

# The effect of labor investment efficiency on investor attention-- Evidence from Chinese listed companies

Jingze Li <sup>1, #</sup>, Yitong Zhou <sup>2, #, \*</sup>, Wen Xiao <sup>3, #</sup>

<sup>1</sup> School of Economics, Qingdao University, Qingdao, China, 266000

<sup>2</sup> School of Finance, Shanxi University of Finance and Economics, Shanxi, China, 030006

<sup>3</sup> School of Finance, Renmin University of China, Beijing, China, 100872

\* Corresponding author: zyt010513@163.com

#These authors contributed equally.

**Abstract.** Based on the annual data of A-share listed companies in Shenzhen and Shanghai from 2018 to 2021, this paper empirically explores the impact of labor investment efficiency on investor attention and its mechanism of action, taking into account the nature of the companies. It is found that labor investment efficiency has a significant positive effect on investor attention, and this finding still holds after robustness tests using various methods. Also, based on the moderating role of stock return in the relationship between labor investment efficiency and investor attention, a model was developed and concluded that the higher the stock return, the stronger the role of labor investment efficiency in attracting investor attention. The research in this paper has implications for firms to attract investors' attention.

**Keywords:** labor investment efficiency investor attention, stock returns, corporate governance.

## 1. Introduction

Investor attention and labor investment efficiency are two important factors that impact the performance and growth of firms. Investor attention refers to the attention behavior of investors generated by a specific time exposure. This concept has received increased attention in the field of finance in recent years, as it has been found to significantly impact investor decision-making and portfolio management. Veldkamp (2010) has examined the effect of investor attention constraints on portfolios, and found that limited ability to pay attention can lead investors to seek more information in the market.

On the other hand, labor investment efficiency refers to the degree of matching between the actual amount of labor employed by a firm and the optimal amount required for production and operation. Labor is a crucial factor in high-quality economic development, as it helps enterprises break through the law of diminishing marginal returns and promotes sustained economic growth. The improvement of labor investment efficiency enables enterprises to have higher quality development, which means the optimization of human capital structure, improvement of enterprise productivity, and enhancement of enterprise management efficiency [1].

Given the importance of both investor attention and labor investment efficiency in determining the success of firms, it is worth exploring the relationship between the two. Specifically, can increased labor investment efficiency lead to increased investor attention? Additionally, what is the moderating effect of labor investment efficiency on investor attention? Answering these questions could provide valuable insights into human capital management and help firms better attract investor attention, leading to improved growth and performance.

## 2. Theoretical analysis and research hypothesis

The rate of return on stocks is the ratio of the total amount of income earned from investing in stocks to the original amount invested, and the efficiency of the firm's labor investment efficiency determines the rate of return on stocks, the higher the efficiency of labor investment efficiency, the

higher the profitability and the smaller the financing constraint of the enterprise, and the more the results it brings can exert influence on the stock yield of the enterprise<sup>[2]</sup>. According to attention theory, it is known that investors' attention is limited, and the level of corporate stock return reasonably influences investors' attention. Thus, stock return, as the decision maker of shareholders' rights and labor returns, affects the success or failure of labor investment efficiency and plays a crucial role in attracting more investors and thus labor talent to the firm in the future.

From the viewpoint of labor investment efficiency, when the stock return is not high, the enterprise cannot get a higher return to pay the employees' salary, the employees' labor motivation becomes poor, the labor investment efficiency becomes low, the labor cost increases, and with the increase of labor cost, the enterprise has to lay off employees to improve the labor investment efficiency, which is not conducive to the economic goal of increasing employment and reducing unemployment in China. When the stock yield is better, the expected project profit of the enterprise increases, considering that labor investment efficiency has the law of diminishing returns [2], enterprises will allocate resources to labor or human capital, and then motivate employees enterprise holding, so as to enhance the labor motivation of employees and thus improve the efficiency of labor investment efficiency, bringing more benefits to enterprises and employees (Lai, Shaojie, et al 2021;) [3].

From the perspective of investor attention, when the enterprise's stock returns are not high, investors believe that they can not get more investment benefits from the enterprise, their input energy will be significantly reduced, which is not conducive to attract more investment attention for the enterprise, and then can not form a herd effect among investors<sup>[4]</sup>, resulting in high volatility characteristics of investor earnings, and even make decisions that are detrimental to the development of the enterprise, because They invest more time and energy but get less investment return, which is not conducive to the enterprise to attract capital investment to achieve long-term development(Vozlyublenniaia, Nadia 2014;)<sup>[5]</sup>. When the enterprise's stock yield is better, they will invest more energy and cost, their search cost will be elevated(Liu Qiyun 2021;)<sup>[6]</sup>, and the search utility will be elevated, which in turn will make the stock obtain higher premium, further expand investors' attention, attract more capital investment and excellent talents for the enterprise, and enhance the labor investment efficiency to drive the sustainable development of the enterprise. While enterprises enhance labor investment efficiency, they continuously optimize their internal operation mechanism to improve stock returns and attract more investment attention.

Therefore, this paper proposes the hypothesis that the relationship between labor investment efficiency and investor attention is positively moderated by the increase in stock return, i.e., the higher the stock return, the stronger the role of labor investment efficiency improvement in attracting investor attention.

### 3. Study Design

#### 3.1. Sample selection and data sources

The research sample period of this paper is the annual data of listed companies in Shenzhen and Shanghai A-shares from 2018 to 2021, and all listed companies in finance and real estate are excluded from the corporate data due to the uniqueness of business nature. Basic corporate information, financial data, corporate governance data, and equity nature data are integrated from Guotai Junan (CSMAR) database, wind database, and CNRDS. The industry classification of listed companies is selected de the standard of "Guideline on Industry Classification of Listed Companies" issued by China Securities Regulatory Commission in 2012. In order to ensure the validity of the data and eliminate the influence of abnormal samples on the research conclusions, when selecting the samples, this paper deals with the data according to the following principles. Since the object of this paper is listed companies, ST and \*ST companies are excluded; in order to consider the hypothesis of going concern, data with leverage greater than or equal to 1 are excluded, and financial and real estate companies are excluded; this paper uses the Winsorized method to sort the outliers of 1% and 99%, and there are 10,743 observations that finally enter the sample regression analysis.

### 3.2. Model Design and Variable Definition

#### 3.2.1. Model Design

First, to investigate the effect of labor investment efficiency on investor attention, the following static panel model is constructed.

$$\ln BDI_{i,t} = \beta_0 + \beta_1 Abresid_{i,t} + \delta X_{i,t} + year_t + ind_t + \varepsilon_{i,t} \quad (1)$$

In equation (1), the variable  $Abresid_{i,t}$  denotes the efficiency of labor investment in firm  $i$  in year  $t$ .  $X_{i,t}$  represents the firm-level control variables.  $year_t$ ,  $ind_t$ ,  $\varepsilon_{i,t}$  denotes year and industry fixed effects, respectively.  $\varepsilon_{i,t}$  is the error term of the model.

To examine the important role of stock returns in labor investment efficiency affecting investor attention, this paper adds to equation (1) the period  $t$  of stock returns  $Return_{i,t}$  and its interaction term with labor investment efficiency in period  $t$   $Abresid_{i,t} * Return_{i,t}$  the following moderating effect model is constructed.

$$\ln BDI_{i,t} = \beta_0 + \beta_1 Abresid_{i,t} + \beta_2 Abresid_{i,t} * Return_{i,t} + \beta_3 Return_{i,t} + \delta X_{i,t} + year_t + ind_t + \varepsilon_{i,t} \quad (2)$$

The variable  $Return_{i,t}$  represents the stock return of firm  $i$  in year  $t$ . The remaining variables follow equation (1). In equation (2), the interaction term  $Abresid_{i,t} * Return_{i,t}$  coefficient  $\beta_2$  significance and direction need to be focused on the  $Abresid_{i,t}$  the coefficient of  $\beta_1$  is significantly positive, if the interaction term  $Abresid_{i,t} * Return_{i,t}$  of  $\beta_2$  is also significantly positive, it indicates that stock returns have a positive moderating effect on the relationship between labor investment efficiency and investor attention.

#### 3.2.2. Variable Definition

The variable  $Return_{i,t}$  represents the stock return of firm  $i$  in year  $t$ .  $X_{i,t}$  represent firm-level control variables.  $year_t$ ,  $ind_t$ ,  $\varepsilon_{i,t}$  denote year and industry fixed effects, respectively.  $\varepsilon_{i,t}$  is the error term of the model.

In this paper, six control variables were selected to avoid the influence of other factors on investors' attention (Yung, Y.E., Zhang, M., 2022;) [7],

(1) firm size (Size) measured using market capitalization at the end of December in billions of dollars

(2) gearing ratio (Lev) = total liabilities/total assets

(3) book-to-market ratio (B/M) = book value of shareholders' equity at the end of the year/ market capitalization at the end of the year

(4) return on assets (Roa) = interest Profit before tax / average total assets

(5) Return on equity (Roe) = Earnings / Input costs

(6) Ratio of first largest shareholder ownership (Dygdg)

## 4. Empirical results and analysis

### 4.1. Moderating effect of stock returns

As can be seen from the table, the interaction terms  $Abresid_{i,t} * Return_{i,t}$  and  $Abresid_{i,t}$  are significantly positive at the 10% level and the coefficients of  $Abresid_{i,t}$  The coefficients of are significantly positive at the 5% and 10% levels, respectively, indicating that stock returns positively moderate the relationship between labor investment efficiency and investor attention, and the higher the stock returns, the stronger the effect of increased labor investment efficiency in increasing investor attention, confirming the hypothesis of the study. As shown in Table 1.

**Table 1.** The regulatory effect of stock returns

|                                                     | (1)                      | (2)                     |
|-----------------------------------------------------|--------------------------|-------------------------|
|                                                     | lnBDI                    | lnBDI                   |
| Abresid                                             | 0.0618***<br>(3.4961)    | 0.0398*<br>(1.8104)     |
| Enterprise size                                     | 0.0543***<br>(3.0906)    | 0.0442**<br>(2.4622)    |
| Gearing ratio                                       | -0.3288***<br>(-3.8431)  | -0.1860**<br>(-2.0048)  |
| Book-to-market ratio                                | -0.7028***<br>(-13.3173) | -0.4487***<br>(-6.4108) |
| Return on Assets                                    | 0.0667*<br>(1.7925)      | 0.0136<br>(0.3584)      |
| Shareholding ratio of the first largest shareholder | -0.0039***<br>(-3.0379)  | -0.0039***<br>(-3.0535) |
| Rate of return                                      |                          | 0.0411<br>(1.0835)      |
| Abresid_return                                      |                          | 0.1220*<br>(1.8214)     |
| Rate of return                                      |                          | 0.0000<br>(...)         |
| _cons                                               | 9.8222***<br>(26.1130)   | 9.9111***<br>(26.2630)  |
| N                                                   | 7607                     | 7607                    |
| adj. R2                                             | 0.116                    | 0.130                   |

t statistics in parentheses

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

#### 4.2. Baseline regression results of the effect of labor investment rate on investor attention

Column (1) of the table shows the regression results without adding any control variables, while columns (2) to (4) show the regression results after adding year, industry and province fixed effects, and firm-level control variables one by one. The results in column (4) of the table show that the regression coefficient of lnBDI is significantly positive at the 1% level of significance after controlling for a range of factors that may affect investor attention. As shown in Table 2.

**Table 2.** Labor investment efficiency and investor attention: benchmark regression results

|                                                     | lnBDI     |           |           |
|-----------------------------------------------------|-----------|-----------|-----------|
| Abresid                                             | 0.089***  | 0.100***  | 0.046**   |
|                                                     | -4.873    | -5.393    | -2.05     |
| Enterprise size                                     |           |           | 0.112***  |
|                                                     |           |           | -6.541    |
| Gearing ratio                                       |           |           | -0.204**  |
|                                                     |           |           | (-2.202)  |
| Book-to-market ratio                                |           |           | -0.449*** |
|                                                     |           |           | (-6.379)  |
| Return on Assets                                    |           |           | -0.033    |
|                                                     |           |           | (-0.849)  |
| Shareholding ratio of the first largest shareholder |           |           | -0.005*** |
|                                                     |           |           | (-4.343)  |
| Rate of return                                      |           |           | 0.004     |
|                                                     |           |           | -0.094    |
| Abresid_return                                      |           |           | 0.204***  |
|                                                     |           |           | -3.003    |
| Constant                                            | 10.019*** | 11.320*** | 9.324***  |
|                                                     | -142.007  | -54.166   | -23.356   |
| Year Effect                                         | No        | Yes       | Yes       |
| Industry Effect                                     | No        | Yes       | Yes       |
| Provincial Effect                                   | No        | Yes       | Yes       |
| Observations                                        | 7,607     | 7,607     | 7,607     |
| Number of id                                        | 2,818     | 2,818     | 2,818     |
| z-statistics in parentheses                         |           |           |           |
| *** p<0.01, ** p<0.05, * p<0.1                      |           |           |           |
| Table 2                                             |           |           |           |

### 4.3. Robustness

**Table 3.** Robustness analysis

|                                                     | (1)       | (2)        |
|-----------------------------------------------------|-----------|------------|
|                                                     | encode    | lnBDI      |
| Abresid                                             | 2.6695*   | 0.0618***  |
|                                                     | (1.8516)  | (3.4961)   |
| Enterprise size                                     | 1.5331    | 0.0543***  |
|                                                     | (1.1315)  | (3.0906)   |
| Gearing ratio                                       | -9.4072*  | -0.3288*** |
|                                                     | (-1.7428) | (-3.8431)  |
| Book-to-market ratio                                | -4.3041   | -0.7028*** |
|                                                     | (-0.9711) | (-13.3173) |
| Return on Assets                                    | -7.6424** | 0.0667*    |
|                                                     | (-2.0068) | (1.7925)   |
| Shareholding ratio of the first largest shareholder | 0.1552**  | -0.0039*** |
|                                                     | (2.0111)  | (-3.0379)  |
| R&D expense ratio                                   |           |            |
|                                                     |           |            |
| Company Age                                         |           |            |
|                                                     |           |            |
| _cons                                               | -3.2446   | 9.8222***  |
|                                                     | (-0.1118) | (26.1130)  |
| N                                                   | 7606      | 7607       |
| adj. R <sup>2</sup>                                 | 0.096     | 0.116      |

t statistics in parentheses

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

To further verify the robustness of the above findings, the following robustness tests were also conducted in this paper.

First, replacing the explanatory variables(Xu Ziyao,Zhang Lisha. 2022;) [8], existing studies have often used the turnover rate in addition to the index value stock code to measure investor attention (turnover /The higher the turnover rate, the more investors' attention will be attracted. In this paper, this indicator is also used as a proxy for the explanatory variables, and the regression results are shown in column (1) of the table.

As seen from the results in the table, the regression coefficient of labor investment efficiency is significant at the 10% level by replacing the explanatory variables for robustness testing.

Second, the control variables are replaced and two new variables, R&D cost rate and firm age, are added to the existing control variables for regression analysis, and the results are presented in column (2) of the table. As seen from the table, the regression coefficient of labor investment efficiency is significant at the 1% level.

As seen from the results in the table 3, the regression coefficients of labor investment efficiency are significant at least at the 10% level using the above-mentioned approaches for robustness testing, and the basic conclusions of the model do not change substantially, further confirming the robustness of the paper's conclusions.

## 5. Heterogeneity Analysis

### 5.1. Results of Heterogeneity Analysis

**Table 4.** Heterogeneity analysis results

|                                                     | Heterogeneity of business nature |                      | Innovative Heterogeneity |                 |
|-----------------------------------------------------|----------------------------------|----------------------|--------------------------|-----------------|
|                                                     | (1)                              | (2)                  | (3)                      | (4)             |
|                                                     | State Enterprise                 | Non-State Enterprise | Highly innovative        | Weak innovation |
| Abresid                                             | 0.015                            | 0.068***             | 0.007                    | 0.091***        |
|                                                     | -0.295                           | -3.177               | -0.176                   | -3.582          |
| Enterprise size                                     | 0.119***                         | 0.104***             | 0.117***                 | 0.130***        |
|                                                     | -4.26                            | -4.504               | -5.092                   | -4.512          |
| Gearing ratio                                       | -0.378**                         | -0.235***            | -0.139                   | -0.234**        |
|                                                     | (-2.369)                         | (-3.002)             | (-0.907)                 | (-2.138)        |
| Book-to-market ratio                                | -0.573***                        | -0.377***            | -0.373***                | -0.526***       |
|                                                     | (-4.273)                         | (-5.152)             | (-3.302)                 | (-5.770)        |
| Return on Assets                                    | 0.114                            | -0.035               | -0.039                   | -0.051          |
|                                                     | -0.873                           | (-0.782)             | (-0.720)                 | (-0.915)        |
| Shareholding ratio of the first largest shareholder | -0.004*                          | -0.007***            | -0.004***                | -0.008***       |
|                                                     | (-1.838)                         | (-4.748)             | (-2.666)                 | (-3.651)        |
| Rate of return                                      | 0.186**                          | -0.086***            | 0.089                    | -0.101**        |
|                                                     | -1.977                           | (-2.666)             | -1.405                   | (-2.251)        |
| Abresid_return                                      | -0.116                           | 0.352***             | 0.047                    | 0.397***        |
|                                                     | (-0.764)                         | -5.171               | -0.439                   | -4.408          |
| Constant                                            | 9.603***                         | 9.257***             | 9.151***                 | 8.603***        |
|                                                     | -13.945                          | -14.902              | -16.427                  | -12.267         |
| Year Effect                                         | Yes                              | Yes                  | Yes                      | Yes             |
| Provincial Effect                                   | Yes                              | Yes                  | Yes                      | Yes             |
| Industry Effect                                     | Yes                              | Yes                  | Yes                      | Yes             |
| Observations                                        | 2,858                            | 4,438                | 4,270                    | 3,337           |
| Number of id                                        | 1,008                            | 1,817                | 1,675                    | 1,398           |

## 5.2. Heterogeneity Analysis Based on the Nature of the Enterprise

In conducting the heterogeneity analysis, this paper divides the sample into state-owned and non-state-owned enterprises according to the form of ownership of the enterprises, and the results of the effect of labor investment efficiency on investor attention in enterprises of different nature are reported in columns (1) and (2) of the above table 4. After comparing the results, this paper concludes that - after controlling for control variables, time, industry and province fixed effects - the regression coefficients of the explanatory variables  $\ln BDI$  in columns (1) and (2) are significantly positive, while at the same time, the regression coefficients are significantly larger for enterprises of non-SOE nature than for SOEs, which indicates that compared to This indicates that labor investment efficiency has a greater impact on enhancing investor attention in non-SOEs than in SOEs. The reason for this is that SOEs are supported by long-term biased policies and their business and production decisions are often centralized in government departments, which also means that labor investment efficiency has less impact on SOEs' attention; for non-SOEs, they need to rely on their own strengths, including improving labor investment efficiency to gain investors' attention (Lee, Chien-Chiang 2021) [9]. Therefore, the marginal effect of investors' attention on the enhancement of non-SOEs' gaining investors' attention will be greater, which is manifested as a greater promotion of labor investment efficiency of non-SOEs.

## 5.3. Heterogeneity Analysis Based on Firm Innovation

In order to investigate the effect of innovativeness on firms' access to investor attention, this paper divides the sample into firms that are highly innovative and weakly innovative according to their innovativeness, and the results of the effect of labor investment efficiency on their firms' investor attention are reported in columns (3) and (4) of the above table. Upon comparison, the regression coefficients of the explanatory variables  $\ln BDI$  in columns (3) and (4) are significantly positive after controlling for control variables, time, industry, and province fixed effects in this paper, but, the regression coefficients of the less innovative firms are significantly larger than those of the more innovative firms, suggesting that labor investment efficiency has a greater impact on enhancing investor attention in the firms of the more innovative firms, implying that these firms The regression coefficient is significantly larger for the less innovative firms than for the more innovative firms, which means that these firms rely more on innovation or other aspects to attract investors' attention and labor investment efficiency has less impact on such attention (Benlemlih, Mohammed, and Mohammad Bitar 2016;) [10]; for the less innovative firms, they need to obtain investors' attention from labor and other factors.

## 6. Conclusion and Insights

This paper empirically investigates the impact of labor investment efficiency on investor attention by constructing a stock return correlation model using annual data of A-share listed companies in Shenzhen and Shanghai from 2018-2021 as samples, and concludes that (1) labor investment efficiency has a significant positive impact on investor attention; (2) the higher the stock return, the higher the role of labor investment efficiency in attracting investor attention the stronger it is. The above conclusions still hold after a series of robustness tests and heterogeneity analysis.

The following insights can be drawn from the conclusions of this paper.

(1) Optimizing the efficiency of labor investment will not only improve the efficiency of business management, but also improve the attention of investors and contribute to the long-term development of the company.

(2) Accordingly, the higher the attention of investors, the better the corresponding development of enterprises, and the stock returns will rise, the stronger the role of labor investment efficiency to attract investors' attention, forming a virtuous circle.

## References

- [1] Zhou Donghua, Wan Yijian. Can digital Transform Improve Corporate Labor Investment Efficiency [J]. *Journal of Shanxi University of Finance and Economics*, 2023 (03): 87 – 101.
- [2] Kong Dongmin, Tang Qi, Xiang Junyi. Labor protection and enterprise labor investment efficiency [J]. *Journal of Huazhong University of Science and Technology (Social Science Edition)*, 2020 (05): 36 - 47.
- [3] Liu, Qi, Zhao, Huxiao. Can employee stock ownership plan improve the efficiency of corporate labor investment? [J]. *Journal of Zhongnan University of Economics and Law*, 2022 (04): 3 - 15.
- [4] Lai, Shaojie, et al. “CEO Overconfidence and Labor Investment Efficiency.” *The North American Journal of Economics and Finance*, vol. 55, no. LAI2021101319, Jan. 2021.
- [5] Zhao Yu. Research on the impact of investor attention on stock returns [D]. Hebei University of Technology, 2021.
- [6] Vozlyublennaa, Nadia. “Investor Attention, Index Performance, and Return Predictability.” *Journal of Banking & Finance*, vol. 41, no. VOZLYUBLENNAA201417, Apr. 2014,
- [7] Xu Ziyao, Zhang Lisha. How digital economy development affects firms' agency costs--Evidence from Chinese manufacturing firms[J]. *Securities Market Herald*, 2022 (02): 25 - 35.
- [8] Liu Qiyun. A study on investment decision based on valuation uncertainty and search cost--a case study of life service industry [J]. *Finance and Accounting Newsletter*, 2021 (18): 99 - 102.
- [9] Lee, Chien-Chiang, et al. “Investor Attention, ETF Returns, and Country-Specific Factors.” *Research in International Business and Finance*, vol. 56, no. LEE2021101386, Apr. 2021.
- [10] Benlemlih, Mohammed, and Mohammad Bitar. “Corporate Social Responsibility and Investment Efficiency.” *Journal of Business Ethics*, vol. 148, no. 3, Jan. 2016.