Generalist CEO and labour investment efficiency

Abstract

We investigate the effect of generalist CEOs on labour investment efficiency. In the first phase, we construct a labour investment efficiency measure using the residuals from a model where financial variables are regressed on net hiring. In the second phase, employing a CEO general ability index (GAI), we report a positive relationship between GAI and labour investment efficiency, suggesting firms with generalist CEOs exhibit better labour investment. In addition, internal and external monitoring moderates the association between the CEO's general ability and efficient labour investment. This relation remains robust when considering additional controls and alternative measures. We contribute to corporate governance practice by highlighting the role of generalist CEOs in optimising labour investment.

JEL Classifications: G34, J24, M12, G38

Keywords: Corporate governance; Efficient labour investment; Generalist CEOs; Government policy

1. Introduction

The roles of CEOs are crucial to modern businesses. Hiring the correct type of CEO is one of the most important decisions of a company. Generalist CEOs (i.e. having general managerial skills along with a variety of firm and industry experience) have become more popular as they receive better perks than specialist CEOs (Custodio et al., 2013). There has been an increased trend in explaining the CEO's role in the corporate governance literature. Many authors argue the relevance towards the presence of generalist CEOs in a competitive business firm (Agnihotri & Bhattacharya, 2021; Brockman et al., 2016; Chatjuthamard et al., 2022; Chen et al., 2021; Custodio et al., 2013; Datta & Iskandar-Datta, 2014; Hossain et al., 2023; Kalelkar et al., 2024; Koo, 2013; Li & Patel, 2019; Lu et al., 2024; Mueller et al., 2021; Xu, 2024; Xu et al., 2021).

Labour investment is instrumental in economic growth. Volatility and uncertainty in the labour market create importance to the effective use of labour resources (Grencikova et al., 2022). Efficient investment in labour is of greater importance to remain competitive (Habib & Hasan, 2020). In this context, Merz and Yashiv (2007) claim that the value of hiring concerns the firm's value. However, the suboptimal investment (i.e. over-hiring and under-hiring) may occur due to the CEO's agency issue, uncertainty and specific business strategy (Ghaly et al., 2020; Habib & Hasan, 2021). From the theoretical setting, market-driven theory forecasts that more efficient CEOs will successfully manage resources (Custodio et al., 2013). However, the extent of the CEO's ability and the degree of managing labour investment is challenging. This study investigates the potential effect of CEOs' general ability index on labour investment efficiency. Following Custodio et al. (2013), we employ the general ability index (GAI) as a measure of CEO general managerial skills that consists of essential elements of CEOs' professional career: past number of (1) designations (2) firms (3) industries in which a CEO served (4) whether the CEO position as a CEO at a different company and (5) whether the CEO served for a conglomerate. Specifically, we examine whether an increase in the CEO's general ability increases labour investment efficiency. Murphy and Zabojnik (2004) claim that specific to the CEO's overall function, general management skills have become more popular than firm-specific skills. Previous studies suggest that generalist CEOs gather general managerial capital, maintain a broad external network, connect with outside directors and move across firms and industries (Custodio et al., 2013; Khedmati et al., 2020). Based on empirical studies, confident CEOs having diverse experiences are associated with return and innovation

(Hirshleifer et al., 2012). Similarly, earlier evidence implies that CEOs with more varied experience in administering and managing companies promote confidence and belief, advancing communication among all units and supporting efficient decision-making (Cai & Sevilir, 2012; Hwang & Kim, 2009). For instance, the study from Zbib and Asare (2023) and Chen et al. (2023) show that experience in the CEO position matters for investment decisions.

We investigate whether the general ability of CEOs can increase efficient labour investment. We consider efficient labour investment (EFFILI) to be the reverse of inefficient labour investment (i.e. overhiring/overinvestment or underhiring / underinvestment). Overinvestment or underinvestment in labour can be considered inefficient labour investment (Khedmati et al., 2020). Overinvestment is an error in labour investment once CEOs appoint employees and keep poorly performing employees in the company and vice versa (Ben-Nasr & Alshwer, 2016; Jung et al., 2014; Khedmati et al., 2020). Over-employment in the company causes extra investment and creates distortions in labour investments (Khedmati et al., 2020). The existing body of research has examined drivers of labour investment efficiency such as conditional conservatism (Ha & Feng, 2018), stock price informativeness (Ben-Nasr & Alshwer, 2016), financial reporting quality (Jung et al., 2014), institutional investor horizon (Ghaly et al., 2015) and CEO director ties (Khedmati et al., 2020). Xu (2024) claims that generalist CEOs have excessive risk-taking behaviour and are confident in reporting internal control weaknesses. The issue of identifying the role of the generalist CEO in managing labour investment efficiency has mainly gone unnoticed. Our study focuses on addressing this literature gap.

