	-0.015 [0.024]	-0.019 [0.025]	-0.017 [0.024]
Dividend	-0.009 [0.007]	-0.008 [0.007]	-0.008 [0.007]	-0.008 [0.007]
Tangibility	-0.008 [0.046]	-0.011 [0.054]	-0.009 [0.046]	-0.013 [0.045]
Loss	0.008 [0.007]	0.008 [0.007]	0.007 [0.007]	0.008 [0.007]
Labour_intensity	-2.687*** [0.929]	-2.686*** [0.936]	-2.691*** [0.937]	-2.740*** [0.928]
σCFO	-0.010 [0.021]	-0.009 [0.021]	-0.009 [0.021]	-0.010 [0.021]
σSales	-0.007 [0.025]	-0.005 [0.024]	-0.006 [0.024]	-0.005 [0.024]
σHiring	0.300*** [0.041]	0.302*** [0.041]	0.305*** [0.042]	0.301*** [0.041]
Abs_other_investments	0.027 [0.069]	0.032 [0.073]	0.028 [0.072]	0.028 [0.072]
Constant	0.032 [0.121]	0.026 [0.117]	0.048 [0.120]	0.030 [0.118]
Observations	2,333	2,333	2,333	2,333
R-squared	0.11	0.107	0.106	0.107
Company fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes

Notes: This table presents the findings from testing whether the relationship between employee satisfaction and labour investment inefficiency varies with labour intensity in columns (1) and (2), reliance on skilled labour in column (3), and industry competition in column (4). All variables are defined in Appendix A. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The robust standard errors are reported in brackets and clustered by company.

4.4. The economic implications of employee satisfaction and labour investment inefficiency

To investigate the economic implications of employee satisfaction (Satisfaction) and labour investment on efficiency (Investment_Inefficiency), we follow prior studies such as Jung et al. (2014) and Cao and Rees (2020). Specifically, we examine the impact of employee satisfaction and labour investment inefficiency on two measures of company performance: return on assets (ROA) and employee productivity (Income_per_employee). These measures are widely used in prior literature related to employees and employment (e.g. Gao, Zhang, & Zhang, 2018).

The results are reported in Table 6. In column (1), the dependent variable is ROA, where the estimated coefficient on Satisfaction is positive and statistically significant ($p < 0.05$). This suggests that company

return on assets increases with higher ratings posted by employees on the Glassdoor UK website. In line with our expectation, the estimated coefficient on labour investment inefficiency, Investment_Inefficiency, is negative and statistically significant ($p < 0.01$). Similarly, in column (2), the estimated coefficients on Satisfaction and Investment_Inefficiency are positive and negative, respectively, although only the former is statistically significant.

Overall, the results of these additional analyses suggest that employee satisfaction and deviation from the optimal level of investment in labour have economic implications in line with our expectations. Specifically, we document that employee satisfaction generally improves company performance, whereas sub-optimal investment in labour is costly in terms of company performance.

Table 6

The impact of employee satisfaction and labour investment inefficiency on performance.

Variables	(1)	(2)
	Dependent variable: ROA	Dependent variable: Income_per_employee
Satisfaction	0.007** [0.003]	1.262** [0.598]
Investment_Inefficiency	-0.053*** [0.019]	-2.193 [4.921]
MTB	0.001*** [0.000]	0.095 [0.072]
Size	-0.035** [0.016]	-5.667*** [1.704]
Liquidity	0.001 [0.025]	3.220 [2.147]
Leverage	-0.101** [0.042]	-25.042*** [5.682]
Dividend	0.024** [0.012]	0.198 [1.799]
Tangibility	-0.021 [0.043]	17.641* [9.566]
Loss	-0.103*** [0.007]	-26.097*** [2.219]
Labour_intensity	-1.637* [0.989]	-1134.422*** [375.300]
σCFO	0.007 [0.009]	6.318 [3.835]
σSales	-0.000 [0.018]	-1.128 [6.540]
σHiring	-0.000 [0.024]	-4.102 [8.384]
Abs_other_investments	0.278*** [0.092]	63.594*** [14.155]
Constant	0.562** [0.221]	98.752*** [26.561]
Observations	2333	2333
R-squared	0.337	0.364
Company fixed effect	Yes	Yes
Year fixed effect	Yes	Yes

Notes: This table presents the results of testing the impact of employee satisfaction and labour investment inefficiency on company performance. In column (1), the dependent variable is return on assets. In column (2), the dependent variable is income per employee. All variables are defined in Appendix A. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The robust standard errors are reported in brackets and clustered by company.

4.5. Robustness checks

To check the robustness of the results, this study follows prior research and uses several alternative proxies for CLIE in the main analysis. First, following Cella (2020), the median of net hiring at the industry level is utilised as the optimal level of investment in labour. Second, following the work of Biddle, Hilary, and Verdi (2009), we use an alternative proxy for labour investment inefficiency by estimating the absolute value of the residuals from a regression in which net hiring is a function of sales growth. Third, we add more control variables to eq. (1) similar to those used by Pinnuck and Lillis (2007). Specifically, the following controls are added: capital expenditure, R&D expenses, acquisition expenses, industry-level unionisation rate, and the country-level logarithm of GDP per capita. Finally, this study adds both year and industry fixed effects to the model in eq. (1) (Pinnuck & Lillis, 2007). The first four columns of Table 7 show that our main results continue to hold using these different specifications to measure labour investment inefficiency (i.e. the inverse measures of investment efficiency).

The measure of CLIE used in this study depends on the residuals from eq. (1) following prior studies such as Biddle et al. (2009) and Ee et al. (2022). However, Chen et al. (2018) challenge this approach and find

that it can generate biased coefficients and standard errors, leading to incorrect inferences. Following their suggestion to address this issue, we run a regression combining the explanatory variables of eq. (1) and (2) in one regression. The results reported in column (5) of Table 7 support the main inferences that employee satisfaction negatively affects and abnormal net hiring.

Additionally, to address concerns about potential bias in our results stemming from company-year observations with a small number of ratings, we conduct a sensitivity analysis. This involves restricting our sample to company-year observations with a minimum of 10 individual employee ratings. As detailed in column (6) of Table 7, our main findings regarding the impact of employee satisfaction on CLIE remain virtually unchanged following this restriction.

Finally, to reduce the risk of multicollinearity in our examination of H2, which investigates the association between employee satisfaction and CLIE in relation to labour intensity, we exclude certain variables. The introduced interaction variables are likely to correlate with some existing controls. Specifically, we exclude Labour_intensity in column (1) and Tangibility in column (2), as they are correlated with Labour_Rank and Intangible_Rank, respectively. Despite these exclusions, the results, as shown in Table 8, remain consistent.

