

Workplace Health Investment and Employment Adjustment Public Health Evidence from CSR Reports of Chinese A-share Listed Firms

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Abstract

Workplace health investment is a firm-level public health practice through which organizations protect workers, reduce occupational-health risks and maintain the health-related capacity of the workforce. Using 12,669 firm-year observations of Chinese A-share non-financial listed firms from 2013 to 2024, this study constructs a sentence-level CSR text measure of workplace health investment and examines its association with employment growth and employment adjustment volatility. The results show that workplace health investment is positively associated with employment growth and employment adjustment volatility. A one-standard-deviation increase in workplace health investment raises employment growth by about 2.4 percentage points and increases adjustment volatility by about 0.012. Mechanism tests show that workplace health investment reduces work-injury rates, employee turnover and vacancy-filling duration, and that the increase in adjustment volatility is concentrated in positive adjustment and industry upturns. The findings indicate that workplace health governance may support employment resilience by reducing preventable health-related labor frictions and strengthening expansion-oriented employment adjustment when demand conditions are favorable.

1. Introduction

Work and employment are central social determinants of health, and stable employment is closely linked to income security, access to social protection, psychological well-being and household resilience. At the same time, the workplace is an important setting for population health intervention because occupational injury, sickness absence, work stress and unsafe working conditions directly affect workers' health and productive capacity. Health is a core component of human capital because it shapes effective labor supply, productivity, job continuity and the quality of worker-firm matching [1, 2]. From the firm perspective, employment is not a fully flexible input: recruitment, training, replacement and retention costs make labor adjustment costly [3, 4]. Workplace health conditions may therefore influence not only individual workers' health, but also how firms expand, retain and reallocate employment.

In this study, workplace health investment refers to internal arrangements, resources and managerial practices through which firms protect and improve the health of their employees. It includes occupational health and safety, medical support, mental-health services, health-promotion programs and improvements in working conditions. This concept differs from external health donations and from mandatory social-insurance payments. Its core is a workplace-based public health practice embedded in corporate management: firms invest in healthier working environments and health-supportive employment relationships in ways that may generate both private organizational benefits and broader employment-related public health value.

Existing studies of employment adjustment mainly emphasize technology, product demand, financing constraints and labor-market institutions [5–7], as well as worker-firm heterogeneity and matching [8, 9]. Management research shows that internal organizational practices affect productivity and firm performance [10, 11], while studies of employee-related intangible capital and corporate sustainability

link workplace practices to firm value and performance [12–15]. Textual-analysis research further demonstrates that corporate disclosures can be transformed into quantitative measures of otherwise unobserved organizational behavior [16, 17]. Public health and occupational-health studies show that workplace wellness, occupational safety and health-promotion programs can affect health risks, costs and worker outcomes [18–22]. However, the employment consequences of workplace health investment remain insufficiently examined, especially in large firm-year samples where health practices must be measured from corporate disclosure rather than from direct administrative health records.

This paper addresses this gap by constructing a CSR text-based measure of workplace health investment and linking it to employment growth and employment adjustment volatility. The public health logic of the study is that healthier workplaces may reduce avoidable health-related labor frictions, such as injury, turnover and delayed recruitment matching. Importantly, higher adjustment volatility is not interpreted mechanically as poorer employment stability. If health investment reduces workplace health risks and improves firms' capacity to expand employment, volatility can reflect active, positive reallocation rather than passive labor loss. The analysis therefore connects workplace health governance to employment resilience and labor-market functioning.

2. Public health framework and hypotheses

Workplace health investment may influence employment growth through health-risk reduction, retention and productivity channels. By lowering occupational injury, sickness absence, psychosocial strain and preventable turnover, workplace health investment can reduce replacement and training costs. It can also improve employer attractiveness and make it easier for firms to recruit and retain suitable workers. When product demand expands or organizational upgrading occurs, firms with stronger workplace health governance are more likely to have the workforce capacity and health-supportive organizational conditions needed to increase formal employment.

The effect on employment adjustment volatility is theoretically ambiguous from a public health perspective. A protective-stability prediction suggests that workplace health investment reduces unexpected worker exits, injury-related disruptions and avoidable turnover, thereby smoothing employment changes. An expansionary-capacity prediction suggests that workplace health investment lowers health-related job-matching frictions and adjustment costs, enabling firms to increase employment more actively in years of demand growth, technology upgrading or organizational expansion. Which effect dominates is therefore an empirical question that should be evaluated using health-friction variables and the decomposition of positive and negative adjustment volatility.

Hypothesis 1

Workplace health investment increases employment growth; if the expansionary-capacity effect dominates, it also increases employment adjustment volatility.

The mechanism should be visible in two public-health-related patterns. First, workplace health investment should be associated with lower health-related labor friction, including work injuries, employee turnover and vacancy-filling duration. Second, any increase in adjustment volatility should be concentrated in positive employment adjustment rather than negative adjustment. These two patterns connect the employment effect to improved workplace health conditions, stronger labor-input capacity and expansion-oriented adjustment.

Hypothesis 2

Workplace health investment reduces health-related labor frictions and increases employment adjustment mainly through positive adjustment volatility rather than negative adjustment volatility.

The public health value of workplace health investment may differ across firms. Non-state-owned firms face stronger market incentives and may respond more directly to recruitment, retention and turnover costs. High-tech firms rely more heavily on specialized human capital and team continuity, so the marginal return to health-supportive workplace practices may be higher. The employment effect may also be more pronounced where occupational-health risks or skill-specific labor shortages make healthy work environments especially important.

Hypothesis 3

The positive employment effects of workplace health investment are stronger in non-state-owned firms and high-tech firms.

3. Research design

3.1 Data sources and sample selection

The sample consists of Chinese A-share non-financial listed firms from 2013 to 2024. Employee counts, firm financial data, market value, ownership, industry and province are obtained from CSMAR and Wind. Workplace health investment is measured from publicly disclosed CSR reports, which describe firms' health-related workplace practices, occupational-health arrangements and employee-support measures. The baseline text-measurement sample retains firm-years with valid CSR text and at least 100 valid CSR sentences, yielding 12,669 firm-year observations after merging employee counts and financial controls. Occupational-health service institutions and regional industrial statistics are used to construct the instrumental variable. Financial firms, ST, *ST and PT firms, observations with missing employee counts, missing financial controls or missing valid CSR text are excluded. Continuous variables are winsorized at the 1st and 99th percentiles.

3.2 Variable definitions

Employment outcomes are measured by employment growth and adjustment volatility. Employment growth is the first difference in the logarithm of employee counts. Adjustment volatility is the three-year

rolling standard deviation of residual employment growth after controlling for sales growth, asset growth, profitability, firm fixed effects and year fixed effects. Mechanism variables capture workplace health and labor-friction pathways at the listed-firm-year level. The work-injury rate equals disclosed work-injury, occupational-injury or safety-accident cases in annual reports, CSR reports or safety-production announcements divided by ending employees; explicit zero-accident disclosures are coded zero, while non-disclosures without countable accident information are treated as missing. Employee turnover equals separations divided by beginning employees; disclosed turnover or separation counts are used first, and when new hires are disclosed separations are inferred as beginning employees plus new hires minus ending employees. Vacancy-filling duration is the firm-year median number of days from vacancy posting to withdrawal or last active date, matched to listed firms by stock code, unified social credit code, firm name and historical aliases. Workplace health investment is the ratio of workplace health-investment sentences to all valid CSR sentences. The definitions of the dependent variables, core explanatory variable, mechanism variables, instrument and controls used in the empirical analysis are reported in Table 1.

Table 1
Variable definitions.

Variable type	Variable	Meaning	Construction
Dependent variable	Employment growth	Employment growth rate	$\ln(\text{Employees}_{it}) - \ln(\text{Employees}_{it-1})$
Dependent variable	Adjustment volatility	Employment adjustment volatility	Three-year rolling standard deviation of residual employment growth
Dependent variable	Positive/negative volatility	Positive/negative adjustment volatility	Three-year rolling standard deviation for positive or negative residual adjustment
Core explanatory variable	Workplace health investment	Workplace health investment	Workplace health-investment sentences / all valid CSR sentences
Mechanism variable	Work-injury rate; employee turnover; vacancy-filling duration	Workplace safety risk, employment stability and recruitment matching friction	Disclosed injury or safety-accident cases / ending employees; separations / beginning employees; days from vacancy posting to withdrawal or last active date
Instrument	Service density instrument	Occupational health service-density instrument	Lagged provincial occupational-health service density $\times$ fixed industry injury risk
Controls	Firm characteristics	Firm-level controls	Size, leverage, revenue growth, capital intensity, and Tobin's Q
Notes: Variables are measured at the firm-year level; continuous variables are winsorized at the 1st and 99th percentiles.			

3.3 Text-based measure of workplace health investment

CSR reports are cleaned, segmented into sentences and screened by a dictionary covering occupational health, safety protection, medical support, mental health, health promotion and working-condition improvement. Reports entering the baseline text measure must contain at least 100 valid CSR sentences after cleaning. A manually labeled sample is used to train a sentence-level classifier. A sentence is classified as workplace health investment only when the actor is the firm or management, the object is internal employees and the content refers to health-related workplace investment, institutional arrangements, benefits or management practices. The supervised classifier follows the BERT-family encoder approach to contextual text classification [23]. This text-based strategy makes it possible to measure workplace public health practices that are often disclosed qualitatively rather than reported as standardized monetary expenditures. Table 2 reports held-out test-set diagnostics; the positive class requires actor, internal-employee object and health-investment content conditions.

Table 2
Text classifier diagnostics.

Metric	Test-set result	Diagnostic meaning
Accuracy	0.9369	Overall out-of-sample classification accuracy
Precision	0.9468	Share of predicted positive sentences that are true positives
Recall	0.9643	Share of true positive sentences identified by the classifier
F1 score	0.9555	Harmonic mean of precision and recall
AUC	0.9838	Area under the ROC curve
Kappa	0.8475	Agreement after excluding random agreement
Labeled sentences	14,475	Manually labeled training and evaluation sample
Positive labels	10,284	Workplace health-investment positive sentences
Notes: Test-set diagnostics are based on the FinBERT2 classifier.		

External-validity tests compare the text measure with employee welfare expenses, payable employee compensation intensity and occupational-health-related announcements. These validation outcomes capture whether the text-based measure is aligned with observable health-supportive employment practices and workplace health disclosure. The placebo outcome is non-employee health donation text, which helps distinguish internal workplace health investment from broader health-related philanthropy. The estimated associations remain economically coherent after applying the CSR text-quality filter, supporting the interpretation that the classifier captures employee-oriented workplace health governance rather than general CSR intensity. Table 3 reports the external-validity results for the text measure.

Table 3
External validity of the text measure.

Dependent variable	Health-investment coefficient	Controls	Fixed effects	N
Employee welfare expenses / revenue	0.029*** (0.008)	Yes	Yes	12,061
Payable employee compensation / employees	0.020** (0.009)	Yes	Yes	12,311
Occupational-health-related announcements	0.043*** (0.011)	Yes	Yes	11,501
Non-employee health donation text	0.005 (0.007)	Yes	Yes	12,669
Notes: All columns include firm controls, firm fixed effects and year fixed effects; standard errors are firm-clustered.				

3.4 Model specification

$$\text{EmploymentAdjustment}_{it} = \alpha + \beta \text{HealthInvestment}_{it} + \gamma \text{Controls}_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

$\text{EmploymentAdjustment}_{it}$ denotes employment growth or adjustment volatility for firm i in year t . $\text{HealthInvestment}_{it}$ is the CSR-text-based workplace health investment measure. Controls_{it} includes firm size, leverage, revenue growth, capital intensity and Tobin's Q. Firm fixed effects and year fixed effects absorb time-invariant firm heterogeneity and common macro shocks. Standard errors are clustered at the firm level [24, 25].

$$\text{EmploymentGrowth}_{it} = \theta \text{Fundamentals}_{it} + \mu_i + \lambda_t + v_{it} \quad (2)$$

$$\text{AdjustmentVolatility}_{it} = \text{sd}(v_{it,t-2}, v_{it,t-1}, v_{it}) \quad (3)$$

Fundamentals include sales growth, asset growth and profitability. Positive and negative adjustment volatility are constructed by separating positive and negative residual employment adjustment, allowing the analysis to distinguish expansion-oriented employment responses from contractionary or passive labor-loss responses. Table 4 summarizes the baseline sample distribution and confirms variation in employment outcomes, health-investment intensity and firm characteristics.

Table 4
Descriptive statistics.

Variable	N	Mean	SD	P25	Median	P75
Employment growth	12,669	0.026	0.218	-0.058	0.020	0.108
Adjustment volatility	10,734	0.223	0.119	0.138	0.203	0.287
Positive adjustment volatility	10,734	0.128	0.084	0.072	0.114	0.165
Negative adjustment volatility	10,734	0.119	0.080	0.066	0.106	0.153
Workplace health investment	12,669	0.113	0.044	0.083	0.111	0.140
Firm size	12,669	22.509	1.322	21.559	22.341	23.291
Leverage	12,669	0.421	0.203	0.253	0.409	0.575
Revenue growth	12,669	0.088	0.291	-0.056	0.069	0.204
Capital intensity	12,669	0.312	0.188	0.164	0.285	0.437
Tobin's Q	12,669	1.958	1.112	1.188	1.603	2.314
Notes: Statistics are based on the baseline sample with valid CSR text, employee counts and financial controls.						

4. Baseline results: workplace health investment and employment outcomes

Table 5 reports the baseline results. Workplace health investment is positive and statistically significant in all specifications. With full controls, the coefficient is 0.552 in the employment-growth equation and 0.281 in the adjustment-volatility equation. Given the remeasured standard deviation of workplace health investment, the economic magnitude implies an increase of about 2.4 percentage points in employment growth and about 0.012 in adjustment volatility. These results suggest that workplace health investment is associated with stronger employment expansion and more active employment adjustment, rather than only with static labor retention.

Table 5
Workplace health investment and employment adjustment: baseline results.

Variable	Growth (1)	Growth (2)	Growth (3)	Volatility (4)	Volatility (5)	Volatility (6)
Workplace health investment	0.441*** (0.069)	0.515*** (0.067)	0.552*** (0.066)	0.198* (0.114)	0.249** (0.112)	0.281** (0.115)
Controls	No	Basic	Full	No	Basic	Full
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	12,669	12,669	12,669	10,734	10,734	10,734
Adjusted R ²	0.218	0.241	0.253	0.186	0.204	0.213

Notes: Firm-clustered robust standard errors are in parentheses; *, ** and *** denote significance at 10%, 5% and 1%.

5. Robustness tests and endogeneity treatment

5.1 CSR disclosure selection

CSR disclosure may be selective because firms with stronger governance, public accountability or health-disclosure incentives are more likely to publish parseable CSR reports. Table 6 therefore estimates a disclosure equation and then includes the inverse Mills ratio following the sample-selection correction approach [26] in the employment-growth equation. Firm size, profitability and ownership characteristics help explain CSR availability, confirming the relevance of the disclosure-selection issue. In the outcome equation, the coefficient on workplace health investment remains positive and significant after applying the text-quality filter, while the inverse Mills ratio is not statistically significant. This pattern indicates that the main employment-growth result is not mechanically generated by CSR disclosure selection or by the removal of short and low-information CSR reports.

Table 6
CSR disclosure selection and Heckman correction.

Variable	Disclosure equation	Employment-growth equation
Firm size	0.284*** (0.019)	0.038*** (0.009)
Leverage	-0.116** (0.048)	-0.021 (0.016)
Profitability	0.092** (0.043)	0.027* (0.014)
State ownership	0.337*** (0.041)	
Workplace health investment		0.518*** (0.075)
Inverse Mills ratio		0.017 (0.022)
Industry fixed effects	Yes	No
Year fixed effects	Yes	Yes
Firm fixed effects	No	Yes
N	31,824	12,669
Notes: The disclosure equation models valid CSR text availability; the outcome equation uses employment growth.		

5.2 Alternative measures and lagged explanatory variables

Table 7 reports robustness checks using three alternative measures: the logarithm of workplace-health sentences, the number of workplace-health sentences per 10,000 valid CSR sentences and lagged workplace health investment. These alternatives capture disclosure quantity, standardized workplace health disclosure intensity and temporal ordering, respectively. The coefficients remain positive and significant in both employment-growth and adjustment-volatility equations. The lagged measure also reduces contemporaneous reporting concerns, while the frequency and log-sentence measures show that the result is not driven by the denominator of the ratio measure or by a small number of unusually long CSR reports.

Table 7
Robustness tests using alternative measures.

Variable	Growth: log sentences	Growth: frequency	Growth: lagged health	Volatility: log sentences	Volatility: frequency	Volatility: lagged health
Log workplace- health sentences	0.039 ^{***} (0.009)			0.020 ^{**} (0.009)		
Workplace- health frequency per 10,000 sentences		0.005 ^{***} (0.001)			0.003 ^{**} (0.001)	
Lagged workplace health investment			0.331 ^{***} (0.073)			0.116 ^{**} (0.054)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	12,669	12,669	11,688	10,734	10,734	9,765
Notes: All columns include firm controls, firm fixed effects and year fixed effects.						

5.3 Instrumental-variable design

To address remaining endogeneity concerns, the paper uses the interaction between lagged provincial occupational-health service density and fixed industry injury risk as an instrument, following the logic of instrumental-variables and shift-share identification designs [27–29]. From a public health perspective, this instrument captures the idea that firms in industries with greater injury risk are more exposed to local occupational-health service capacity. Table 8 shows a strong first-stage relationship between the instrument and workplace health investment, and the second-stage estimates remain positive for both employment growth and adjustment volatility. A placebo instrument based on other public-service density is insignificant, while the reported first-stage F-statistics remain above conventional weak-instrument concerns [30].

Table 8
Instrumental-variable estimates based on occupational-health service density.

Variable	First stage (1)	First stage (2)	2SLS growth (3)	2SLS volatility (4)	Placebo first stage (5)
Occupational-health service density × risk	0.031 ^{***} (0.007)	0.029 ^{***} (0.006)			
Workplace health investment			0.632 ^{***} (0.176)	0.309 ^{**} (0.151)	
Placebo service × risk					0.004 (0.006)
Provincial controls	No	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
First-stage F	23.4	20.2	20.2	19.4	0.6
N	12,669	12,669	12,669	10,734	12,669
Notes: The instrument is lagged occupational-health service density × fixed industry injury risk.					

Table 9 reports sensitivity checks for the instrumental-variable design. The first-stage and second-stage estimates remain stable after controlling for provincial GDP growth, provincial unemployment, province-specific trends and an alternative injury-risk quantile measure. The placebo public-service instrument remains weak and statistically insignificant. These results strengthen the interpretation that occupational-health service density matters through its match with industry injury risk rather than through broad provincial development conditions, regional public-service supply or general local economic performance.

Table 9
Instrumental-variable sensitivity tests.

Specification	First-stage coefficient	2SLS growth	2SLS volatility	First-stage F
Provincial GDP growth	0.030 ^{***} (0.006)	0.623 ^{***} (0.174)	0.305 ^{**} (0.151)	20.6
Provincial unemployment rate	0.031 ^{***} (0.007)	0.617 ^{***} (0.177)	0.298 ^{**} (0.150)	19.8
Province-specific trend	0.028 ^{***} (0.006)	0.598 ^{***} (0.171)	0.291 [*] (0.153)	19.0
Industry injury-risk quantile	0.035 ^{***} (0.008)	0.647 ^{***} (0.185)	0.324 ^{**} (0.156)	18.4
Placebo public-service instrument	0.004 (0.006)			0.6
Notes: The placebo instrument uses non-occupational public-service density.				

6. Mechanism analysis: occupational-health friction and adjustment direction

Table 10 reports mechanism evidence from two angles: occupational-health-related labor friction and adjustment direction. Columns (1)-(3) show that workplace health investment is associated with lower work-injury rates, employee turnover and vacancy-filling duration. These results indicate that firms with higher workplace health investment face lower workplace accident risk, more stable employment relationships and shorter recruitment-matching periods. Columns (4)-(5) show that workplace health investment significantly increases positive adjustment volatility but has no significant effect on negative adjustment volatility. The volatility effect is therefore concentrated in expansionary or positive adjustment years rather than in downsizing or passive labor-loss years, which is consistent with a friction-reduction interpretation of the employment-adjustment results.

Table 10
Mechanism analysis: health friction and adjustment direction.

Variable	Work-injury rate	Employee turnover	Vacancy-filling duration	Positive volatility	Negative volatility
Workplace health investment	-0.086 ^{***} (0.022)	-0.119 ^{**} (0.049)	-1.801 ^{**} (0.728)	0.241 ^{**} (0.096)	0.054 (0.083)
Controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
N	8,729	7,918	5,594	10,734	10,734
Adjusted R ²	0.209	0.221	0.247	0.193	0.178
Notes: Mechanism variables are constructed from firm disclosures and recruitment-posting records; standard errors are firm-clustered.					

Table 11 further examines whether the adjustment effect is aligned with industry demand conditions. The positive-volatility coefficient is significant, whereas the negative-volatility coefficient is not. In interaction specifications, the effect is stronger during industry upturns and insignificant during downturns. This pattern shows that workplace health investment is more closely associated with employment adjustment when external demand conditions create expansion opportunities, rather than when firms face contractionary pressure.

Table 11
Positive versus negative adjustment tests.

Variable	Positive volatility	Negative volatility	Upturn interaction	Downturn interaction
Workplace health investment	0.241** (0.096)	0.054 (0.083)	0.188** (0.080)	0.043 (0.067)
Workplace health investment × industry upturn	0.122** (0.053)		0.129** (0.056)	
Workplace health investment × industry downturn		0.039 (0.048)		0.033 (0.045)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	10,734	10,734	10,734	10,734
Notes: Industry upturns/downturns are defined by industry sales growth relative to the annual median.				

7. Heterogeneity analysis

The employment effect of workplace health investment differs by ownership and technology intensity. Table 12 shows that the coefficient is 0.636 for employment growth and 0.337 for adjustment volatility among non-state-owned firms, both larger than the corresponding estimates for state-owned firms. The high-tech subsample shows stronger effects, with coefficients of 0.712 for employment growth and 0.394 for adjustment volatility. Formal difference tests support these group differences, indicating that market-based employment incentives and skill-specific human capital amplify the employment effect of workplace health investment.

Table 12
Heterogeneity by ownership and technology intensity.

Group	Employment growth	Adjustment volatility	N	Difference test
Non-state-owned firms	0.636 ^{***} (0.089)	0.337 ^{**} (0.144)	7,371	
State-owned firms	0.301 ^{**} (0.126)	0.118 (0.121)	5,298	Non-SOE - SOE: 0.335 ^{**} / 0.219 [*]
High-tech firms	0.712 ^{***} (0.109)	0.394 ^{**} (0.155)	4,457	
Non-high-tech firms	0.401 ^{***} (0.078)	0.154 [*] (0.090)	8,212	High-tech - non-high-tech: 0.311 ^{**} / 0.240 [*]
Notes: Cells report workplace health-investment coefficients from specifications with firm controls and firm/year fixed effects.				

Table 13 reports interaction-based heterogeneity tests. The interaction between health investment and non-state ownership is positive and significant in both employment-growth and adjustment-volatility equations; the same pattern appears for high-tech firms and high occupational-risk industries. By contrast, the labor-intensive industry interaction is statistically insignificant. The results show that the marginal employment effect of workplace health investment depends more on market incentives, skill specificity and occupational-risk exposure than on simple labor quantity intensity, and the pattern is consistent with the subgroup estimates reported in Table 12.

Table 13
Interaction-based heterogeneity tests.

Interaction	Employment growth	Adjustment volatility	Controls	Fixed effects	N
Workplace health investment × non-state ownership	0.335** (0.145)	0.219* (0.131)	Yes	Yes	12,669 / 10,734
Workplace health investment × high-tech firm	0.311** (0.132)	0.240* (0.136)	Yes	Yes	12,669 / 10,734
Workplace health investment × labor-intensive industry	0.116 (0.098)	0.048 (0.085)	Yes	Yes	12,669 / 10,734
Workplace health investment × high occupational-risk industry	0.256** (0.106)	0.187* (0.099)	Yes	Yes	12,669 / 10,734
Notes: All columns include the main health-investment effect and the relevant group indicator.					

8. Conclusion and public health implications

This paper examines the association between workplace health investment and employment adjustment. Using CSR text from Chinese A-share non-financial listed firms from 2013 to 2024, it constructs a sentence-level measure of employee-oriented workplace health practices and links it to employment growth and adjustment volatility.

The results show that workplace health investment is positively associated with employment growth and employment adjustment volatility. Mechanism tests show that workplace health investment is associated with lower work-injury rates, employee turnover and vacancy-filling duration, and that the volatility effect is concentrated in positive adjustment and industry upturns. The evidence therefore links workplace health investment to lower occupational-health-related labor friction and expansion-oriented adjustment rather than to negative downsizing or passive labor loss.

The findings have several public health implications. First, workplace health investment should be viewed as part of the public health infrastructure of employment, not merely as an internal welfare cost or symbolic CSR disclosure. Healthier workplaces may reduce preventable injuries, stabilize employment relationships and improve the capacity of firms to expand employment when economic conditions improve. Second, occupational health services, workplace safety systems, mental-health support and working-condition improvements may generate employment-related spillovers beyond a single firm's private cost-benefit calculation. By reducing health-related labor disruption, these practices can contribute to employment resilience, social protection and inclusive labor-market adjustment. Third,

public policies that strengthen occupational-health service capacity and encourage transparent disclosure of workplace health practices may improve both worker health and labor-market functioning.

The study has limitations. CSR text captures disclosed workplace health governance practices and may not fully measure undisclosed spending or the quality of implementation. Future research can combine firm disclosures with detailed welfare expenses, occupational-health examination records, work-injury administrative records and recruitment-platform data to better evaluate how workplace health interventions affect both worker health and employment outcomes.

Declarations

Author Contributions

Mingcheng Gao designed the study, conducted the empirical analysis, and drafted the manuscript. Kangsi Zhang contributed to the study design, provided overall guidance on the research framework and interpretation of the results, and critically checked the manuscript for important intellectual content. Kangsi Zhang is the corresponding author. Both authors read and approved the final manuscript.

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Data Availability

The employee count, corporate financial and characteristic data used in this study are sourced from the CSMAR and Wind databases. These third-party datasets are subject to usage restrictions and licensed solely for this research, and thus cannot be publicly redistributed. The derived variables, CSR text-based workplace health investment metrics, analytical data, text measurement code, dictionary and anonymized firm-year indicators required to replicate the results can be accessed at <https://github.com/gaomingcheng/hhci-csr-text-measurement>. The custom code for CSR text preprocessing, dictionary-based sentence retrieval, classifier fine-tuning, firm-year variable construction and empirical analysis is available from the corresponding author upon reasonable request. Note that raw data from CSMAR and Wind cannot be shared due to licensing constraints; researchers with legitimate access to these licensed datasets may utilize the provided code package to reproduce the analyses.

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