While prior studies have examined the connection of CEOs' managerial ability with environmental concerns such as carbon emissions (Hossain et al., 2023), corporate social responsibility (CSR) (S. Park et al., 2024), compensation (Custodio et al., 2013; Mueller et al., 2021; Zbib & Asare, 2023), corporate overinvestment (Chen et al., 2023), audit price (Z. Ma et al., 2021), firm performance (Li & Patel, 2019), mergers and acquisitions (Xu et al., 2021), and reporting internal control weaknesses (Xu, 2024), the unnoticed concern in previous literature is whether the generalist CEOs exercise comparable results on labour investment efficiency. In this research, we contend that investment decision practice in labour differs from other corporate-related investments for the following reasons. First, in contrast to the non-labour investment related to capital expenditure, labour investments are variable, regularly adjusted and typically permanently affect a company's operating costs and earnings (Merz & Yashiv,

2007). Secondly, labour is a crucial component of production that exposes businesses to the threat of workers who may depart the company in response to better future career prospects (Donangelo, 2014). As a result, CEO labour investment choices differ significantly from other corporate investments like capital spending, research and development and mergers and acquisitions.

Our primary focus is investigating the relationship between CEOs' general ability and labour investment efficiency. CEOs formally involve long-term corporate investment decisions, including hiring employees, because keeping the right employees to ensure the organisation's correct number of human resources increases growth; otherwise, hiring the excess/limited can deteriorate performance (Khedmati et al., 2020). In providing support for this argument, after hiring Christina Gil White as the interim CEO of GRI, Jessica Fries, Chair of the GRI Supervisory Board, says, "Cristina has a deep understanding of GRI and the varied needs and perspectives of our key stakeholders and staff, alongside proven credentials in corporate sustainability. She is, therefore, ideally placed to take on leadership of the organization at this time, and I am delighted she has agreed to be interim CEO. The Management and Supervisory Boards will fully support Cristina to deliver on GRI's strategic priorities". We argue that the diverse ability of CEOs enhances labour investment efficiency because they can apply their wide range of expertise and experience from different companies to use labour resources efficiently.

Considering the developments in generalist CEO-related literature and labour investment efficiency, we have tested the association of CEOs' general ability index with labour investment efficiency. In a theoretical sense, agency theory aligns labour investment with shareholder interests (Jensen, 2003; Jensen & Meckling, 1976; Jensen & Meckling, 2019), whereas human capital theory focuses on leadership skills, knowledge, and experiences (Becker, 1962). Both theories receive empirical support from many studies. For instance, CEO abilities are more important in dealing with environmental complications (Custodio et al., 2013; Murphy & Zabojnik, 2004; Teece, 2007). Large-size organizations look for generalist CEOs to deal with the product market dynamics (Cunat & Guadalupe, 2009). In the natural ground, a firm's internal investment policies influence the CEO's performance to align with the shareholders' interest, which may result in inefficient labour investment (Shleifer & Vishny, 1989; Stulz, 1990). Nevertheless, contradictory to agency and human capital theories, instrumental leadership theory privileges that corporate leaders' knowledge matters to improve performance,

which is missing from generalist CEOs (Antonakis & House, 2014). Likewise, functional leadership theory points out that an inherent leader's ability to better handle a leadership role to realise the goal line of the company (Adair, 1979; Fleishman et al., 1991).

Employing U.S. employment data extracted from Compustat and an aggregate measure of the CEO-general ability index obtained from (Custodio et al., 2013) over 2000 to 2022, using ordinary least square (OLS), random effects (RE), fixed effects (FE) and Fama Macbeth regression techniques, we find a positive relationship between GAI and EFFILI, stating that an increase in the CEO general ability index increases efficient labour investment. Furthermore, we examine the channel through which the association between GAI and EFFILI manifests. Here, we determine whether generalist CEOs lead to efficient labour investment when exposed to empire-building and different business strategies. We find evidence that general CEOs exhibit efficient labour investment when aligned with prospector-type business strategies. However, we fail to find generalist CEOs showing efficient labour investment when bound by an empire-building perspective. We report that governance score, managerial ability score, institutional ownership and analyst followings have moderating roles in establishing the relationship between GAI and EFFILI. We further expand our analysis to obtain additional empirical validation. First, we tested the impact of GAI on EFFILI of both extreme overhiring/underhiring and moderate overhiring/underhiring. We document that generalist CEOs are more efficient in enhancing labour investment efficiency in extreme overhiring and underwriting firms. Similarly, we analyse the effect of other investments, such as capital expenditure. Higher generalist CEOs are more effective at enhancing labour investment efficiency in firms with limited capital expenditures. We use Propensity Score Matching (PSM) to mitigate the issue of functional form misspecification (Shipman et al., 2017) and Two-Stage Least Squares (2SLS) to mitigate endogeneity by utilizing instrumental variables such as the CEO having MBA qualifications, labour union membership, CEO turnover and industry tournament incentive (ITI). Considering all analyses, our baseline results are consistent.

Our study contributes to the corporate governance literature in two lengths. First, we extend this research paradigm by investigating the association between the CEO general ability index and labour investment efficiency. Previous studies have overlooked business strategy (Habib & Hasan, 2021), conditional conservatism (Ha & Feng, 2018), stock price informativeness (Ben-Nasr & Alshwer, 2016), institutional investors' horizon (Ghaly et al., 2015), and financial reporting quality (Jung et al., 2014) as factors of efficient labour

investment, concluding that these factors help to enhance efficient labour investment. In this paper, we establish additional contributions by examining the influence of CEOs' general ability index on labour investment efficiencies. We offer compelling evidence of the CEO's ability to increase efficient labour investment. We add to the body of knowledge on corporate governance by demonstrating how the generalist CEO can result in the best possible labour investment.

Our second contribution to the labour economics and human resource literature is methodological. Although discussions about labour investment frequently occur at the corporate level, it is essential to identify the implications of labour investment at the firm level when formulating labour policies. In general, prior research, for instance, indicates that managerial entrenchment reduces the effectiveness of corporate governance, which harms shareholder value (Khedmati et al., 2020). We uncover that generalist CEOs can successfully address the issue of labour investment inefficiency and give a solid solution for suboptimal labour investment issues. Additionally, Xu (2024) investigates how generalist CEOs better report internal control weaknesses and concludes they have more risk-taking behaviour. Our research is similar to that of (Xu, 2024), declaring that generalist CEOs have adequate skills and experience can lead to better labour investment.

Our evidence on CEOs' general skills adds to the promising literature that the higher general ability of CEOs is an essential factor in labour investment efficiency. We add a growing body of literature concerning the insight of the association between generalist CEOs and various corporate policies and investment decisions. Our research fills the gap in the literature by establishing the relationship between a generalist CEO and labour investment efficiency, stating how adopting a generalist CEO increases efficacy in labour investment. Our empirical analysis offers insights and implications for corporate executives like CEOs or managers in developing efficient labour policies, given the consequence of verifying the role of corporate governance in human capital investment efficiency. Hence, this study adds to these discussions about regulations and practice. Ultimately, investors who use investment decisions to assess firm performance would gain from our findings since they show that a generalist CEO's ability increases efficient labour investment. Our findings also directly add to the body of knowledge regarding the general ability of CEOs and investment decisions.

We organise the remainder of this paper as follows. In the next section, we discuss related literature and the development of hypotheses. Section 3 presents the research method. Section

4 presents empirical results, including additional tests and sensitivity analysis. We conclude the entire study in Section 5.

2. Literature review and hypothesis development

2.1 Determinants of labour investment

Numerous studies have explored the determinants of labour investment. Previous studies confirm the importance of optimal investment in labour (Ben-Nasr & Alshwer, 2016; Habib & Hasan, 2021; Jung et al., 2014; Khedmati et al., 2020; Xu, 2024). In addition, several empirical studies advocate that effective labour investment advances revenue generation and productivity (Hansson et al., 2004). Even though effective labour investment can boost a company's competitiveness (Merz & Yashiv, 2007), there is evidence that ineffective labour investment is likely on the opposite side of maximising value (Ben-Nasr & Alshwer, 2016). A company's performance may suffer if it either over-hires or under-hires, making it harder for shareholders to get the returns on their investments they had anticipated. Because ineffective labour investment is likely to minimise value, earlier studies have determined what factors contribute to effective labour investment. When Ben-Nasr and Alshwer (2016) look at the relationship between informative stock prices and labour investment efficiency, they discover that higher informative stock prices link to higher labour investment efficiency. This finding is consistent with Ferriera's theoretical argument that more informative stock prices connect to a better monitoring environment (Ferreira et al., 2011). This relationship can help managers avoid making labour investment decisions that are not cost-effective (Khedmati et al., 2020).

Recent studies have identified several factors that influence effective labour investment, such as cash holdings (Kaplan & Lee, 2024), employee satisfaction (Adwan et al., 2024), strategic alliance (Chen et al., 2024), perks to managers (Hu & Li, 2024), CEO-employee pay ratio (Li et al., 2024) and corporate social responsibility (Yuan et al., 2024). However, the generalist CEO - a management leader likely to influence labour investment decisions—has been mainly unnoticed. Generalist CEOs who possess various experiences working in many companies, including conglomerate professional experience in managing human resources, can influence labour investment decisions.

2.2 Generalist Vs. specialist CEO

The distinction between generalist and specialist CEOs lies in the breadth and depth of their prior experiences (Custodio et al., 2013; Murphy & Zabojnik, 2004; Sungbeen Park et al., 2024; Xu et al., 2021). Generalist CEOs, with a wide range of experiences across many functions and firms, are often seen as versatile leaders capable of navigating diverse challenges (Custodio et al., 2013). Specialist CEOs have in-depth expertise, knowledge, and experience in specific functions and industries (Murphy & Zabojnik, 2004). Evidence shows that there is a growing choice from specialist CEO to generalist CEO in many companies (Brockman et al., 2016), and CEOs must be able to comprehend and integrate different knowledge areas and perspectives due to the growing complexity of the business landscape (Frydman & Jenter, 2010). For instance, firstly, generalists are more suited to deal with the complex issues posed by globalization, technological disruption, and quickly shifting market conditions (Frydman & Jenter, 2010; Garicano & Rossi-Hansberg, 2006; Tushman & O'Reilly, 2002). Secondly, CEO generalists have a high capacity to maintain good relationships with investors (Murphy & Zabojnik, 2004). