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The Impact of Corporate Social Responsibility on Labor Investment Efficiency: Evidence from China

Zhizhu Yuan [1,*], Junze Yu [1] and Yue Yin [2]

1   School of Business Administration, Northeastern University, Shenyang 110169, China; lynze_yu@sina.com
2   School of Management, Northeastern University at Qinhuangdao, Qinhuangdao 066004, China; yinyuesusan@sina.com
*   Correspondence: zzyuan@mail.neu.edu.cn

Abstract: This study examines the impact of corporate social responsibility (CSR) on labor investment efficiency utilizing a sample of China's listed companies. The empirical results demonstrate that CSR improves labor investment efficiency, and the effect is significant in terms of both overinvestment and underinvestment. Findings from cross-sectional tests indicate that CSR has a more significant effect on labor investment efficiency in non-state-owned firms and firms with more financing constraints or higher labor adjustment costs. The conclusion is robust after utilizing a 2SLS regression, replacing indicators for labor investment efficiency and accounting for the impact of non-labor investment. In general, the results support stakeholder theory and confirm that CSR can enhance external monitoring and improve firms' investment behavior.

Keywords: corporate social responsibility; labor investment efficiency; property rights; financing constraints; labor adjustment costs

1. Introduction

Corporate social responsibility (CSR) is defined as the action of companies voluntarily integrating economic, legal, and ethical concerns in their business operations and in their interaction with their stakeholders [1,2]. Good CSR performance can reduce managers' short-sighted behaviors [3], enhance earnings quality [4], and inhibit insider trading [5]. Through CSR activities, firms build close and long-term relationships with various stakeholders and reduce risks when firms face negative shocks, which leads to improved market valuation [6]. In research on CSR, its influence on investment behavior has attracted much attention. Cook et al. (2019) [7] find that high-CSR firms have more efficient capital investment and innovation behavior. Wang et al. (2020) [8] find that environment governance information disclosure can improve Chinese firms' investment efficiency. This effect is more significant in high-pollution industries such as heavy industry. Lee and Kim (2020) [9] also demonstrate that fulfilling environment responsibility inhibits overinvestment in South Korean companies, especially in highly competitive markets. Existing studies show that CSR activities significantly enhance investment efficiency. However, these studies concentrate mainly on capital or innovation investment, while few studies concentrate on the influence of CSR on labor investment efficiency.

Labor is an indispensable factor of productivity, and labor cost (i.e., employee salary expenditure) usually accounts for nearly two-thirds of firms' economic value added [10]. According to a survey by the US Census Bureau, the total wages and benefits of employees in the US manufacturing industry were USD 784 billion in 2008, which is 4.7 times that of capital investment expenditure [11]. Erosa et al. (2010) [12] develop quantitative models and prove that human capital accumulation magnifies the differences in total factor productivity across countries. By increasing the marginal output of capital, a higher human capital stock will lead to more physical capital accumulation. In the era of knowledge economy, labor is an important core asset for a firm to obtain competitive advantages [13].

In recent years, scholars have focused on ways to enhance labor investment efficiency. Pinnuck and Lilli (2007) [14] propose a quantitative method of expected employee growth, which Jung et al. (2014) [11] apply to develop a measurement of labor investment efficiency. They prove that more transparent accounting information can enhance labor investment efficiency through alleviating agency problems. Ghaly et al. (2020) [15] claim that institutional investors tend to supervise the decision-making process of the management and are often related to efficient labor investment. Scholars also find that analyst following, macro-policies, and CEO traits are the influencing factors of labor investment efficiency [16–18]. However, the existing research is still limited, and the relationship between CSR and labor investment efficiency is not generally known.

This paper fills this gap and tries to verify the positive influence of CSR on enhancing labor investment efficiency. CSR can enhance labor investment efficiency from two aspects: reducing agency costs and easing financing constraints. In terms of the former, firms with good CSR performance usually have better corporate governance mechanisms [19] and a larger analyst following and media tracking [20], which restrains inefficient labor investment decisions by self-interested managers. In terms of the latter, good CSR performance not only increases non-financial information disclosure quantity [21] but also enhances information disclosure quality [4], therefore reducing the cost of capital [22]. Good CSR performance also assists companies to reduce risks [23] and thus reduce the risk compensation required by investors. Finally, firms showing better CSR performance also have easier access to external financial support such as government subsidies, thus reducing underinvestment in labor [24].

To test this hypothesis, 15,998 firm-year observations of Chinese listed companies are analyzed covering 2011 to 2019, and the results support the hypothesis. China is selected as the setting for the study for the following reasons. First, as the Chinese economy enters a high-quality development stage, achieving sustainable development becomes a new development goal for firms. Meeting this goal requires firms to shoulder social responsibilities and meet the demands of stakeholders. Since the publication of the Guidance on Social Responsibility of China in 2015, improvements in CSR institutional arrangements, legalization, and standardization have accelerated. The CSR performance of Chinese firms continues to improve. However, the Research Report on CSR of China (2019) points out that the development of China's CSR is still insufficient, leaving room for progress. The imperfect CSR system limits its influence on corporate governance, which makes the connection between CSR and the development of firms uncertain. Therefore, it is worth further discussing the economic consequences of China's CSR implementation at the current stage and whether it brings value to the development of firms. Second, in the past few decades, labor has been an important factor in China's economic growth. In recent years, with the demographic dividend disappearing and the population aging, China's economy is under downward pressure, and efficient labor configurations can mitigate the negative impact of the diminishing demographic dividend. Third, as China is the largest emerging economy, it is a highly representative research sample, and the research conclusion may be relevant to other emerging economies. However, existing studies on labor investment efficiency chiefly analyze firms in developed countries [16,25], so research on emerging markets is limited.

This study generates several contributions. First, the results enrich the research about the influence of CSR on firms' investment behavior. The existing research on the connection between CSR and investment behavior concentrates on capital or innovation investment [7,8], leaving labor investment behavior relatively neglected. The results prove that CSR also significantly impacts labor investment efficiency, reflecting the important role of CSR in firms' development. Second, labor investment is gaining increasing attention, and the factors influencing labor investment efficiency, such as analyst following [17], macro-polices [16], population structure [26], and so on, are gradually coming to light. However, the existing research is still limited. This study demonstrates that CSR contributes to enhancing labor investment efficiency and provides more evidence about the influencing factors of labor investment.

The remainder of this paper is arranged as follows. The second part provides a literature review and develops the hypothesis. The third part describes the research design. The fourth part provides the empirical results. The fifth part reports the extended analysis and robustness test. The final part presents the conclusions.

2. Literature Review and Hypothesis Development

2.1. Literature Review

In recent years, firms have gradually integrated CSR into their business activities, and research on CSR is booming. Classical economic scholars hold that managers should take profit maximization as the sole goal of the company. They believe that the fulfillment of CSR increases agency costs within the firm and will damage the interests of shareholders [27]. However, social economic scholars claim that non-shareholder stakeholders provide the environment for the firm's survival, and managers should integrate their needs into the decision-making process [28], which lays the foundation for stakeholder theory. The subsequent corporate citizenship [29] and strategic management theories [30] illustrate the necessity for firms to fulfill their social responsibilities. Nguyen et al. (2020) argue that with the monitoring of long-term investors, managers will choose proper CSR activities and maximize shareholder value [31].

The existing literature provides a full discussion of how CSR influences firms' financial performance [32,33]. CSR can help accumulate moral capital, which reduces the costs of unfavorable events [23,34]. Hong and Kacperczyk (2009) [20] find that analysts and media tend to track firms with good CSR performance. Firms showing good CSR performance may disclose more information [21,35] and report more transparent accounting information [4]. Therefore, CSR activities reduce the cost of capital because investors require a reduced risk premium [22]. CSR can also expand the investor base [36], promote innovation [7], and improve capital investment efficiency [8,9]. Thus, firms can fulfill their social responsibilities to meet stakeholders' expectations, thus enhancing their reputation and public image [37]. In this way, firms can attract more customers and form unique competitive advantages [38]. For example, Bardos et al. (2020) claim that CSR enhances a firm's product competitiveness, because CSR suggests the trustworthiness of the firm in product quality and acts as a signal for firms to differentiate themselves in a market where quality is difficult to observe [39]. In addition, a firm's CSR performance can affect its supply chain partners, which is known as the spillover effect along supply chains [40].

Labor investment is an indispensable investment of a firm. Effective labor investment can improve productivity, income, and competitiveness [13]. Many scholars have explored the influencing factors of labor investment efficiency, among which information asymmetry is one of the main causes. Jung et al. (2014) [11] reveal that high-quality accounting information improves the information environment, thus promoting external supervision. Hence, it reduces the agency costs of managers' self-interested behavior and alleviates the financing costs caused by adverse selection, resulting in more efficient labor investment. High stock price informativeness can also enhance labor investment efficiency, because it provides an improved information environment, which will lead to better supervision of managers [41]. Bai et al. (2023) [42] claim that diversified enterprises are faced with a more complex external environment, and their accounting information is more difficult to interpret. Higher agent costs inside diversified enterprises also make employment decisions more inefficient.

CEO characteristics also affect labor investment efficiency. The close ties between CEOs and directors might weaken corporate governance, thus exacerbating agency conflicts and leading to distortions in labor investment decisions [43]. Lai et al. (2021) [18] claim that an overconfident CEO is related to higher labor cost stickiness of a firm, which makes labor investment less efficient. In addition, CEO inside debt holdings also cause more conservative labor investment decisions [44].

From an external supervision perspective, analysts can supervise and give advice for managers' decisions. Therefore, more analyst tracking and higher accuracy of the analysts'

predictions can enhance labor investment efficiency [17]. Internal governance can also influence labor investment efficiency. Institutional investors will pay more attention to supervising management decisions than short-term investors, which alleviates inefficient labor investment [15]. Employee-oriented treatment policies ensure the consistency of the interests between the employees and the company, thus improving labor investment efficiency [45]. Adwan (2024) also finds a positive connection between employee ownership and labor investment efficiency, because it improves the monitoring of management and reduces agency costs [46].

Finally, some studies investigate the influence of legal and external environments on labor investment efficiency. The Inevitable Disclosure Doctrine decreases the mobility of employees with proprietary information and reduces the threat of knowledge leakage, but it also makes firms take preventive recruitment measures, leading to overinvestment in labor [16]. Kong et al. (2018) [47] prove that promotion incentives put pressure on local politicians to create jobs, who may then force firms to overinvest in labor. The "Enterprise Bankruptcy Law" and "Property Law" strengthen creditor protection and increase creditors' willingness to offer financial support, which enhances labor investment efficiency [48]. Chen et al. (2024) argue that the emission trading system reduces labor investment efficiency, because it increases the operating costs and external uncertainty [49]. Jiang et al. (2024) [26] find that as the retirement of older employees increases, firms naturally reduce labor overinvestment. The adjustment of population structure also pushes firms to optimize their employee structure, which leads to more efficient labor investment. Oil price uncertainty also asymmetrically influences firms' labor investment decisions through affecting managers' expectations [50].

2.2. Hypothesis Development

Information asymmetry in an imperfect market leads to inefficient labor investment, which manifests as overinvestment in labor, including over-hiring or under-firing and underinvestment caused by under-hiring or over-firing [11]. Information asymmetry makes it costly to monitor the firm's managers, and moral hazards may arise when managers make decisions that cater to their own interests for "empire building" purposes [51], resulting in overinvestment in labor. To maintain a "quiet life", managers may be reluctant to change the status quo [52] and refuse to fire employees to avoid problems with layoffs, resulting in under-firing [15]. In addition, Pagano and Volpin (2005) [53] find that in firms with poor performance, if the employees have enough power to influence the managers' appointments and dismissals, managers may also ally with employees by avoiding layoffs and salary decreases, thus causing overinvestment in labor. Agency costs may also lead to labor underinvestment because if the firm's short-term performance affects managers' compensation, they are likely to over-fire underperforming employees or delay hiring new employees to manipulate profit, as it takes longer to improve firms' performance through labor investment [54].

Second, information asymmetry leads external investors to increase the cost of capital as compensation, resulting in financing constraints. The classical economics school perceives labor as a variable factor of production, so they do not include additional fixed costs in labor adjustment [55]. In this view, firms pay labor expenditure out of current revenues without requirement of financing. Since labor costs are variable, financing constraints will not influence labor investment decisions, and investment opportunities are the only factor determining labor investment [11]. However, the social economic literature points out that labor cost is not completely variable, as it includes fixed cost (or at least quasi-fixed cost) [56,57]. For example, firms incur recruitment, training, and adaptation costs when recruiting new employees. It may take some enterprises a long time for new employees to adapt to the environment, increasing the cost of adaptation. This phenomenon is also known as the cost of productivity loss. Additionally, firms must usually pay compensation costs for firing employees; in most cases, layoffs do not have zero cost, and in extreme cases, layoffs may lead to lawsuits. These fixed costs are labor adjustment costs that make

financing constraints a common phenomenon in labor investment [53], resulting in labor underinvestment [11].

CSR can improve the information environment and then enhance labor investment efficiency through alleviating the agency problems and easing financing constraints.

CSR can restrain inefficient labor investment by alleviating the agency problems. First, good CSR performance is generally associated with sound corporate governance mechanisms [19] because it allows stakeholders to be involved in firms' decision-making processes. In China, by lobbying the board of directors, fostering invisible proxies, mobilizing collective action, and leveraging third parties, stakeholders can influence the appointments of managers and firms' strategic decisions [58]. These actions can restrain managers' power and ameliorate agency problems. Althoff (2021) [59] takes a further step and claims that CSR is indispensable for firms to achieve sustainable development, so it should be regarded as a part of good governance. Second, firms with good CSR performance attract more analysts and a greater media following [20], so such firms face stronger external supervision and constraints, which inhibits managers from making inefficient labor investment decisions for their own benefit. Third, sufficient free cash flow can prompt managers to get involved in speculation [60]. The cost of undertaking social responsibility can reduce the free cash flow inside the firm, thus restraining excessive speculation such as labor overinvestment. In summary, CSR can alleviate agency problems and inhibit managers from self-interested inefficient labor investment.

CSR can alleviate underinvestment by easing financing constraints. CSR activities increase both the quantity and quality of information disclosure, which can reduce the cost of capital investors impose as compensation for their information disadvantages [22]. From the information quantity perspective, CSR information, as non-financial information disclosure, supplements the financial information disclosed in financial reports, delivers more characteristic information to investors, and helps firms to obtain external financing [21]. As for information quality, firms showing good CSR performance tend to reduce earnings management behaviors and can provide financial information with high transparency and reliability [4]. Simultaneously, good CSR performance can send positive market signals [61,62], improve the firm's reputation, establish a public image, and form moral capital as protective insurance to help firms reduce risks [23], thus reducing the risk compensation required by equity and bond investors [22,63]. CSR also meets the expectation of stakeholders such as the government and regulators, which can help firms get external financial support such as subsidies [24]. For example, the Chinese government provides firms that reduce their chemical oxygen demand emissions with one-off grants. Finally, better CSR performance of buyer firms suggests their trustworthiness and lower operational risks to suppliers, so the firms with better CSR performance have greater access to trade credit financing [64]. Therefore, our first hypothesis is as follows.

H1a. *Good CSR performance can improve labor investment efficiency.*

In contrast, CSR may also negatively impact labor investment efficiency because fulfilling CSR does not always reduce agency costs and may also become an agency problem itself [27], thus exacerbating inefficient labor investment. For example, Koehn and Ueng (2009) [65] believe that charitable donations are easy to implement and can bring high short-term gains, making them a likely tool for managers to divert public attention and cover up negative information. Managers will also overinvest in CSR to improve their personal reputation or win stakeholder support [66]. Apart from agency conflicts, firms may hire more workers and avoid layoffs to fulfill their responsibilities to employees [67], which leads to labor overinvestment. In addition, when the firm lacks funds, CSR activities may occupy the cash flow of labor investment and aggravate labor underinvestment. Therefore, our second hypothesis is as follows.

H1b. *Good CSR performance can reduce labor investment efficiency.*

3. Research Design

3.1. Labor Investment Efficiency Measurement

Following Jung et al. (2014) [11], we adopt abnormal net hiring as the proxy for labor investment efficiency. Specifically, as in Pinnuck and Lillis (2007) [14], we utilize net hiring (percentage change in the number of employees) as a proxy for labor investment and then regress labor investment over some fundamental economic variables of the firm. The residuals from this model are the values of abnormal net hiring. Cao and Rees (2020) [45], Ding et al. (2023) [48], Ghadhab et al. (2023) [68], and others also follow this method. The equation based on this method is as follows:

$$
\begin{aligned}
NET\_HIRE_{it} = {} & \beta_0 + \beta_1 SALES\_GROWTH_{it-1} + \beta_2 SALES\_GROWTH_{it} + \beta_3 \Delta ROA_{it-1} \\
& + \beta_4 \Delta ROA_{it} + \beta_5 ROA_{it} + \beta_6 RETURN_{it-1} + \beta_7 SIZE\_R_{it-1} + \beta_8 QUICK_{it-1} \\
& + \beta_9 QUICK_{it} + \beta_{10} \Delta QUICK_{it} + \beta_{11} LEV_{it-1} + \beta_{12} LOSSBIN1_{it-1} \\
& + \beta_{13} LOSSBIN2_{it-1} + \beta_{14} LOSSBIN3_{it-1} + \beta_{15} LOSSBIN4_{it-1} \\
& + \beta_{16} LOSSBIN5_{it-1} + \beta_j \sum\nolimits_{17}^{62} INDUSTRY + \beta_j \sum\nolimits_{63}^{69} YEAR + \varepsilon_{it}
\end{aligned}
\tag{1}
$$

In Equation (1), *NET_HIRE* is the percentage change in the number of employees. *SALES_GROWTH* is the percentage growth of sales revenue. *ROA* is the ratio of net profit to the total assets at the beginning of the year, and *ΔROA* is the increment in *ROA*. *RETURN* is the total annual stock return. *SIZE_R* is the percentile rank of the total market value. *QUICK* is the ratio of current assets excluding inventory to current liabilities, and *ΔQUICK* is the increment of *QUICK*. *LEV* is the ratio of total debt to total assets. The *LOSSBIN* variables are used to measure the degree of losses in the prior year, obtained by dividing *ROA* into five intervals from 0 to −0.025 with a length of 0.005. That is, if *ROA* is in the range of −0.005 to 0, then *LOSSBIN*1 = 1; if *ROA* is in the range of −0.01 to −0.005, then *LOSSBIN*2 = 1, and so on. *INDUSTRY* and *YEAR* represent dummy variables for the industry and year.

To simplify the interpretation, we utilize the absolute value of the residuals as a proxy for labor investment efficiency and label it *AB_NET_HIRE*. A larger *AB_NET_HIRE* indicates a larger gap between the actual and predicted labor investment, indicating lower labor investment efficiency.

3.2. CSR Measurement

We extract the CSR from the CSR score in the Hexun database. The Hexun CSR score is a comprehensive and objective evaluation of CSR performance and is a common measure in research on CSR in China [69,70]. The Hexun CSR score consists of five dimensions (i.e., shareholder responsibility; employee responsibility; supplier, customer, and consumer responsibility; environment responsibility; and public responsibility). These dimensions are given various weights by industry to derive a comprehensive score. To increase the value of the regression coefficient, we divide the CSR score by 10 and express it as the variable *CSR*. Larger values of *CSR* indicate better CSR performance.

3.3. Model Specification

Following Jung et al. (2014) [11] and Cao and Rees (2020) [45], we conduct the empirical analysis utilizing the following regression model:

$$
\begin{aligned}
AB\_NET\_HIRE_{it} = {} & \beta_0 + \beta_1 CSR_{it-1} + \beta_2 MTB_{it-1} + \beta_3 SIZE_{it-1} + \beta_4 QUICK_{it-1} + \beta_5 LEV_{it-1} \\
& + \beta_6 DIVDUM_{it-1} + \beta_7 STD\_CFO_{it-1} + \beta_8 STD\_SALES_{it-1} + \beta_9 TANGIBLE_{it-1} \\
& + \beta_{10} LOSS_{it-1} + \beta_{11} INSTI_{it-1} + \beta_{12} STD\_NET\_HIRE_{it-1} \\
& + \beta_{13} LABOR\_INTENSITY_{it-1} + \beta_{14} AB\_INVEST\_OTHER_{it-1} \\
& + \beta_j \sum\nolimits_{15}^{60} INDUSTRY + \beta_j \sum\nolimits_{61}^{67} YEAR + \varepsilon_{it}
\end{aligned}
\tag{2}
$$

In Equation (2), β_0 is the constant term, and β_k (k = 1, 2, ... 14) is the regression coefficient of the equation. *AB_NET_HIRE* is the reverse indicator of labor investment efficiency, as Section 3.1 described. *CSR* is the comprehensive score of firms' CSR performance. A significantly negative coefficient of β_1 would support H1a. However, a significantly positive coefficient of β_1 would support H1b. As in Jung et al. (2014) [11], we add 13 control variables. We add the market-to-book ratio (*MTB*) to measure the growth of a company. *SIZE* is the natural logarithm of firm's market value. *QUICK* is the quick ratio. *LEV* is the ratio of total debt to total assets, which we use to measure the financial risk of the firm. *DIVDUM* is a dummy variable for dividend payment. It is equal to 1 if the firm pays dividends and 0 otherwise. *STD_CFO* and *STD_SALES* are the standard deviation of the cash flow and sales revenue in the previous five years, respectively. *TANGIBLE* is the ratio of tangible assets to total assets. *LOSS* is equal to 1 if the firm suffers loss and 0 otherwise. As in Cella (2020) [71], we use institutional investors' shareholding (*INSTI*) to control the possible supervisory role of institutional investors. We include the standard deviation of the employee change rate in the previous five years (*STD_NET_HIRE*) to avoid the impact of employment volatility. *LABOR_INTENSITY* is the labor intensity of the firm, which is equal to the number of employees divided by total assets. Finally, *AB_INVEST_OTHER* represents capital investment efficiency. As in Biddle et al. (2009) [72], we regress capital investment expenditure over the sales growth rate ($OTHER\_INVEST_{it} = \beta_0 + \beta_1 SALES\_GROWTH_{it-1} + \varepsilon_{it}$) to obtain the absolute value of the residual as a proxy for capital investment efficiency. *INDUSTRY* and *YEAR* represent dummy variables for the industry and year effects. We correct standard errors for firm-level clustering. All the variables in Equation (2) are defined in Table 1.

Table 1. The definitions of main variables.

Variable	Definition
AB_NET_HIRE	The labor investment efficiency of a firm, namely the residuals of Equation (2).
CSR	CSR score extracted from the Hexun database.
MTB	Market-to-book ratio.
SIZE	Natural logarithm of firm's market value.
QUICK	Quick ratio, which is equal to [current assets - inventory]/current liabilities.
LEV	The ratio of total debt to total assets.
DIVDUM	A dummy variable, which is equal to 1 if the firm pays dividends and 0 otherwise.
STD_CFO	The standard deviation of the cash flow in the previous five years.
STD_SALES	The standard deviation of the sales revenue in the previous five years.
TANGIBLE	The ratio of tangible assets to total assets.
LOSS	A dummy variable, which is equal to 1 if the firm suffers a loss and 0 otherwise.
INSTI	Institutional investors' shareholding.
STD_NET_HIRE	The standard deviation of the employee change rate in the previous five years.
LABOR_INTENSITY	Labor intensity of the firm, namely the number of employees divided by total assets.
AB_INVEST_OTHER	Capital investment efficiency calculated according to Biddle et al. (2009) [72].

3.4. Sample and Data Sources

We utilize the CSR score of Chinese listed firms in the Hexun database and collect other data from the CSMAR database. We select firm-year observations of Chinese A-share listed firms in the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2011 to 2019 as our sample. All the industries are included in our research sample except financial firms. Financial firms apply different accounting standards from other firms, so we excluded them to ensure the consistency of the indicators. In China, although not all the companies disclose their CSR reports, many firms disclose their CSR information in a dedicated section in the financial reports. The Hexun CSR score used in this article integrates the CSR information disclosed in financial reports, CSR reports, and other public information. Thus, the sample is not limited to companies that disclose their CSR reports. We remove the observations where the CSR score is missing. We also remove the observations with other missing data.

Finally, the sample contains 15,998 firm-year observations. We winsorize all the continuous variables at the 1st and the 99th percentiles.

Since 2010 is the first year for which Hexun provided CSR scores and that we lag the value of CSR by one year in Equation (2), the sample begins in 2011. Our sample ends in 2019, because COVID-19 is likely to have an abnormal impact on the hiring of firms from 2020, which might distort our results. The period of COVID-19 is a special case, and we believe that it cannot serve as a reference for future general situations. In 2020–2022, because of the strict prevention and control measures against COVID-19 (e.g., home quarantine), the economy of China was impacted. The average GDP growth from 2017 to 2019 was 6.5%, and GDP growth in 2020 fell to 2.2%. At the same time, the labor investment and CSR decisions were also influenced by COVID-19, which made the relationship between CSR and labor investment efficiency in 2020–2022 (or even 2023, as the first year after reopening) not applicable to the mechanism analysis in this study. As the impact of COVID-19 continues to weaken, selecting a research period before 2020 might be more instructive for the future.

4. Empirical Results

4.1. Descriptive Statistics and Correlation Analysis

Table 2 provides the descriptive statistics of the variables in Equation (2). The mean and median of *AB_NET_HIRE* are 0.199 and 0.105, respectively, which are consistent with the descriptive statistics of Chinese listed companies in Kong et al. (2018) [47]. The mean and median of the independent variable *CSR* are 2.480 and 2.128, respectively, and the first and third quartiles are 1.494 and 2.846, respectively, which means that CSR performance varies greatly among Chinese listed firms. The results indicate that the value of CSR in the research sample has a certain cross-sectional change.

Table 2. Descriptive statistics of the main variables.

Variable	N	Mean	Median	Standard Deviation	Q1	Q3
AB_NET_HIRE	15,998	0.199	0.105	0.342	0.048	0.201
CSR	15,998	2.480	2.128	1.800	1.494	2.846
MTB	15,998	4.159	2.654	5.779	1.669	4.406
SIZE	15,998	22.630	22.529	0.958	21.951	23.200
QUICK	15,998	1.089	0.724	1.216	0.410	1.256
LEV	15,998	0.484	0.485	0.212	0.321	0.642
DIVDUM	15,998	0.653	1.000	0.476	0.000	1.000
STD_CFO($/10^{10}$)	15,998	0.049	0.015	0.100	0.007	0.040
STD_SALES($/10^{10}$)	15,998	0.179	0.045	0.418	0.018	0.130
TANGIBLE	15,998	0.241	0.191	0.211	0.084	0.343
LOSS	15,998	0.123	0.000	0.328	0.000	0.000
INSTI	15,998	0.045	0.020	0.062	0.003	0.061
STD_NET_HIRE	15,998	0.663	0.157	2.381	0.079	0.350
LABOR_INTENSITY($/10^{-4}$)	15,998	0.007	0.005	0.007	0.003	0.010
AB_INVEST_OTHER	15,998	0.040	0.028	0.044	0.014	0.048

Table 3 provides the Pearson correlation coefficients for the main variables. Consistent with H1a, the correlation coefficient between CSR and AB_NET_HIRE is significantly negative at the 1% level. This indicates that better CSR performance is related to more efficient labor investment. The correlation coefficients between the control variables are not high enough to drive multicollinearity.

Table 3. Pearson correlation matrix.

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V1:AB_NET_HIRE	1														
V2:CSR	−0.064 ***	1													
V3:MTB	0.150 ***	−0.165 ***	1												
V4:SIZE	−0.082 ***	0.339 ***	−0.057 ***	1											
V5:QUICK	0.041 ***	0.008	0.025 ***	0.019 **	1										
V6:LEV	0.010	−0.040 ***	0.118 ***	−0.019 **	−0.619 ***	1									
V7:DIVDUM	−0.125 ***	0.409 ***	−0.256 ***	0.316 ***	0.105 ***	−0.191 ***	1								
V8:STD_CFO	−0.057 ***	0.213 ***	−0.151 ***	0.530 ***	−0.168 ***	0.281 ***	0.115 ***	1							
V9:STD_SALES	−0.060 ***	0.197 ***	−0.131 ***	0.496 ***	−0.151 ***	0.250 ***	0.105 ***	0.717 ***	1						
V10:TANGIBLE	0.017 **	−0.079 ***	0.051 ***	−0.115 ***	−0.130 ***	0.046 ***	−0.134 ***	−0.003	−0.014 *	1					
V11:LOSS	0.076 ***	−0.407 ***	0.152 ***	−0.189 ***	−0.093 ***	0.188 ***	−0.455 ***	−0.052 ***	−0.053 ***	0.099 ***	1				
V12:INSTI	−0.006	0.262 ***	0.022 ***	0.309 ***	0.042 ***	−0.050 ***	0.227 ***	0.050 ***	0.071 ***	−0.073 ***	−0.144 ***	1			
V13:STD_NET_HIRE	0.034 ***	0.032 ***	0.025 ***	0.072 ***	−0.027 ***	0.047 ***	−0.043 ***	0.034 ***	0.074 ***	−0.025 ***	−0.022 ***	−0.010	1		
V14:LABOR_INTENSITY	−0.052 ***	−0.085 ***	0.148 ***	−0.230 ***	−0.031 ***	−0.078 ***	−0.081 ***	−0.213 ***	−0.132 ***	0.126 ***	0.057 ***	0.058 ***	0.023 ***	1	
V15:AB_INVEST_OTHER	0.070 ***	−0.022 ***	0.074 ***	−0.004	−0.025 ***	0.032 ***	−0.071 ***	−0.053 ***	−0.014 *	0.126 ***	−0.009	0.023 ***	0.063 ***	0.028 ***	1

Note: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed).

4.2. Baseline Results

Table 4 provides the results of Equation (2). The baseline result is in Column (1). The coefficient of CSR is significantly negative (t-statistic = −4.07), indicating that CSR activities can enhance corporate labor investment efficiency, which supports H1a rather than H1b. The results reveal that the positive impact of CSR in enhancing external supervision and transmitting market signals outweighs the negative impacts of increased agency problems, leading to more efficient labor investment.

Table 4. The effect of corporate social responsibility on labor investment efficiency.

Variable	Baseline	Firm Fixed Effects	Random Effects	Fama–MacBeth	GMM
	AB_NET_HIRE	AB_NET_HIRE	AB_NET_HIRE	AB_NET_HIRE	AB_NET_HIRE
	(1)	(2)	(3)	(4)	(5)
Intercept	0.554 ***	1.757 ***	0.674 ***	0.581 ***	0.843 ***
	(4.78)	(6.78)	(6.28)	(4.04)	(5.42)
CSR	−0.007 ***	−0.005 **	−0.006 ***	−0.005 *	−0.005 **
	(−4.07)	(−2.54)	(−3.35)	(−1.87)	(−2.00)
MTB	0.008 ***	0.008 ***	0.008 ***	0.008 ***	0.008 ***
	(8.92)	(6.45)	(9.09)	(9.71)	(5.20)
SIZE	−0.013 ***	−0.065 ***	−0.017 ***	−0.013 *	−0.026 ***
	(−2.59)	(−5.81)	(−3.62)	(−2.24)	(−3.84)
QUICK	0.011 **	0.019 ***	0.011 **	0.012 *	0.005
	(2.43)	(2.70)	(2.50)	(1.87)	(0.82)
LEV	−0.065 ***	−0.083 *	−0.053 **	−0.063 **	−0.073 **
	(−2.72)	(−1.92)	(−2.24)	(−2.50)	(−2.15)
DIVDUM	−0.035 ***	−0.022 **	−0.038 ***	−0.036 ***	−0.020 **
	(−4.48)	(−2.30)	(−4.87)	(−3.78)	(−2.24)
STD_CFO	−0.055	−0.107	0.044	−0.079	−0.015
	(−1.54)	(−1.58)	(1.29)	(−1.72)	(−0.38)
STD_SALES	0.003	−0.041 ***	−0.011	0.004	−0.001
	(0.38)	(−2.58)	(−1.56)	(0.48)	(−0.14)
TANGIBLE	0.039	0.053	−0.009	0.024	0.053
	(1.53)	(1.46)	(−0.44)	(0.73)	(1.55)
LOSS	0.039 ***	0.035 ***	0.035 ***	0.043 ***	0.038 ***
	(3.45)	(2.82)	(3.10)	(4.66)	(2.99)
INSTI	0.061	0.378 ***	0.065	0.041	0.155 **
	(1.15)	(4.86)	(1.27)	(0.74)	(2.26)
STD_NET_HIRE	0.002 *	−0.021 ***	0.005 ***	0.003 **	−0.015 ***
	(1.84)	(−8.12)	(4.22)	(2.44)	(−5.61)
LABOR_INTENSITY	−5.860 ***	−8.955 ***	−6.287 ***	−5.803 ***	−6.473 ***
	(−9.70)	(−6.01)	(−10.74)	(−8.55)	(−6.58)
AB_INVEST_OTHER	0.328 ***	0.170 **	0.308 ***	0.291 ***	0.012
	(4.23)	(2.01)	(3.99)	(3.39)	(0.12)
Year FE	YES	YES	YES	NO	YES
Industry FE	YES	NO	NO	YES	YES
Adj. R²	0.085	0.076	-	-	-
N	15,998	15,998	15,998	15,998	15,998

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

We exclude the influence of non-observable factors on the results by applying the firm fixed effects and random effects models to perform the regression in Equation (2). We report the results in columns (2) and (3) of Table 4. The regression coefficients of *CSR* are significantly negative (t-statistic = −2.54, −3.35). We apply the Fama–Macbeth model (1973) [73] to exclude the cross-sectional correlation of the residuals and provide the results in column (4). The coefficient of *CSR* is still significantly negative (t-statistic = −1.87). The GMM model is also applied to avoid interference caused by the issues of heteroscedasticity and autocorrelation in the random error term. The result in column (5) shows that the coefficient of *CSR* is still significantly negative. These results further validate the conclusion.

The results of the control variables in the baseline results are consistent with previous studies (e.g., Khedmati et al., 2020 [43]). Firms with a high market-to-book ratio (*MTB*), high liquidity (*QUICK*), no dividend distribution (*DIVDUM*), loss (*LOSS*), high employment fluctuation (*STD_NET_HIRE*), and highly inefficient capital investment (*AB_INVEST_OTHER*) show a higher degree of inefficient labor investment, while larger firms (*SIZE*) and firms with higher leverage (*LEV*) and higher labor intensity (*LABOR_INTENSITY*) can improve labor investment efficiency.

4.3. Endogeneity

The previous analysis shows that CSR is conducive to improving labor investment efficiency. However, endogeneity, such as reverse causality and omitted variables, may be of concern. We select two instrumental variables and use 2SLS and 3SLS methods to re-estimate Equation (2).

First, the number of religious sites is selected as an instrumental variable. Culture represents shared values, beliefs, and norms [74] and determines how members in a firm interact with each other and stakeholders outside the firm [75]. Different cultural contexts result in different capacities of companies and their managers to comprehend and address CSR issues [76]. Religiousness is a part of culture and has a significant impact on business ethics. Longenecker et al. (2004) find that more religiously inclined individuals tend to exhibit better decision-making in ethical contexts and a greater orientation to CSR [77]. Ibrahim et al. (1991) [78] conduct a study of 152 self-proclaimed Christian firms and claim that nearly half of these firms emphasize employee-centered values and behaviors, and 73% of the surveyed firms emphasize loyalty and fairness. Religion can also teach people to be good and help others [79], which is essentially similar to CSR. For example, Buddhism advocates cultivation of compassion, generosity, and altruism, which is conducive to cultivating CSR concepts and will help improve CSR performance, especially through environmental protection and charitable donations [79]. Similarly, the spiritual goal in Taoist doctrine is closely related to the fulfillment of CSR, especially charity activities [80]. Therefore, local religious beliefs may affect CSR activities. However, religious sites are mainly formed in history, and their number is external to firms, so they will not directly affect labor investment efficiency.

We select the number of religious sites in the provinces in which the firms are registered as the first instrumental variable. For firms registered in a municipality directly under the central government (i.e., Beijing, Tianjin, Shanghai, or Chongqing), the total number of religious sites is the sum of the number of religious sites in the municipality and the number of religious sites in the province from which the municipality is divided (e.g., Chongqing was subordinate to Sichuan Province before 1997), because the religious culture of the municipality is also affected by the religious factors of the province from which it is divided due to the historical heritage and the geographical distance.

Second, following Arouri et al. (2019) [81] and others, we use the mean of CSR in the same year, industry, and province as an instrumental variable. Liu and Wu (2016) [82] argue that the peer effect exists in CSR; that is, the adoption of CSR policy by a firm in an industry will lead other firms in the same industry to strategically carry out more CSR practices. Therefore, we can infer that the industry average CSR performance will affect

firms' CSR performance. Otherwise, the industry average CSR is an exogenous factor that does not directly impact firms' labor investment efficiency.

The 2SLS results using the number of religious sites (*Religion*) as an instrumental variable are provided in columns (1) and (2) in Table 5. The coefficient of Religion in column (1) is significantly positive (t-statistic = 3.09), indicating that religious belief affects the fulfillment of CSR. The coefficient of *CSR* in column (2) is significantly negative (t-statistic = −1.77), indicating the consistency with our baseline results. The Kleibergen-Paap rk Wald F statistic, which is above the 15% level, alleviates the concern about weak instrumental variables. Columns (3) and (4) list the results of using the average CSR (*Average*) as the instrumental variable with a 2SLS method. The coefficient of *Average* in column (3) is significantly positive (t-statistic =5.96), demonstrating the influence of industry average CSR performance on a company's CSR performance. The coefficient of *CSR* in column (4) is still significant (t-statistic = −2.31). The Kleibergen-Paap rk Wald F statistic is significantly above the 15% level (F-statistic = 35.5), which alleviates the concern about weak instrumental variables. Columns (5) and (6) provide the results when using both *Religion* and *Average* as instrumental variables. The regression coefficients of *Religion* and *Average* in column (5) are significantly positive (t-statistic = 2.66, 5.85). The coefficient of CSR in column (6) is negative (t-statistic = −2.74). The Kleibergen-Paap rk Wald F statistic is 21.5, which passes the weak instrumental variable test at the 15% level. The result of the Hansen J test confirms that our results pass the overidentification test (*p*-value = 0.397).

Table 5. Two-stage least squares (2SLS) regression.

Variable	First Stage	Second Stage	First Stage	Second Stage	First Stage	Second Stage
	CSR	AB_NET_HIRE	CSR	AB_NET_HIRE	CSR	AB_NET_HIRE
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−10.083 *** (−14.79)	−0.250 (−0.48)	−10.079 *** (−14.18)	−0.006 (−0.02)	−10.165 *** (−14.28)	−0.070 (−0.28)
CSR		−0.088 * (−1.77)		−0.053 ** (−2.31)		−0.059 *** (−2.74)
Religion	0.004 *** (3.09)				0.004 *** (2.66)	
Average			0.183 *** (5.96)		0.178 *** (5.85)	
Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
N	15,998	15,998	15,098	15,098	15,098	15,098
Kleibergen–Paap rk LM statistic		9.4 ***		35.4 ***		40.3 ***
Kleibergen-Paap rk Wald F statistic		9.5		35.5		21.5
Overidentification test (*p*-value)		-		-		0.397

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level. The number of religious sites is divided by 100 to increase the value of the regression coefficient.

Finally, according to Zenller and Theil (1962) [83], a three-stage least squares (3SLS) method is applied to re-perform the tests above, because 3SLS takes into account the correlation between the random error terms of different structural equations in the model. Our conclusion stays robust after performing the 3SLS regression. The results are omitted to save space.

These findings indicate that our conclusion remains valid after addressing endogeneity concerns.

4.4. Overinvestment and Underinvestment in Labor

We further examine the impact of CSR on labor overinvestment and underinvestment. Following Jung et al. (2014) [11], we split the full sample into overinvestment and underinvestment subsamples according to the sign of residual obtained from Equation (1). If it is positive, then the actual labor investment is above the predicted value, indicating overinvestment (*OVER_INV*). If it is negative, then the actual labor investment is below the predicted value, indicating underinvestment (*UNDER_INV*).

Column (1) of Table 6 provides the test results of Equation (2) for the overinvestment sample. The coefficient of *CSR* is significantly negative (t-statistic = −2.68), which proves that CSR can restrain labor overinvestment. Further, as in Jung et al. (2014) [11], we separate the labor overinvestment subsample *OVER_INV* into *OVER_HIRE* (with positive predicted net hiring) and *UNDER_FIRE* (with negative predicted net hiring) according to the expected level of labor investment obtained from Equation (1). The coefficient of *CSR* is still significant in the *OVER_HIRE* subsample in column (2), but the significance decreases in the *UNDER_FIRE* subsample in column (3), which may be because CSR, especially labor responsibility, increases the cost of firing employees, which is not conducive to timely firing decisions.

Table 6. The effect of CSR on specific type of inefficient labor investment.

Variable	OVER_INV			UNDER_INV		
	TOTAL	OVER_HIRE	UNDER_FIRE	TOTAL	UNDER_HIRE	OVER_FIRE
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	1.045 ***	1.939 ***	0.516 **	0.105	0.167 **	−0.065
	(3.18)	(3.86)	(2.23)	(1.63)	(2.27)	(−0.46)
CSR	−0.015 ***	−0.018 **	−0.006	−0.003 ***	−0.003 ***	−0.006 **
	(−2.68)	(−2.21)	(−1.63)	(−3.33)	(−2.90)	(−2.55)
MTB	0.011 ***	0.023 ***	0.004 ***	0.004 ***	0.005 ***	0.002 ***
	(5.40)	(5.78)	(3.12)	(8.02)	(7.38)	(2.87)
SIZE	−0.026 *	−0.059 ***	−0.012	0.003	0.000	0.009
	(−1.85)	(−2.74)	(−1.23)	(1.18)	(0.13)	(1.33)
QUICK	0.041 ***	0.036 *	0.012	0.005 ***	0.005 **	0.004
	(3.03)	(1.87)	(1.28)	(2.95)	(2.33)	(0.93)
LEV	−0.083	−0.102	−0.027	−0.044 ***	−0.050 ***	0.030
	(−1.30)	(−0.87)	(−0.80)	(−3.26)	(−3.01)	(1.31)
DIVDUM	−0.029	−0.096 ***	0.000	−0.030 ***	−0.034 ***	−0.023 ***
	(−1.33)	(−2.62)	(0.03)	(−6.88)	(−6.51)	(−2.99)
STD_CFO	−0.070	−0.097	0.020	−0.042 **	−0.031	−0.116 ***
	(−0.65)	(−0.68)	(0.22)	(−2.04)	(−1.29)	(−2.75)
STD_SALES	−0.001	0.033	−0.015	−0.004	−0.004	0.007
	(−0.04)	(1.00)	(−0.88)	(−0.86)	(−0.74)	(0.61)
TANGIBLE	0.159 **	0.251 **	−0.006	−0.030 **	−0.025	−0.044 **
	(2.42)	(2.56)	(−0.14)	(−2.39)	(−1.64)	(−2.25)
LOSS	−0.002	0.167 **	0.018	0.052 ***	0.088 ***	0.016 *
	(−0.07)	(2.08)	(1.28)	(7.24)	(7.95)	(1.82)
INSTI	0.272 *	0.128	−0.061	−0.067 ***	−0.077 ***	−0.133
	(1.70)	(0.63)	(−0.58)	(−2.76)	(−2.98)	(−1.39)
STD_NET_HIRE	−0.004	−0.006	−0.000	0.005 ***	0.005 ***	0.003
	(−1.28)	(−1.37)	(−0.07)	(4.65)	(4.23)	(0.98)
LABOR_INTENSITY	−17.946 ***	−22.150 ***	−9.475 ***	−0.132	−0.193	0.431
	(−9.38)	(−7.32)	(−7.70)	(−0.40)	(−0.49)	(0.75)
AB_INVEST_OTHER	0.392 *	0.305	0.063	0.250 ***	0.267 ***	0.112
	(1.69)	(1.15)	(0.24)	(6.49)	(6.25)	(1.07)

Table 6. *Cont.*

Variable	OVER_INV			UNDER_INV		
	TOTAL	OVER_HIRE	UNDER_FIRE	TOTAL	UNDER_HIRE	OVER_FIRE
	(1)	(2)	(3)	(4)	(5)	(6)
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Adj. R^2	0.120	0.151	0.065	0.156	0.176	0.078
N	5410	3190	2220	10,588	8858	1730

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

Column (4) of Table 6 provides the results of Equation (2) in the labor underinvestment sample. The coefficient of *CSR* is significantly negative (t-statistic = −3.33), which supports the view that CSR fulfillment can alleviate labor underinvestment. Likewise, we then divide the labor underinvestment subsample *UNDER_INV* into *UNDER_HIRE* (with positive predicted net hiring) and *OVER_FIRE* (with negative predicted net hiring) and then re-estimate Equation (2). Columns (5) and (6) present the results. The coefficients of *CSR* are significantly negative (t-statistic = −2.90, −2.55), indicating that CSR fulfillment can alleviate under-hiring and over-firing simultaneously, thus alleviating underinvestment in labor.

5. Extended Analysis and Robustness Checks

5.1. The Impact of Property Rights

The influence of CSR on labor investment efficiency may differ for state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOEs). First, many Chinese firms have government ownership, such as SOEs. SOEs should undertake policy goals, such as expanding employment and providing social security and housing fund to employees [84]. Further, the government greatly influences the appointment and dismissals of SOEs' executives [85]. To obtain better promotion opportunities, SOE managers usually voluntarily fulfill the government's policy objectives, such as providing more employment opportunities. Therefore, the net effect of CSR on labor overinvestment may be weaker in SOEs, because these firms face greater pressure to recruit redundant employees.

Second, SOEs have a natural advantage in financing activities, relying on their own political connections. The Chinese financial system is largely subject to government intervention, forming a financing chain of "central government—state-owned commercial banks—SOEs" [86]. With the support of this financing chain, SOEs can obtain low-cost capital, with few problems with capital shortage. However, most non-SOEs have difficulty raising capital from state-owned banks. Moreover, when the macroeconomic environment starts to deteriorate, state-owned banks will prioritize loans for SOEs, leading to increased financing costs for non-SOEs [87]. Therefore, compared with SOEs, CSR is more likely to alleviate labor underinvestment of non-SOEs.

We investigate whether differences exist in the hypothesized relationship between SOEs and non-SOEs by rerunning Equation (2) with the addition of *SOE* (1 for SOEs and 0 otherwise) and its interaction terms with *CSR*. The results are provided in Table 7. The coefficient of SOE × CSR is significantly positive at the 1% level in the whole sample (column (1)), which supports the view that CSR exerts greater influence on labor investment efficiency in non-SOEs than in SOEs. When regressing the labor overinvestment and underinvestment subsamples, the coefficients of *SOE × CSR* are still significantly positive at the 1% level (columns (2) and (3)), which further supports our primary analysis.

Table 7. Cross-sectional analyses: the moderating effect of property rights.

Variable	AB_NET_HIRE	OVER_INV	UNDER_INV
	(1)	(2)	(3)
Intercept	0.561 ***	1.044 ***	0.107 *
	(4.84)	(3.17)	(1.67)
CSR	−0.013 ***	−0.031 ***	−0.006 ***
	(−5.20)	(−4.17)	(−4.33)
SOE	−0.057 ***	−0.084 ***	−0.043 ***
	(−5.19)	(−2.84)	(−6.51)
SOE × CSR	0.010 ***	0.027 ***	0.006 ***
	(3.41)	(3.01)	(3.29)
MTB	0.008 ***	0.011 ***	0.004 ***
	(8.46)	(5.20)	(7.34)
SIZE	−0.012 **	−0.024 *	0.004
	(−2.40)	(−1.70)	(1.51)
QUICK	0.011 **	0.043 ***	0.005 ***
	(2.55)	(3.15)	(3.02)
LEV	−0.049 **	−0.063	−0.032 **
	(−2.01)	(−0.97)	(−2.36)
DIVDUM	−0.035 ***	−0.028	−0.029 ***
	(−4.43)	(−1.30)	(−6.83)
STD_CFO	−0.049	−0.073	−0.037 *
	(−1.37)	(−0.67)	(−1.81)
STD_SALES	0.003	−0.003	−0.004
	(0.36)	(−0.13)	(−0.80)
TANGIBLE	0.042 *	0.162 **	−0.028 **
	(1.65)	(2.46)	(−2.28)
LOSS	0.036 ***	−0.010	0.052 ***
	(3.26)	(−0.33)	(7.20)
INSTI	0.060	0.281 *	−0.069 ***
	(1.13)	(1.75)	(−2.79)
STD_NET_HIRE	0.002	−0.004	0.004 ***
	(1.60)	(−1.27)	(4.38)
LABOR_INTENSITY	−5.681 ***	−17.733 ***	−0.015
	(−9.46)	(−9.32)	(−0.05)
AB_INVEST_OTHER	0.307 ***	0.379	0.234 ***
	(4.01)	(1.64)	(6.10)
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Adj. R^2	0.088	0.121	0.163
N	15,998	5410	10,588

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

5.2. The Impact of Financing Constraints

As labor costs are semi-fixed, financing constraints are a common phenomenon in labor investment [53], resulting in labor underinvestment [11]. Financially constrained companies may face labor underinvestment because they have difficulty obtaining low-cost capital. They may reduce the number of employees to save costs and improve cash flow [88]. In this case, it is more important for these firms to deliver positive signals and obtain external financing through CSR activities. As a result, the enhancement of labor

investment efficiency made by CSR will be strengthened in firms with higher financing constraints. On the contrary, firms subject to low financing constraints that can easily obtain cheap capital are unlikely to experience labor underinvestment, and the influence of CSR performance on enhancing labor investment efficiency will be weakened.

We use the KZ index [89] and WW index [90] as a proxy for financing constraints. Greater *KZ* and *WW* values represent higher financing constraints. We add *KZ* (*WW*) and its interaction term with *CSR*, *KZ* × *CSR* (*WW* × *CSR*) to Equation (2). Columns (1) and (4) of Table 8 list the results of the moderating effect of financing constraints in the whole sample. The coefficient of *KZ* × *CSR* (*WW* × *CSR*) is significantly negative at the 1% level, consistent with our expectation that in financially constrained firms, the influence of CSR on enhancing labor investment efficiency is strengthened. Subsample regression shows that in the labor underinvestment subsample (columns (3) and (6)), the coefficient of *KZ* × *CSR* (*WW* × *CSR*) is significantly negative at the 1% level, suggesting consistency with the result of the whole sample. This demonstrates that CSR has a greater impact on underinvestment in firms facing higher financing constraints. Although the coefficient of *WW* × *CSR* is significantly negative at the 10% level when utilizing the WW index as a proxy for financing constraints (column (5)), the coefficient of *KZ* × *CSR* is not significant when we utilize the KZ index as a proxy for financing constraints (column (2)). Therefore, there is no consistent evidence to prove the influence of CSR on labor overinvestment is strengthened in firms with higher financing constraints. This may be because although financing constraints restrict firms' layoff decisions to some extent as layoffs also have costs, which may lead to under-firing and aggravate overinvestment in labor, we believe that overinvestment in labor is more associated with agency problems and is thus less affected by financing constraints. Therefore, the influence of CSR on labor overinvestment may be less affected by financing constraints.

Table 8. Cross-sectional analyses: the moderating effect of financial constraints.

Variable	AB_NET_HIRE	OVER_INV	UNDER_INV	AB_NET_HIRE	OVER_INV	UNDER_INV
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.570 *** (4.87)	1.087 *** (3.29)	0.136 ** (2.11)	0.761 *** (5.85)	1.317 *** (3.60)	0.235 *** (3.15)
CSR	−0.006 *** (−3.11)	−0.015 ** (−2.24)	−0.003 *** (−2.61)	−0.099 *** (−4.27)	−0.143 * (−1.87)	−0.058 *** (−4.70)
KZ	0.008 (1.48)	−0.005 (−0.32)	0.004 (1.29)			
KZ × CSR	−0.003 *** (−2.79)	−0.001 (−0.33)	−0.002 *** (−3.83)			
WW				0.324 *** (2.78)	0.305 (0.77)	0.131 * (1.84)
WW × CSR				−0.088 *** (−4.01)	−0.123 * (−1.69)	−0.052 *** (−4.49)
MTB	0.008 *** (8.20)	0.012 *** (5.16)	0.004 *** (7.41)	0.007 *** (7.32)	0.011 *** (4.40)	0.004 *** (6.55)
SIZE	−0.014 *** (−2.73)	−0.028 ** (−1.97)	0.002 (0.68)	−0.008 (−1.25)	−0.025 (−1.31)	0.004 (0.92)
QUICK	0.010 ** (2.33)	0.039 *** (2.85)	0.004 ** (2.55)	0.011 ** (2.40)	0.041 *** (3.03)	0.005 *** (3.00)
LEV	−0.066 ** (−2.50)	−0.063 (−0.91)	−0.037 ** (−2.55)	−0.054 ** (−2.13)	−0.078 (−1.09)	−0.042 *** (−2.98)
DIVDUM	−0.035 *** (−4.34)	−0.034 (−1.48)	−0.031 *** (−7.06)	−0.026 *** (−2.60)	−0.024 (−0.77)	−0.028 *** (−5.19)
STD_CFO	−0.054 (−1.52)	−0.063 (−0.59)	−0.041 ** (−2.05)	−0.071 ** (−1.99)	−0.102 (−0.93)	−0.054 *** (−2.67)

Table 8. *Cont.*

Variable	AB_NET_HIRE	OVER_INV	UNDER_INV	AB_NET_HIRE	OVER_INV	UNDER_INV
	(1)	(2)	(3)	(4)	(5)	(6)
STD_SALES	0.004 (0.46)	−0.001 (−0.04)	−0.003 (−0.69)	−0.000 (−0.02)	−0.005 (−0.21)	−0.007 (−1.51)
TANGIBLE	0.038 (1.50)	0.157 ** (2.39)	−0.030 ** (−2.39)	0.036 (1.42)	0.155 ** (2.36)	−0.032 ** (−2.55)
LOSS	0.031 *** (2.73)	−0.002 (−0.07)	0.046 *** (6.40)	0.024 ** (2.13)	−0.017 (−0.57)	0.044 *** (6.17)
INSTI	0.058 (1.09)	0.263 (1.64)	−0.072 *** (−2.96)	0.058 (1.10)	0.266 * (1.66)	−0.065 *** (−2.66)
STD_NET_HIRE	0.002 * (1.90)	−0.004 (−1.27)	0.005 *** (4.64)	0.002 ** (2.04)	−0.004 (−1.16)	0.005 *** (4.67)
LABOR_INTENSITY	−5.962 *** (−9.80)	−18.063 *** (−9.36)	−0.273 (−0.83)	−5.975 *** (−9.88)	−18.079 *** (−9.44)	−0.157 (−0.47)
AB_INVEST_OTHER	0.328 *** (4.22)	0.357 (1.55)	0.240 *** (6.03)	0.342 *** (4.39)	0.398 * (1.71)	0.252 *** (6.47)
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Adj. R^2	0.086	0.120	0.158	0.087	0.120	0.158
N	15,998	5410	10,588	15,998	5410	10,588

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

5.3. The Impact of Labor Adjustment Costs

Firms face fixed costs when they adjust the number of employees. Hiring creates recruitment, training, and adaptation costs, while firing employees will bring compensation costs and even lead to lawsuits. These labor adjustment costs restrict firms from proportionately adjusting labor investment in response to a change in sales [56], thus exacerbating inefficient labor investment. Labor adjustment costs may influence our hypothesized relationship. First, in firms facing higher labor adjustment costs, inefficient labor investment will cause more loss, and shareholders have a stronger willingness to supervise firms' employment decisions [15]. Similarly, CSR enables firms to establish a positive, sustainable relationship with their stakeholders. In companies with high labor adjustment costs, these stakeholders pay more attention to their labor investment decisions to reduce the deviation from the optimal level to safeguard their own interests. Second, increased labor adjustment costs mean that companies' financing demand for labor investment increases. In this case, CSR plays a more important role in labor adjustment decisions because good CSR performance can transmit positive signals and reduce capital cost. However, companies facing lower labor adjustment costs have less financing demand for labor investment, so CSR activities may contribute less to alleviating inefficient labor investment.

We utilize the percentage of employees with a bachelor's degree or above (*BACH*) and the proportion of employees with a master's degree or above (*MAST*) as proxies for labor adjustment costs. Highly educated employees are expected to take on more complicated and high-skilled work and are hard to substitute; hence, firms with a higher percentage of highly educated employees are likely to face higher cost of adjustments (e.g., hiring, firing, training, and adaptation costs) [55,56]. We rerun Equation (2) by adding *BACH* (*MAST*) and its interaction with *CSR*, *BACH* × *CSR* (*MAST* × *CSR*), and provide the results in Table 9. Columns (1) and (4) report the test results of the moderating effect in the whole sample. The coefficient of *BACH* × *CSR* (*MAST* × *CSR*) is significantly negative. It indicates that higher labor adjustment costs increase the influence of CSR on labor investment efficiency. Further, in the labor overinvestment (columns (2) and (5)) and underinvestment subsamples (columns (3) and (6)), the coefficient of *BACH* × *CSR*

(*MAST* × *CSR*) is still significantly negative. This indicates that CSR has a greater impact on labor overinvestment and underinvestment as labor adjustment costs increase.

Table 9. Cross-sectional analyses: the moderating effect of labor adjustment costs.

Variable	AB_NET_HIRE	OVER_INV	UNDER_INV	AB_NET_HIRE	OVER_INV	UNDER_INV
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.683 ***	1.623 ***	0.159 **	0.762 ***	1.793 ***	0.163 **
	(5.72)	(4.80)	(2.45)	(5.55)	(4.65)	(2.23)
CSR	−0.006 ***	−0.012 **	−0.003 ***	−0.005 *	−0.006	−0.004 ***
	(−3.23)	(−2.06)	(−2.75)	(−1.95)	(−0.77)	(−3.13)
BACH	0.101 ***	0.293 ***	−0.007			
	(2.84)	(2.92)	(−0.33)			
BACH×CSR	−0.023 **	−0.054 **	−0.012 **			
	(−2.43)	(−2.12)	(−2.31)			
MAST				0.598 ***	1.705 ***	0.003
				(3.06)	(3.00)	(0.02)
MAST × CSR				−0.096 *	−0.254 *	−0.050 *
				(−1.86)	(−1.78)	(−1.82)
MTB	0.009 ***	0.013 ***	0.005 ***	0.009 ***	0.014 ***	0.004 ***
	(8.44)	(5.29)	(8.09)	(7.97)	(5.55)	(7.30)
SIZE	−0.013 ***	−0.034 **	0.004	−0.016 ***	−0.041 **	0.004
	(−2.59)	(−2.36)	(1.46)	(−2.80)	(−2.52)	(1.37)
QUICK	0.007 *	0.034 **	0.005 ***	0.004	0.024	0.005 **
	(1.77)	(2.44)	(2.69)	(0.80)	(1.46)	(2.20)
LEV	−0.070 ***	−0.081	−0.046 ***	−0.091 ***	−0.119	−0.052 ***
	(−2.96)	(−1.29)	(−3.52)	(−3.22)	(−1.55)	(−3.41)
DIVDUM	−0.034 ***	−0.031	−0.029 ***	−0.032 ***	−0.024	−0.029 ***
	(−4.02)	(−1.33)	(−6.20)	(−3.23)	(−0.93)	(−5.24)
STD_CFO	−0.043	−0.030	−0.044 **	−0.045	−0.026	−0.052 **
	(−1.18)	(−0.28)	(−2.10)	(−1.13)	(−0.23)	(−2.27)
STD_SALES	0.000	0.000	−0.005	0.003	0.007	−0.004
	(0.02)	(0.02)	(−0.94)	(0.36)	(0.26)	(−0.78)
TANGIBLE	0.027	0.146 **	−0.029 **	0.041	0.175 **	−0.022
	(1.05)	(1.97)	(−2.12)	(1.33)	(2.15)	(−1.40)
LOSS	0.037 ***	−0.005	0.052 ***	0.045 ***	0.011	0.053 ***
	(3.11)	(−0.17)	(6.76)	(3.30)	(0.32)	(5.99)
INSTI	0.041	0.194	−0.059 **	0.039	0.218	−0.054 *
	(0.76)	(1.24)	(−2.19)	(0.64)	(1.18)	(−1.84)
STD_NET_HIRE	0.002 *	−0.003	0.004 ***	0.002 *	−0.003	0.004 ***
	(1.86)	(−0.85)	(4.72)	(1.68)	(−0.76)	(4.08)
LABOR_INTENSITY	−6.271 ***	−17.541 ***	−0.778 **	−7.537 ***	−19.541 ***	−1.486 ***
	(−8.90)	(−8.05)	(−2.15)	(−8.90)	(−7.33)	(−3.35)
AB_INVEST_OTHER	0.263 ***	0.312	0.224 ***	0.282 ***	0.307	0.234 ***
	(3.43)	(1.34)	(5.74)	(3.20)	(1.16)	(5.22)
Year and Industry FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Adj. R²	0.084	0.114	0.158	0.089	0.124	0.157
N	13,784	4782	9002	10,518	3667	6851

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

5.4. Alternative Proxies for Labor Investment Efficiency

We apply several substitute proxies for labor investment efficiency as a robustness test. First, following Biddle et al. (2009) [72], we retain only the sales growth on the right-hand side of Equation (1). We obtain the absolute residuals for the variable *AB_NET_HIRE_1*.

Second, following Cella (2020) [71] and Ben-Nasr and Alshwer (2016) [41], we take the median of labor investment in the same industry and year as the predicted labor investment. *AB_NET_HIRE_2* is the absolute value of the deviation between the actual and predicted labor investment level. Third, we take average labor investment in the past two, three, and four years as the predicted level, and the absolute value of the deviation between the actual value and the predicted level is the proxy for labor investment efficiency, labeled *AB_NET_HIRE_3*, *AB_NET_HIRE_4*, and *AB_NET_HIRE_5*, respectively. Fourth, we re-estimate Equation (1) by year and industry. The absolute value of the residuals is the proxy for labor investment efficiency, labeled *AB_NET_HIRE_6*. Then, we re-estimate Equation (2) and report the results in columns (1)–(6) of Table 10. Using these substitute measures for labor investment efficiency, the coefficient of *CSR* is still significantly negative at the 1% level.

Table 10. Alternative proxies for labor investment efficiency.

Variable	AB_NET _HIRE_1	AB_NET _HIRE2	AB_NET _HIRE3	AB_NET _HIRE4	AB_NET _HIRE5	AB_NET _HIRE6	AB_NET _WAGE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	1.614 ***	0.710 ***	0.476	0.900 *	1.194 **	0.551 ***	0.396 ***
	(10.28)	(4.45)	(0.98)	(1.67)	(2.51)	(4.66)	(4.59)
CSR	−0.009 ***	−0.010 ***	−0.032 ***	−0.030 ***	−0.023 ***	−0.007 ***	−0.005 ***
	(−4.40)	(−4.38)	(−4.16)	(−3.64)	(−3.38)	(−3.79)	(−3.65)
Controls	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES
Adj. R^2	0.534	0.049	0.224	0.378	0.530	0.070	0.088
N	15,998	15,998	13,562	12,380	11,372	15,998	15,608

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

Labor investment appears as the number and the remuneration of employees. With the improvement of mechanization and artificial intelligence, firms reduce the number of employees and require more well-paid employees. In addition, firms may have a large gap in the remuneration of different positions, which may cause a certain deviation in measuring labor investment by the fluctuation in the number of employees. We replace *NET_HIRE* in Equation (1) with the annual change in labor remuneration (*NET_WAGE*), where labor remuneration = cash paid to employees + the annual change in employee remuneration payable. Considering the influence of other factors on employee remuneration, we add more control variables in Equation (1). First, we add the lagged cash asset ratio (*CASH*). We also add the change in cash asset ratio (Δ*CASH*) of the current year and its one-year lagged variable. Second, given China's vast territory, the economic development level of different regions varies greatly. We control for regional influences on labor remuneration by adding the log of the average wage of urban employed people in each province (*WAGE_MEAN*). We also add the change in the log of average wage (Δ*WAGE_MEAN*) in the current year and its one-year lagged variable. For these variables, the data of the average wage of urban employed people are from *The China Statistical Yearbook*, and the other data are from CSMAR. We employ the absolute value of the residuals of the improved model (*AB_NET_WAGE*) as a proxy for labor investment efficiency. Then, we re-estimate Equation (2). Column (7) of Table 10 provides the results. The coefficient of *CSR* is still significantly negative at the 1% level, demonstrating the validity of our conclusion after utilizing the growth in labor remuneration as a proxy for labor investment.

5.5. The Impact of Non-Labor Investment

Labor investment and non-labor investment are often complementary [91], so non-labor investment may influence our results. Following Jung et al. (2014) [11], we test the

influence of non-labor investment on our hypothesized relationship. In particular, for capital, acquisition, and advertising expenditures, we divide the sample into different subsamples according to the association between a firm's net hiring and the specific type of non-labor investment. If a company expands or reduces its labor investment and a specific type of non-labor investment simultaneously, then it shows a positive correlation, and we add the sample firm to the positive group. If a firm expands (reduces) labor investment and reduces (expands) a specific type of non-labor investment, it shows a negative correlation, and we add the sample to the negative group. If the amount of non-labor investment is missing or zero, we add it to the uncertain group. We then estimate Equation (2) for each group. If our hypothesized relationship is dominated by non-labor investment, then we expect a significant coefficient of CSR only in the positive group, which indicates that the two types of investment are complementary. As we report in Table 11, only the coefficient of *CSR* in the positive group of advertising expenditure (column (6)) is not significant. In other cases, the coefficients of *CSR* are all significantly negative. This proves that non-labor investment does not interfere with our main results.

Table 11. The effect of non-labor investment on the association between CSR and labor investment efficiency.

Variable	Capital Expenditures		Acquisitions Expenditures			Advertising Expenses		
	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE
	Positive	Negative	Positive	Negative	Uncertain	Positive	Negative	Uncertain
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.682 ***	0.377 **	0.836 ***	0.731 ***	0.544 ***	0.857 ***	0.182	0.582 ***
	(4.45)	(2.31)	(4.12)	(3.10)	(3.28)	(3.96)	(0.94)	(3.15)
CSR	−0.008 ***	−0.007 ***	−0.009 ***	−0.008 **	−0.004 *	−0.003	−0.008 **	−0.009 ***
	(−3.35)	(−2.80)	(−2.94)	(−2.12)	(−1.70)	(−0.94)	(−2.49)	(−3.53)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Adj. R^2	0.089	0.085	0.103	0.085	0.091	0.089	0.055	0.102
N	8425	7573	5329	3877	6792	4676	4594	6728

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

5.6. Additional Control Variables

We add more control variables to the model. These control variables are not included in Equation (2) because the requirements of their data will result in additional sample losses. First, as regional marketization and economic development may affect the accumulation of human capital [92], we add regional marketization level (*MKT*) and regional GDP growth (*GDP*) to Equation (2) to account for the impact of the macroeconomic environment on labor investment efficiency. We use the marketization total index score as a proxy for the regional marketization level [93]. Larger values of *MKT* indicate higher marketization levels. We present the results after adding the two macroenvironment control variables in column (1) of Table 12. Second, considering the interference of equity structure on corporate investment, we add the largest shareholder's shareholding (*FHOLD*) and the equity balance degree (*SHBAL*). The results are listed in column (2). Third, to account for the impact of the governance of the board of directors [43], we add the combination of CEO and board chair (*BOTH*), independent director proportion (*INDIR*), and the number of directors (*DIRNUM*) as control variables. If the CEO is also the board chair, then *BOTH* is 1, and 0 otherwise. The results are listed in column (3). Fourth, we avoid the possible impact of management incentives on labor investment efficiency by adding management shareholding (*MGTSH*) and management compensation (*MGTWG*) as control variables, where the total management compensation is the log of total management monetary compensation.

The regression results are listed in column (4). Fifth, according to the research results of Jung et al. (2014) [11], we add accounting quality (*AQ*) to Equation (2) as a control variable, which we obtained from the modified Jones Model [94]. Column (5) provides the results. Finally, we include all the ten additional control variables simultaneously in Equation (2) and provide the results in column (6). In columns (1) to (6), the coefficients of *CSR* are all significantly negative at the 1% level, and our main conclusion still holds. Meanwhile, the coefficient of *BOTH* is significantly positive, supporting the view that appointing the CEO as the chair of the board does not improve the decisions around labor investment [36]. The coefficients of *DIRNUM* and *MGTWG* are significantly negative, indicating that larger boards and higher management compensation will alleviate inefficient labor investment. The regression coefficient of *AQ* supports the view that reliable accounting information significantly enhances labor investment efficiency [11].

Table 12. The results when adding additional controls to the baseline model.

Variable	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE	AB_NET _HIRE
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.568 *** (4.88)	0.606 *** (4.96)	0.564 *** (4.74)	0.518 *** (4.20)	0.414 *** (3.15)	0.392 ** (2.54)
CSR	−0.007 *** (−4.05)	−0.007 *** (−3.82)	−0.007 *** (−3.82)	−0.007 *** (−3.80)	−0.008 *** (−4.21)	−0.006 *** (−3.31)
MKT	−0.002 (−0.84)					−0.002 (−1.04)
GDP	−0.022 (−0.37)					−0.053 (−0.82)
FHOLD		−0.032 (−1.02)				−0.047 (−1.33)
SHBAL		−0.001 (−0.15)				0.001 (0.11)
BOTH			0.013 * (1.73)			0.017 * (1.77)
INDIR			−0.072 (−1.30)			−0.022 (−0.33)
DIRNUM			−0.008 *** (−4.36)			−0.008 *** (−3.68)
MGTSH				−0.017 (−0.82)		−0.007 (−0.21)
MGTWG				−0.000 * (−1.83)		−0.000 ** (−2.56)
AQ					0.036 *** (4.21)	0.039 *** (4.28)
Other Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Adj. R^2	0.085	0.085	0.087	0.085	0.087	0.091
N	15,998	15,998	15,899	15,982	13,198	12,570

Notes: ***, **, and * indicate significance at the 0.01, 0.05, and 0.1 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

5.7. The Impact of CSR Dimensions on Labor Investment Efficiency

We utilize a comprehensive CSR score as a proxy for CSR performance in the tests above. However, this score includes shareholder responsibility (*CSR_SH*); employee responsibility (*CSR_LAB*); supplier, customer, and consumer responsibility (*CSR_SUPCUS*); environment responsibility (*CSR_ENV*); and public responsibility (*CSR_SOC*). The impact of a company's CSR in different dimensions on labor investment efficiency may vary [95]. To further explore the influence of each CSR dimension on labor investment efficiency, we add five sub-dimension variables of CSR (*CSR_SH*, *CSR_LAB*, *CSR_SUPCUS*, *CSR_ENV*, and *CSR_SOC*) to Equation (2). The results are listed in Table 13.

Columns (1) to (3) list the results of the influence of shareholder responsibility on labor investment efficiency. In the full sample (column (1)) and the labor underinvestment sample (column (3)), the coefficients of *CSR_SH* are significantly negative at the 1% level, as expected. However, in the overinvestment sample (column (2)), the coefficient of *CSR_SH* is not significant. We investigate the underlying cause by performing regressions for the over-hiring and under-firing subsamples (the subsamples of overinvestment). We see that the influence of shareholder responsibility on labor overinvestment is more concentrated in the over-hiring subsample (the coefficient of *CSR_SH* is −0.008, t-statistic = −2.38) and not significant in the under-firing subsample (the coefficient of *CSR_SH* is −0.002, t-statistic = −1.48). To save space, we omit these results from Table 13. To maximize shareholders' wealth, firms should reduce redundant employees in timely manner, but China's new labor law in 2008 restricts dismissals and requires more layoff compensation, which makes it harder for firms to fire redundant employees. Columns (4) to (6) show the test results of the influence of employee responsibility on labor investment efficiency. Similarly, the coefficients of *CSR_LAB* in columns (4) and (6) are significantly negative, consistent with expectations. However, in the overinvestment sample, the coefficient of *CSR_LAB* is not significant (column (5)). In fact, to assume employee responsibility means that firms should hire as many workers as possible, treat them with welfare higher than the legal standard, and avoid layoffs [67], which offsets the inhibiting effect of CSR on labor overinvestment. Columns (7) to (9) report the results of *CSR_SUPCUS*. The coefficients of *CSR_SUPCUS* are significantly negative at the 1% level (columns (7) and (8)), consistent with expectations, but are not significant in the labor underinvestment sample (column (9)). Supplier, customer, and consumer responsibility means that firms tend to issue more prepayments for their suppliers, provide more credit financing for their customers, and commit a longer time to guarantee product quality for their customers. These behaviors may occupy the cash flow for labor investment to a certain extent and offset the influence of CSR in alleviating labor underinvestment. Columns (10) to (12) report the results of environmental responsibility. The coefficients of *CSR_ENV* are significantly negative at the 1% level in all three kinds of sample, consistent with expectations. Columns (13) to (15) show the results of public responsibility. The coefficient of *CSR_SOC* is significant only in the underinvestment sample (column (15)), but not significant in the full or overinvestment samples (columns (13) and (14)). This result is likely because public responsibility (e.g., charitable giving) is easy to implement but will bring high short-term returns and is sometimes regarded as a "fig leaf" to divert social attention away from negative information about the firm [65]. Hence, the performance of public responsibility may actually indicate agency conflict and is not conducive to restraining overinvestment in labor.

Table 13. The effect of CSR dimensions on labor investment efficiency.

Variable	AB_NET _HIRE	OVER _INV	UNDER _INV	AB_NET _HIRE	OVER _INV	UNDER _INV	AB_NET _HIRE	OVER _INV	UNDER _INV	AB_NET _HIRE	OVER _INV	UNDER _INV	AB_NET _HIRE	OVER _INV	UNDER _INV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CSR_SH	−0.020 *** (−2.88)	−0.026 (−1.24)	−0.012 *** (−2.84)												
CSR_LAB				−0.017 ** (−2.18)	−0.034 (−1.34)	−0.012 *** (−2.80)									
CSR_SUPCUS							−0.017 *** (−3.22)	−0.055 *** (−2.97)	−0.003 (−1.16)						
CSR_ENV										−0.019 *** (−3.92)	−0.054 *** (−3.41)	−0.005 ** (−2.10)			
CSR_SOC													−0.010 (−1.28)	0.004 (0.18)	−0.010 ** (−2.08)
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj. R^2	0.085	0.119	0.156	0.085	0.119	0.156	0.085	0.120	0.155	0.085	0.121	0.156	0.085	0.119	0.156
N	15,998	5410	10,588	15,998	5410	10,588	15,998	5410	10,588	15,998	5410	10,588	15,998	5410	10,588

Notes: *** and ** indicate significance at the 0.01and 0.05 levels, respectively (two-tailed). Standard errors are clustered at the firm level.

6. Conclusions

In this study, we utilize a sample of Chinese listed companies to investigate the connection between CSR and labor investment efficiency. It is found that CSR can enhance labor investment efficiency. The relationship remains valid after implementing the 2SLS methods to address the endogeneity problem. We also perform robustness tests of using alternative proxy variables for labor investment efficiency, considering the impact of non-labor investment, and adding additional control variables. Dividing inefficient labor investment into overinvestment and underinvestment subsamples further supports our conclusion that good CSR performance can improve labor investment efficiency by inhibiting overinvestment and underinvestment simultaneously.

We also examine the moderating effect of property rights and find that compared to SOEs, the influence of CSR is more significant in non-SOEs. Second, we test the moderating effect of financing constraints and find a stronger connection between CSR and labor investment efficiency in firms facing greater financing constraints. Third, we find that higher labor adjustment costs attract more supervision from stakeholders and will strengthen the impact of CSR on labor investment efficiency. Fourth, our tests of the sub-dimensions of CSR confirm that CSR can inhibit inefficient labor investment in most cases.

This study supports the previous literature about the economic consequence of CSR. Consistent with the previous literature, CSR can improve corporate governance [19,21] and therefore reduce agency costs, which is against the view that CSR is a manifestation of agency problems [27]. In addition, CSR reduces labor underinvestment through alleviating financial constraints and supports the signaling theory [61,70] that CSR acts as a positive signal and reduces costs of capital [22,63]. The previous literature on CSR mainly focused on the firms of developed countries [19,21,22], but we select China as the research setting and provide empirical evidence from an emerging economy to complement the literature.

This study also extends the research on the influencing factors of labor investment efficiency. The previous literature on firms' investment decision-making primarily focused on capital investment efficiency and innovation investment efficiency [7,8], but in recent years, labor investment efficiency has gradually garnered significant attention. The existing research on labor investment efficiency mainly focuses on CEO traits [18,43,44], external monitoring [15,17,45], and legal environment [16,47,48], but we emphasize CSR and its influence on labor investment efficiency and provide additional insights to the current research. Our results are consistent with the view that information asymmetry is a main cause of inefficient labor investment [11,17,41], and high-quality information disclosure and external monitoring will improve labor investment efficiency by reducing labor overinvestment and underinvestment simultaneously.

This study provides practical implications for firm managers and government regulators. The research demonstrates the significant positive impact of CSR activities on firms, which could encourage managers to actively participate in CSR activities to improve resource allocation efficiency. The results of moderating-effect tests provide differentiated instructions according to the property rights, financial constraints, and labor adjustment costs and are conducive for firms to adapt to their own conditions and select suitable paths to enhance investment efficiency. Since the development of China's CSR overall is still insufficient, regulators should continue implementing CSR policies, improve the CSR evaluation system, and encourage more firms to undertake social responsibility.

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