4.6. Endogeneity tests

Establishing causality between employee satisfaction and CLIE could be challenged by the absence of appropriate exogenous shock. For example, it could be argued that companies with efficient investments in labour have more resources to provide a workplace environment and incentives that improve employee satisfaction. In addition, there might be omitted variables that drive the results and influence both employee satisfaction and CLIE, such as corporate culture and industry characteristics.

Multiple approaches are employed in this study to mitigate potential endogeneity concerns in the relationship between the key variables, i.e. employee satisfaction and CLIE. First, we use company fixed effects in the main model to alleviate the effect of unobservable time-invariant omitted variables at the company level.

Second, we use an instrumental variable for employee satisfaction in a two-stage least squares (2SLS) estimation. Following prior research, such as Bae, Kang, and Wang (2011) and Ghaly et al. (2015), historical pension expenses are used as an instrument in the first stage. In particular, the three-year lagged value of pension expenses per employee was considered as a determinant of CLIE.⁴ We perform two tests to verify the inclusion of the instrumental variable. The underidentification test is performed using the Kleibergen-Paap rank LM statistic and reported at the bottom of Table 9. The statistic is significantly different from zero at the 1% level, suggesting that the model is not underidentified. Additionally, the Cragg-Donald Wald F statistic is calculated (equal to 27.269) to check the potential issue of weak instruments. As reported in Table 9, this statistic is greater than 16.38, the threshold of weak instruments based on the rule of thumb suggested by Staiger and Stock (1997).

The results of the first-stage regression reported in Table 9 show that there is a significant positive effect of historical pension expenses on employee satisfaction. In the second-stage regression, the coefficient on the instrumented employee satisfaction is negative and statistically significant. Overall, the main results of a causal relationship between employee satisfaction and CLIE are confirmed using a two-stage instrumental variable model.

Third, we use the Children and Families Act 2014 as an exogenous change to employee satisfaction. The change in the regulation allows

⁴ A three-year lag of the instrument is used instead of five-year lagged value as in (Bae et al., 2011) to avoid a large drop in sample size due to the lack of historical data on the companies in the sample in the Refinitiv database.

Table 7
Robustness checks I.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Satisfaction	-0.011*** [0.004]	-0.011*** [0.004]	-0.010*** [0.003]	-0.010*** [0.003]	-0.008*** [0.003]	-0.012** [0.006]
MTB	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.000 [0.001]	0.000 [0.000]
Size	0.020* [0.011]	-0.005 [0.012]	0.002 [0.008]	0.006 [0.008]	-0.007 [0.008]	0.002 [0.012]
Liquidity	-0.015* [0.008]	-0.015* [0.009]	0.004 [0.008]	0.001 [0.008]	0.031 [0.021]	-0.002 [0.010]
Leverage	-0.038 [0.038]	-0.011 [0.037]	-0.003 [0.026]	-0.003 [0.026]	0.015 [0.028]	0.028 [0.030]
Dividend	-0.013 [0.012]	-0.029*** [0.011]	-0.007 [0.008]	-0.011 [0.007]	-0.018*** [0.007]	-0.004 [0.010]
Tangibility	-0.099* [0.055]	-0.078 [0.050]	0.005 [0.049]	0.000 [0.049]	-0.003 [0.043]	-0.057 [0.055]
Loss	0.007 [0.009]	0.015 [0.010]	0.005 [0.008]	0.003 [0.008]	0.015 [0.011]	0.009 [0.008]
Labour_intensity	-2.884** [1.292]	-3.803*** [1.325]	-2.932*** [1.086]	-2.811** [1.096]	-2.495*** [0.864]	-2.881* [1.531]
σ CFO	-0.039 [0.032]	-0.019 [0.036]	-0.010 [0.022]	-0.010 [0.022]	-0.006 [0.019]	-0.000 [0.009]
σ Sales	-0.038 [0.049]	-0.043 [0.050]	-0.010 [0.027]	-0.019 [0.027]	-0.009 [0.022]	-0.040 [0.028]
σ Hiring	0.378*** [0.063]	0.444*** [0.060]	0.326*** [0.056]	0.321*** [0.057]	0.299*** [0.037]	0.454*** [0.055]
Abs_other_investments	0.160** [0.081]	0.209** [0.083]	0.046 [0.104]	0.077 [0.108]	0.060 [0.062]	-0.069 [0.069]
Constant	-0.117 [0.161]	0.250 [0.180]	0.076 [0.124]	0.023 [0.121]	0.203* [0.115]	0.110 [0.194]
Observations	2,333	2,333	2,333	2,333	2,333	1,388
R-squared	0.098	0.108	0.104	0.102	0.175	0.133
Eq. (1) regressors	No	No	No	No	Yes	No
Company fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results for the impact of employee satisfaction on labour investment inefficiency using different specifications to measure labour investment inefficiency as well as addressing concerns setting from observations with low number of employee ratings. In column (1), the dependent variable, labour investment inefficiency, is calculated as the difference between corporate-level net hiring and the industry-level median of net hiring. In column (2), the dependent variable, labour investment inefficiency, is calculated by estimating the absolute value of the residuals from a regression model where net hiring is regressed on sales growth. In column (3), the dependent variable, labour investment inefficiency, is calculated as the absolute value of the residuals from eq. (1) after incorporating the following control variables: capital expenditure, R&D expenses, acquisition expenses, industry-level unionisation rate, and the country-level logarithm of GDP per capita. In column (4), the dependent variable, labour investment inefficiency, is calculated as the absolute value of the residuals from eq. (1) after adding both year and industry fixed effects. In column (5), the dependent variable, labour investment inefficiency, is calculated as the absolute value of the residuals from eq. (1), consistent with the main analysis approach in the paper, with the addition of regressors from eq. (1) as controls in eq. (2). Column (6) reports the results for the impact of employee satisfaction on labour investment inefficiency by restricting our sample to company-year observations with at least 10 employee reviews.

shared parental leave in the UK. It can be suggested that the act will have a positive impact on employee satisfaction for the industries that tend to hire proportionally more female workers. If the main relationship between employee satisfaction and CLIE holds, the change in regulation will result in a higher level of labour investment efficiency for industries with more female labour. Employee satisfaction in eq. (2) is replaced with a dummy variable, Act, that equals one if it meets two conditions: (i) the company belongs to an industry that has a percentage of female workers above the sample median and (ii) the year is 2014 or later. Indeed, the results in column (1) of Table 10 show that companies in industries with above average female staff exhibit more efficient labour investments following the implementation of the Children and Families Act 2014 relative to companies in industries with a lower percentage of female labour. We also interact the dummy variable, Act, with employee satisfaction to test whether the association between the latter and CLIE is stronger following the change in employment regulation that allows sharing parental leave. Indeed, as reported in column (2) of Table 10, the estimated coefficient on Act*Satisfaction is negative and statistically significant ($p < 0.05$), suggesting a stronger association between satisfaction and CLIE after the Children and Families Act 2014 was implemented.

Finally, this study uses a change specification of eq. (2) to further

address endogeneity concerns. A change specification can help alleviate potential problems in terms of time-invariant, company-level correlated omitted variables as well as the direction of causality (Adwan, Alhaj-Ismail, & Jelic, 2022). The results of change specification are reported in column (3) of Table 10. The coefficient of the change in employee satisfaction is negative and statistically significant, confirming the results of employee satisfaction affecting investment efficiency in labour positively.

Overall, the robustness checks performed in this study support the main empirical finding that employee satisfaction is associated with more efficient investment in labour.

5. Conclusion

Our study addresses a research gap in understanding the relationship between employee job satisfaction and company's labour investment efficiency (CLIE). Recognising the pivotal role of employment decisions in overall company's performance, we draw upon existing research regarding the interplay between employee satisfaction and organisational performance. Our paper advances compelling arguments on two fronts: one advocating for a positive correlation between employee satisfaction and CLIE, aligning with the premises of human relations

Table 8
Robustness checks II.

Variables	(1)	(2)
Satisfaction	0.005 [0.005]	-0.000 [0.004]
Labour_Rank	0.048 [0.035]	
Labour_Rank*Satisfaction	-0.024** [0.010]	
Intangible_Rank		0.063* [0.034]
Intangible_Rank*Satisfaction		-0.019** [0.009]
MTB	0.001 [0.001]	0.001 [0.001]
Size	0.007 [0.007]	0.004 [0.008]
Liquidity	0.006 [0.008]	0.005 [0.007]
Leverage	-0.008 [0.024]	-0.016 [0.023]
Dividend	-0.009 [0.007]	-0.008 [0.007]
Tangibility	-0.009 [0.046]	
Loss	0.008 [0.007]	0.008 [0.007]
Labour_intensity		-2.691*** [0.933]
σCFO	-0.011 [0.020]	-0.010 [0.021]
σSales	-0.004 [0.024]	-0.004 [0.024]
σHiring	0.300*** [0.041]	0.302*** [0.041]
Abs_other_investments	0.032 [0.070]	0.032 [0.073]
Constant	-0.043 [0.114]	0.021 [0.114]
Observations	2333	2333
R-squared	0.105	0.107
Company fixed effect	Yes	Yes
Year fixed effect	Yes	Yes

Notes: This table presents the findings from testing whether the relationship between employee satisfaction and labour investment inefficiency varies with labour intensity. We drop Labour intensity in column (1) and Tangibility in column (2). All variables are defined in Appendix A. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The robust standard errors are reported in brackets and clustered by company.

theory. Simultaneously, we present a counter viewpoint in favour of a negative impact, as posited by agency theory.

We utilise a dataset comprising 164,341 employee ratings associated with 302 companies listed in the UK from 2008 to 2020, resulting in a total of 2,333 company-year observations. We investigate empirically the influence of employee satisfaction on CLIE. The results reveal a positive impact of employee satisfaction, aligning with arguments based on human relations theory, as opposed to agency theory, in explaining its effect on organisational performance. We also find that employee satisfaction is associated with a reduction in both overinvestment and underinvestment in labour. The results hold after using various proxies for CLIE and several approaches to address endogeneity concerns including using models with company fixed effects, a two-stage instrumental model, exogenous analysis, and a change model.

Furthermore, we test three additional hypotheses to investigate whether the impact of employee satisfaction on CLIE varies in settings with greater exposure to labour adjustment costs, such as those related to recruitment, training, retention, and dismissal. We find that the positive impact of employee satisfaction on CLIE is more pronounced in companies with greater labour intensity, a higher dependence on skilled

Table 9
Instrumental variable analysis.

Variables	First stage	Second stage
L3Pension	0.0655** [0.020]	
Satisfaction		-0.055** [0.027]
MTB	0.00578 [0.005]	0.001 [0.001]
Size	0.0805*** [0.023]	0.005 [0.003]
Liquidity	0.087 [0.050]	0.014** [0.006]
Leverage	-0.352 [0.195]	0.015 [0.024]
Dividend	0.0495 [0.063]	-0.003 [0.008]
Tangibility	-0.0372 [0.110]	0.006 [0.013]
Loss	-0.0332 [0.052]	0.007 [0.009]
Labour_intensity	1.249 [2.191]	-0.446** [0.188]
σCFO	0.105* [0.050]	0.004 [0.009]
σSales	-0.199 [0.112]	0.027 [0.022]
σHiring	0.13 [0.202]	0.352*** [0.044]
Abs_other_investments	0.161 [0.446]	0.090 [0.088]
Constant	2.296*** [0.366]	0.095* [0.050]
Observations	1436	1436
R-squared	0.218	0.065
Year fixed effect	Yes	Yes
Kleibergen-Paap rk LM statistic (underidentification test)	Chi-sq = 8.97	P-value = (0.0027)
Cragg-Donald Wald F statistic (weak identification test)	27.269	

Notes: This table shows the results on the association between employee satisfaction and labour investment inefficiency after controlling for endogeneity using a two-stage least squares model (2SLS). The first stage reports the determinants of employee satisfaction including the instrument variable: L3Pension. L3Pension is the three-year lagged value of pension expenses per employee. The second stage includes the instrumented employee satisfaction from the first stage. The lower part of the table shows the values for the two specification tests: the test of under-identification and Cragg-Donald Wald F statistic (weak identification test). Number of observations drops due to missing data on L3Pension in the Refinitiv database. All other variables are defined in Appendix A. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The robust standard errors are reported in brackets and clustered by company.

labour, and operating in a more competitive industry environment.

The findings of our study support the theoretical proposition that higher employee satisfaction leads to more efficient labour investment decisions as companies with satisfied employees seem to maintain a level of labour investment close to the optimal level justified by economic fundamentals. This result could be explained by the notion that satisfied employees tend to put forth more efforts, be more committed to employers, and show lower turnover rates, thus reducing the company's susceptibility to labour market frictions. With this, we also demonstrate that aspects of human relations theory still hold true in today's business world, even though it has changed significantly since the time the theory was initially developed: from unemployment to labour shortages and high turnover.

Our study highlights the crucial importance of finding a way to listen to employee voices in order to better understand how employee perceptions of work affect corporate outcomes. It suggests that interested parties, such as potential investors, can deploy employee reviews to

Table 10
Exogenous analysis and change specification.

	(1) Exogenous variable	(2) Exogenous interaction	(3) Change specification	
Satisfaction		−0.006** [0.003]	DSatisfaction	−0.009** [0.004]
Act	−0.019** [0.008]	0.022 [0.021]		
Act*Satisfaction		−0.013** [0.006]		
MTB	0.001 [0.001]	0.001 [0.001]	DMTB	0.001 [0.001]
Size	0.005 [0.008]	0.005 [0.007]	DSize	0.119*** [0.040]
Liquidity	0.005 [0.008]	0.004 [0.008]	DLiquidity	0.004 [0.013]
Leverage	−0.017 [0.025]	−0.013 [0.025]	DLeverage	0.009 [0.041]
Dividend	−0.008 [0.007]	−0.007 [0.007]	Dividend	−0.002 [0.011]
Tangibility	−0.016 [0.046]	−0.021 [0.046]	DTangibility	0.035 [0.082]
Loss	0.008 [0.007]	0.008 [0.007]	Loss	0.031*** [0.011]
Labour_intensity	−2.814*** [0.991]	−2.945*** [0.981]	DLabour_intensity	1.362 [2.575]
σCFO	−0.009 [0.021]		DσCFO	−0.026 [0.022]
σSales	−0.004 [0.024]		DσSales	−0.043 [0.046]
σHiring	0.301*** [0.041]		DσHiring	0.578*** [0.104]
Abs_other_investments	0.030 [0.072]		DAbs_other_investments	−0.033 [0.064]
Constant	0.013 [0.120]	0.031 [0.118]	Constant	−0.000 [0.017]
Observations	2,333	2,333	Observations	1,916
R-squared	0.103	0.109	R-squared	0.140
Company fixed effect	Yes	Yes	Company fixed effect	Yes
Year fixed effect	Yes	Yes	Year fixed effect	Yes

Notes: This table shows the results on the association between employee satisfaction and labour investment inefficiency after addressing endogeneity using exogenous analysis and change specification. In column (1), we replace employee satisfaction with Act as this variable represents an exogenous change to employee satisfaction after enacting the Children and Families Act 2014 in the UK. Act is a dummy variable that equals to one if it meets two conditions: (i) the company belongs to an industry that has a percentage of female workers above the sample median and (ii) the year is 2014 or later. In column (2), we include the dummy variable, Act, as an interaction term in the main model testing the association between employee satisfaction and labour investment efficiency. In column (3), we run change analysis for the main relations between employee satisfaction and labour investment inefficiency. “D” for the variables indicates the change (first difference) specification. All other variables are defined in Appendix A. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The robust standard errors are reported in brackets and clustered by company.

make more insightful and accurate predictions about labour investment decisions and performance. Similarly, the knowledge gained from understanding employee perception of work and the level of job satisfaction they express also enables businesses to better respond to societal concerns related to workplace. Specifically, management can make use of employee reviews posted on social media platforms to analyse satisfaction and identify areas for improvement to enhance investment in labour.

From this study, a number of potential avenues for future research can be identified. First, the relationship between employee satisfaction and CLIE could be examined in other national and economic contexts than the UK. In addition, it is worth exploring employment contexts beyond publicly listed companies, including private ones, as levels of employee job satisfaction may vary between these two categories. Further research could take into consideration the aspects of the most recent global external shocks, such as the COVID-19 pandemic, and the subsequent recession and socio-political instabilities. Finally, future studies could also investigate further the channels through which employee satisfaction improves employment decisions and other corporate outcomes.

To conclude, our study provides a steppingstone on the path to investigating the determinants of investing efficiently in workforce,

incorporating the perspective of individual employee perceptions of the workplace. We deploy employee-driven social media contributions to develop a measure of employee satisfaction and reveal new insights on how employee perceptions affect the efficient investment in labour. By doing so, we evidence the importance and practical value of employee perspective for deepening scholarly and practitioner understanding of the relationship between job satisfaction and corporate outcomes, as investing efficiently in labour determines organisational success and long-lasting sustainable development.

Funding

This research has been funded by the Leverhulme Trust Grant ‘Understanding workplace democracy through corporate and employee disclosures’ (RPG-2022-098).

Data availability

No

Acknowledgements

We are grateful to the Leverhulme Trust for funding this research project. We would also like to express our gratitude to Tobias Polzer for his valuable contributions to earlier versions of this paper. Furthermore, we are grateful for helpful comments and suggestions from two anonymous referees, Michal Frenkel, Ranko Jelic, Faek Menla Ali, M. Mostak

Ahamed, Andreas Kaeck, Diogenis Baboukardos, Mihai Mutascu, and the participants of the 39th Colloquium of European Group for Organisational Studies, the British Academy of Management 2023 Conference, the 7th edition of the International Conference “Current Economic Trends in Emerging and Developing Countries” (TIMTED-2023), and the 27th annual Financial Reporting and Business Communication (FRBC).

Appendix A. The definition of variables

Variable	Description
Model (1)	
Net_hire	The percentage change in the number of employees of company <i>i</i> from year <i>t</i> -1 to year <i>t</i>
Sales_growth	The percentage change in sales of company <i>i</i> from year <i>t</i> -1 to year <i>t</i>
ROA	The ratio of return on assets of company <i>i</i> in year <i>t</i> . It is calculated by dividing net income in year <i>t</i> by total assets at end of year <i>t</i> -1
Return	Total stock return during fiscal year <i>t</i> for company <i>i</i>
Size_P	The percentile rank of the natural log of market value of equity of company <i>i</i> at the beginning of the year <i>t</i> (i.e., end of year <i>t</i> -1)
Liquidity	The quick ratio of company <i>i</i> in year <i>t</i> . It is the sum of cash, short-term investments, and receivables divided by current liabilities
Leverage_L	The ratio of debt to total assets of company <i>i</i> in year <i>t</i> -1
LOSSBIN	The model in eq. (1) includes five variables (denoted as LOSSBIN) to indicate 0.005 intervals of ROA from 0 to -0.025 for company <i>i</i> in period <i>t</i> -1. For example, LOSSBIN1 equals to 1 if ROA ranges from -0.005 to 0
Model (2)	
Investment_Inefficiency	The absolute value of the residuals from eq. (1). It captures the level of deviation from the optimal level of investment in labour that is determined by a company's fundamentals. This variable measures labour investment inefficiency.
Satisfaction	The mean value of individual employees' overall ratings of their employing company <i>i</i> in a fiscal year <i>t</i>
MTB	The ratio of the market value of equity to the book value of common share of company <i>i</i> in year <i>t</i>
Size	The natural logarithm of total assets for <i>i</i> in year <i>t</i>
Liquidity	The quick ratio of company <i>i</i> in year <i>t</i> . It is the sum of cash, short-term investments, and receivables divided by current liabilities
Leverage	The ratio of debt to total assets of company <i>i</i> in year <i>t</i>
Dividend	A dummy variable that takes the value one if a company <i>i</i> pays common dividends in year <i>t</i> , and zero otherwise
Tangibility	The ratio of tangible assets to total assets calculated by dividing net property, plant, and equipment by total assets of company <i>i</i> in year <i>t</i> .
Loss	A dummy variable that takes the value one if ROA of company <i>i</i> is negative in year <i>t</i> , and zero otherwise.
Labour_intensity	The ratio of number of employees to total assets of company <i>i</i> in year <i>t</i> .
σCFO	The standard deviation of the cash flow from operations (CFO) for company <i>i</i> over the period from <i>t</i> -5 to <i>t</i> -1
σSales	The standard deviation of sales for company <i>i</i> over the period from <i>t</i> -5 to <i>t</i> -1.
σHiring	The volatility of net hiring calculated as the standard deviation of company <i>i</i> 's net hiring over the period from <i>t</i> -5 to <i>t</i> -1
Abs_other_investments	Abnormal nonlabour investments are measured by the absolute value of the residuals from the regression of other investments of company <i>i</i> in year <i>t</i> on sales growth in year <i>t</i> -1. 'Other investments' is the sum of capital expenditure, research and development (R&D) expenditure, and acquisition expenditure, minus cash receipts from the sale of property, plant, and equipment, multiplied by 100 and scaled by the lagged total assets
Other variables	
Labour_Rank	The yearly quartile rank of the ratio of the number of employees to total assets. This rank ranges from 0 to 3, which is then scaled by 3 to normalise the range from 0 (indicating the least labour-intensive companies) to 1 (representing the most labour-intensive companies).
Intangible_Rank	The yearly quartile rank of intangible asset intensity. Intangible assets intensity is calculated as one minus the ratio of gross property, plant, and equipment divided by total assets. The quartile rank ranges from 0 to 3, which is then scaled by 3 to normalise the range from 0 (indicating the least intangible-intensive companies) to 1 (representing the most intangible-intensive companies).
R&D	A dummy variable that takes the value of one if a company reports research and development (R&D) expenses in its financial statements, and zero otherwise.
HHI_Rank	The yearly quartile rank of the inverse value of the Herfindahl–Hirschman Index (HHI). HHI is calculated by summing the squared market shares of companies within each industry, where market share is determined by a company's sales relative to total industry sales for the same year. The quartile rank ranges from 0 to 3, which is then scaled by 3 to normalise the range from 0 (indicating the least competitive industries) to 1 (indicating the most competitive industries).
Independ_Rank	The yearly quartile ranks based on the inverse of the percentage of independent directors on a company's board. The quartile rank ranges from 0 to 3, which is then scaled by 3 to normalise the range from 0 (for companies with the highest level of board independence) to 1 (for companies with the lowest level of board independence).
Freecash_Rank	The yearly quartile ranks based on the free cash flow. Free cash flow is calculated as net cash flow from operating activities minus capital expenditures divided by total assets. The quartile rank ranges from 0 to 3, which is then scaled by 3 to normalise the range from 0 (for companies with the lowest level of free cash flow) to 1 (for companies with the highest level of free cash flow).
Income_per_employee	The ratio of income per employee which is calculated by dividing the net income of a company by the total number of employees.
L3Pension	The three-year lagged value of pension expenses per employee.
Act	A dummy variable that equals one if it meets two conditions: (i) the company belongs to an industry that has a percentage of female workers above the sample median and (ii) the year is 2014 or later. Otherwise, it equals zero.

References

Adams, R. B., Hermalin, B. E., & Weisbach, M. S. (2010). *The role of boards of directors in corporate governance: A conceptual framework and survey*. *Journal of economic literature*, 48(1), 58–107. JSTOR.

Adwan, S. (2024). Does employee ownership improve labour investment efficiency? Evidence from European firms. *Economics Letters*, 238, Article 111717. <https://doi.org/10.1016/j.econlet.2024.111717>

Adwan, S., Alhaj-Ismail, A., & Jelic, R. (2022). Non-executive employee ownership and financial reporting quality: Evidence from Europe. *Review of Quantitative Finance and Accounting*, 59(2), 793–823. <https://doi.org/10.1007/s11156-022-01058-8>

- Akerlof, G. A. (1982). *Labor contracts as partial gift exchange*. *The quarterly journal of economics*, 97(4), 543–569. [JSTOR. https://doi.org/10.2307/1885099](https://doi.org/10.2307/1885099)
- Akerlof, G. A., Yellen, J. L., & (Eds.). (1986). *Efficiency wage models of the labor market*. Cambridge Core: Cambridge University Press. <https://doi.org/10.1017/CBO9780511559594>
- Ali, I., Arslan, A., Chowdhury, M., Khan, Z., & Tarba, S. Y. (2022). Reimagining global food value chains through effective resilience to COVID-19 shocks and similar future events: A dynamic capability perspective. *Journal of Business Research*, 141, 1–12. <https://doi.org/10.1016/j.jbusres.2021.12.006>
- Anagnostopoulou, S. C., & Avgoustaki, A. (2023). The impact of human resource practices on corporate investment efficiency. *International Review of Financial Analysis*, 87, Article 102609. <https://doi.org/10.1016/j.irfa.2023.102609>
- Atanassov, J., & Kim, E. H. (2009). *Labor and corporate governance: International evidence from restructuring decisions*. *The journal of finance*, 64(1), 341–374. [JSTOR. https://doi.org/10.1016/j.jfineco.2010.10.019](https://doi.org/10.1016/j.jfineco.2010.10.019)
- Bae, K.-H., Kang, J.-K., & Wang, J. (2011). Employee treatment and firm leverage: A test of the stakeholder theory of capital structure. *Journal of Financial Economics*, 100(1), 130–153. <https://doi.org/10.1016/j.jfineco.2010.10.019>
- Bendapudi, N., & Leone, R. P. (2002). Managing business-to-business customer relationships following key contact employee turnover in a vendor firm. *Journal of Marketing*, 66(2), 83–101.
- Bertrand, M., & Mullainathan, S. (2003). Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy*, 111(5), 1043–1075. <https://doi.org/10.1086/376950>
- Biddle, G. C., Hilary, G., & Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics*, 48(2), 112–131. <https://doi.org/10.1016/j.jacc.2009.09.001>
- Bonner, S. E., & Sprinkle, G. B. (2002). The effects of monetary incentives on effort and task performance: Theories, evidence, and a framework for research. *Accounting, Organizations and Society*, 27(4), 303–345. [https://doi.org/10.1016/S0361-3682\(01\)00052-6](https://doi.org/10.1016/S0361-3682(01)00052-6)
- Boubaker, S., Dang, V. A., & Sassi, S. (2022). Competitive pressure and firm investment efficiency: Evidence from corporate employment decisions. *European Financial Management*, 28(1), 113–161. <https://doi.org/10.1111/eufm.12335>
- Bowen, R. M., DuCharme, L., & Shores, D. (1995). Stakeholders' implicit claims and accounting method choice. *Journal of Accounting and Economics*, 20(3), 255–295. [https://doi.org/10.1016/0165-4101\(95\)00404-1](https://doi.org/10.1016/0165-4101(95)00404-1)
- Brown, J. (2009). Democracy, sustainability and dialogic accounting technologies: Taking pluralism seriously. *Critical Perspectives on Accounting*, 20(3), 313–342. <https://doi.org/10.1016/j.cpa.2008.08.002>
- Bruce, K. (2006). Henry S. Dennison, Elton Mayo, and human relations historiography. *Management & Organizational History*, 1(2), 177–199. <https://doi.org/10.1177/1744935906064095>
- Bruce, K., & Nyland, C. (2011). Elton Mayo and the deification of human relations. *Organization Studies*, 32(3), 383–405. <https://doi.org/10.1177/0170840610397478>
- Budhwar, P., & Cumming, D. (2020). New directions in management research and communication: Lessons from the COVID-19 pandemic. *British Journal of Management*, 31(3), 441–443. <https://doi.org/10.1111/1467-8551.12426>
- Campbell, D. W., & Shang, R. (2022). Tone at the bottom: Measuring corporate misconduct risk from the text of employee reviews. *Management Science*, 68(9), 7034–7053. <https://doi.org/10.1287/mnsc.2021.4211>
- Cao, Z., & Rees, W. (2020). Do employee-friendly firms invest more efficiently? Evidence from labor investment efficiency. *Journal of Corporate Finance*, 65, Article 101744. <https://doi.org/10.1016/j.jcorpfin.2020.101744>
- Causa, O., Abendschein, M., Luu, N., Soldani, E., & Sorio, C. (2022). The post-COVID-19 rise in labour shortages. *OECD*. <https://doi.org/10.1787/e60c2d1c-en>
- Cella, C. (2020). Institutional investors and corporate investment. *Finance Research Letters*, 32, Article 101169. <https://doi.org/10.1016/j.frl.2019.04.026>
- Chamberlain, A., & Smart, M. (2017). Give to Get: A Mechanism to Reduce Bias in Online Reviews. <https://research.glassdoor.com/site-us/wp-content/uploads/sites/2/2017/10/Glassdoor.GiveToGet.Oct2017.pdf>
- Chang, S., & Jo, H. (2019). Employee-friendly practices, product market competition and firm value. *Journal of Business Finance & Accounting*, 46(1–2), 200–224. <https://doi.org/10.1111/jbfa.12353>
- Chatzopoulou, E. C., Manolopoulos, D., & Agapitou, V. (2022). Corporate social responsibility and employee outcomes: Interrelations of external and internal orientations with job satisfaction and organizational commitment. *Journal of Business Ethics*, 179(3), 795–817.
- Chen, C., Chen, Y., Hsu, P.-H., & Podolski, E. J. (2016). Be nice to your innovators: Employee treatment and corporate innovation performance. *Journal of Corporate Finance*, 39, 78–98. <https://doi.org/10.1016/j.jcorpfin.2016.06.001>
- Chen, W., Hribar, P., & Melessa, S. (2018). Incorrect inferences when using residuals as dependent variables. *Journal of Accounting Research*, 56(3), 751–796. <https://doi.org/10.1111/1475-679X.12195>
- Dehaan, E., Li, N., & Zhou, F. S. (2023). Financial reporting and employee job search. *Journal of Accounting Research*, 61(2), 571–617. <https://doi.org/10.1111/1475-679X.12469>
- Delery, J. E., & Shaw, J. D. (2001). The strategic management of people in work organizations: Review, synthesis, and extension. In, *Vol. 20. Research in personnel and human resources management* (pp. 165–197). Emerald Group Publishing Limited. [https://doi.org/10.1016/S0742-7301\(01\)20003-6](https://doi.org/10.1016/S0742-7301(01)20003-6)
- Deming, W. E., Orsini, J., & Cahill, D. D. (2012). *The essential Deming: Leadership principles from the father of quality*. McGraw Hill LLC.
- Devos, E., & Rahman, S. (2023). Does labor unemployment insurance affect corporate tax aggressiveness? *International Review of Financial Analysis*, 90, Article 102917. <https://doi.org/10.1016/j.irfa.2023.102917>
- Dickson, W. J., & Roethlisberger, F. J. (1966). *Counseling in an organization: A sequel to the Hawthorne researches*. Harvard University.
- Dixit, A. (1997). *Investment and employment dynamics in the short run and the long run*. *Oxford economic papers*, 49(1), 1–20. [JSTOR. https://doi.org/10.1111/1475-679X.12393](https://doi.org/10.1111/1475-679X.12393)
- Dube, S., & Zhu, C. (2021). The disciplinary effect of social media: Evidence from Firms' responses to Glassdoor reviews. *Journal of Accounting Research*, 59(5), 1783–1825. <https://doi.org/10.1111/1475-679X.12393>
- Edmans, A. (2011). Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics*, 101(3), 621–640. <https://doi.org/10.1016/j.jfineco.2011.03.021>
- Edmans, A., Pu, D., Zhang, C., & Li, L. (2024). Employee satisfaction, labor market flexibility, and Stock returns around the world. *Management Science*, 70(7), 4357–438. <https://doi.org/10.1287/mnsc.2023.4889>
- EE, M. S., Hasan, I., & Huang, H. (2022). Stock liquidity and corporate labor investment. *Journal of Corporate Finance*, 72, Article 102142. <https://doi.org/10.1016/j.jcorpfin.2021.102142>
- Faleye, O., & Trahan, E. A. (2011). Labor-friendly corporate practices: Is what is good for employees good for shareholders? *Journal of Business Ethics*, 101(1), 1–27. <https://doi.org/10.1007/s10551-010-0705-9>
- Fan, R., Weng, R., & Pan, J. (2022). How property rights affect Firm's labor investment efficiency? Evidence from a property law enactment in China. *Emerging Markets Finance and Trade*, 58(2), 381–397. <https://doi.org/10.1080/1540496X.2021.1987215>
- Fauver, L., McDonald, M. B., & Taboada, A. G. (2018). Does it pay to treat employees well? International evidence on the value of employee-friendly culture. *Journal of Corporate Finance*, 50, 84–108. <https://doi.org/10.1016/j.jcorpfin.2018.02.003>
- Forsythe, E., Kahn, L. B., Lange, F., & Wiczer, D. (2022). Where have all the workers gone? Recalls, retirements, and reallocation in the COVID recovery. *Labour Economics*, 78, Article 102251. <https://doi.org/10.1016/j.labeco.2022.102251>
- Fu, J., Ji, Y., & Jing, J. (2023). Rank and file employee satisfaction and the implied cost of equity capital. *Journal of Accounting, Auditing & Finance*, 38(1), 182–210. <https://doi.org/10.1177/0148558X20971942>
- Gao, H., Zhang, H., & Zhang, J. (2018). Employee turnover likelihood and earnings management: Evidence from the inevitable disclosure doctrine. *Review of Accounting Studies*, 23(4), 1424–1470. <https://doi.org/10.1007/s11142-018-9475-x>
- Ghadhab, I., Nizar, H., Benkraiem, R., & Lakhal, F. (2023). Cross-listing dynamics and labor investment efficiency: International evidence. *International Review of Financial Analysis*, 88, Article 102678. <https://doi.org/10.1016/j.irfa.2023.102678>
- Ghaly, M., Anh Dang, V., & Stathopoulos, K. (2017). Cash holdings and labor heterogeneity: The role of skilled labor. *The Review of Financial Studies*, 30(10), 3636–3668. <https://doi.org/10.1093/rfs/hhx045>
- Ghaly, M., Dang, V. A., & Stathopoulos, K. (2015). Cash holdings and employee welfare. *Journal of Corporate Finance*, 33, 53–70. <https://doi.org/10.1016/j.jcorpfin.2015.04.003>
- Ghaly, M., Dang, V. A., & Stathopoulos, K. (2020). Institutional investors' horizons and corporate employment decisions. *Journal of Corporate Finance*, 64, Article 101634. <https://doi.org/10.1016/j.jcorpfin.2020.101634>
- Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, 66, Article 101889. <https://doi.org/10.1016/j.jcorpfin.2021.101889>
- Guo, J., Huang, P., Zhang, Y., & Zhou, N. (2016). The effect of employee treatment policies on internal control weaknesses and financial restatements. *The Accounting Review*, 91(4), 1167–1194.
- Guo, J., Tang, Q., & Jin, G. (2021). Labor protection and the efficiency of human capital investment. *Economic Analysis and Policy*, 69, 195–207. <https://doi.org/10.1016/j.eap.2020.12.006>
- Hamermesh, D. S. (1995). Labour demand and the source of adjustment costs. *The Economic Journal*, 105(430), 620–634. <https://doi.org/10.2307/2235021>
- Hancock, J. I., Allen, D. G., Bosco, F. A., McDaniel, K. R., & Pierce, C. A. (2013). Meta-analytic review of employee turnover as a predictor of firm performance. *Journal of Management*, 39(3), 573–603. <https://doi.org/10.1177/0149206311424943>
- Harter, J. K., Schmidt, F. L., & Hayes, T. L. (2002). Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: A meta-analysis. *Journal of Applied Psychology*, 87(2), 268–279. <https://doi.org/10.1037/0021-9010.87.2.268>
- Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica*, 46(6), 1251–1271. <https://doi.org/10.2307/1913827>
- Holmström, B. (1979). *Moral Hazard and observability*. *The bell journal of economics*, 10(1), 74–91. [JSTOR. https://doi.org/10.2307/3003320](https://doi.org/10.2307/3003320)
- Hope, O.-K., Li, C., Lin, A.-P., & Rabier, M. (2021). Happy analysts. *Accounting, Organizations and Society*, 90, Article 101199. <https://doi.org/10.1016/j.aos.2020.101199>
- Iaffaldano, M. T., & Muchinsky, P. M. (1985). Job satisfaction and job performance: A meta-analysis. *Psychological Bulletin*, 97(2), 251–273. <https://doi.org/10.1037/0033-2909.97.2.251>
- Jack, A. (2022). *May 9*. Financial Times: Employers embrace workplace wellbeing. <https://www.ft.com/content/f9b30353-3089-4081-ae75-c1170c9bd4db>
- Jensen, M. C. (1986). *Agency costs of free cash flow, corporate finance, and takeovers*. *The American economic review*, 76(2), 323–329. [JSTOR. https://doi.org/10.2307/1885099](https://doi.org/10.2307/1885099)
- Ji, Y.-Y., Guthrie, J. P., & Messersmith, J. G. (2014). The tortoise and the hare: The impact of employment instability on firm performance. *Human Resource Management Journal*, 24(4), 355–373. <https://doi.org/10.1111/1748-8583.12052>
- Judge, T. A., Thoresen, C. J., Bono, J. E., & Patton, G. K. (2001). The job satisfaction–job performance relationship: A qualitative and quantitative review. *Psychological Bulletin*, 127(3), 376–407. <https://doi.org/10.1037/0033-2909.127.3.376>

- Jung, B., Kang, T., Lee, W.-J., Zhou, G., & (Stephen).. (2022). Pro-labor institutions and corporate employment efficiency. *Journal of Accounting, Auditing & Finance*, 37(3), 547–561. <https://doi.org/10.1177/0148558X20929859>
- Jung, B., Lee, W.-J., & Weber, D. P. (2014). Financial reporting quality and labor investment efficiency. *Contemporary Accounting Research*, 31(4), 1047–1076. <https://doi.org/10.1111/1911-3846.12053>
- Khedmati, M., Sualihu, M. A., & Yawson, A. (2020). CEO-director ties and labor investment efficiency. *Journal of Corporate Finance*, 65, Article 101492. <https://doi.org/10.1016/j.jcorpfin.2019.101492>
- Kohn, A. (1993). *Punished by rewards: The trouble with gold stars, incentive plans, A's, praise, and other bribes*. (pp. xiv, 398). Houghton, Mifflin and Company.
- Le, A.-T., & Tran, T. P. (2022). Corporate governance and labor investment efficiency: International evidence from board reforms. *Corporate Governance: An International Review*, 30(5), 555–583. <https://doi.org/10.1111/corg.12422>
- Luo, J., Li, X., & Chan, K. C. (2020). Political uncertainty and labour investment efficiency. *Applied Economics*, 52(43), 4677–4697. <https://doi.org/10.1080/00036846.2020.1739615>
- Ma, G., Kong, D., & Liu, S. (2023). Credit stimulus and corporate excess employees. *International Review of Financial Analysis*, 89, Article 102829. <https://doi.org/10.1016/j.irfa.2023.102829>
- Marshall, B. R., Nguyen, J. H., Nguyen, N. H., & Visaltanachoti, N. (2021). Does a change in the information environment affect labor adjustment costs? *International Review of Financial Analysis*, 74, Article 101665. <https://doi.org/10.1016/j.irfa.2021.101665>
- Mayo, E. (1933). *The human problems of an industrial civilization*. Macmillan.
- Mortensen, D. T., & Pissarides, C. A. (1994). *Job creation and job destruction in the theory of unemployment*. *The review of economic studies*, 61(3), 397–415. <https://doi.org/10.2307/2297896>
- Nguyen, J. H. (2022). How do labor adjustment costs affect corporate tax planning? Evidence from labor skills. *International Review of Financial Analysis*, 83, Article 102293. <https://doi.org/10.1016/j.irfa.2022.102293>
- Ostrow, C., & Bowen, D. E. (2000). Moving HR to a higher level: HR practices and organizational effectiveness. In *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 211–266). Jossey-Bass/Wiley.
- Peltokorpi, V., Allen, D. G., & Shipp, A. J. (2023). Time to leave? The interaction of temporal focus and turnover intentions in explaining voluntary turnover behaviour. *Applied Psychology*, 72(1), 297–316. <https://doi.org/10.1111/apps.12378>
- Pinnuck, M., & Lillis, A. M. (2007). Profits versus losses: Does reporting an accounting loss act as a heuristic trigger to exercise the abandonment option and divest employees? *The Accounting Review*, 82(4), 1031–1053.
- Qiu, Y., Shaikat, A., & Tharyan, R. (2016). Environmental and social disclosures: Link with corporate financial performance. *The British Accounting Review*, 48(1), 102–116. <https://doi.org/10.1016/j.bar.2014.10.007>
- Rice, D. B., Taylor, R. M., Wang, Y., Wei, S., & Ge, V. (2023). My company cares about my success...I think: Clarifying why and when a Firm's ethical reputation impacts Employees' subjective career success. *Journal of Business Ethics*, 186(1), 159–177. <https://doi.org/10.1007/s10551-022-05143-9>
- Richards, J. (2008). 'Because I need somewhere to vent': The expression of conflict through work blogs. *New Technology, Work and Employment*, 23(1–2), 95–110. <https://doi.org/10.1111/j.1468-005X.2008.00205.x>
- Rosenbaum, E. (2021). The SEC, and ESG advocates, want to know how well companies are treating their workers. *CNBC*, August 20 <https://www.cnb.com/2021/08/20/the-sec-wants-to-know-how-well-companies-are-treating-their-workers.html>.
- Rousseau, D. M. (1998). *Why workers still identify with organizations*. *Journal of organizational behavior*, 19(3), 217–233. <https://doi.org/10.1111/j.1468-005X.2008.00205.x>
- Saqib, S. I., Allen, M. M. C., Martínez Lucio, M., & Allen, M. (2023). Sustaining solidarity through social media? Employee social-media groups as an emerging platform for collectivism in Pakistan. *Work, Employment and Society*, 09500170221148301. <https://doi.org/10.1177/09500170221148301>
- Schmid, M. M., & Walter, I. (2012). Geographic diversification and firm value in the financial services industry. *Journal of Empirical Finance*, 19(1), 109–122. <https://doi.org/10.1016/j.jempfin.2011.11.003>
- Shan, C., & Tang, D. Y. (2023). The value of employee satisfaction in disastrous times: Evidence from COVID-19. *Review of Finance*, 27(3), 1027–1076. <https://doi.org/10.1093/rof/rfac055>
- Staiger, D., & Stock, J. H. (1997). *Instrumental variables regression with weak instruments*. *Econometrica*, 65(3), 557–586. <https://doi.org/10.2307/2171753>
- Teoh, S. H. (2018). The promise and challenges of new datasets for accounting research. *New Corporate Disclosures and New Methods*, 68–69, 109–117. <https://doi.org/10.1016/j.aos.2018.03.008>
- Tong, Y., Tian, Y., & Cao, Z. (2023). *No place like home: Do local CEOs invest in labor more efficiently? Corporate governance: An international review*, n/a(n/a). <https://doi.org/10.1111/corg.12553>
- Walker, M. (2020). Successful social media resistance: Implications for employee voice. *Labour and Industry*, 30(2), 174–184. <https://doi.org/10.1080/10301763.2020.1772701>
- Winkler, R., & Fuller, A. (2019). How companies secretly boost their Glassdoor ratings—WSJ. *The Wall Street Journal*, January 22 <https://www.wsj.com/articles/companies-manipulate-glassdoor-by-inflating-rankings-and-persuading-employees-11548171977>.
- World Health Organisation (WHO). (2015). *World report on ageing and health*. <https://www.who.int/publications-detail-redirect/9789241565042>.
- Xu, H., Dao, M., & Sun, H. (2023). Accounting firms' employee satisfaction and audit fees. *Accounting and Business Research*, 53(7), 821–852. <https://doi.org/10.1080/00014788.2022.2049193>
- Younge, K. A., & Marx, M. (2016). The value of employee retention: Evidence from a natural experiment. *Journal of Economics & Management Strategy*, 25(3), 652–677. <https://doi.org/10.1111/jems.12154>
- Zingales, L. (2000). In search of new foundations. *The Journal of Finance*, 55(4), 1623–1653. <https://doi.org/10.1111/0022-1082.00262>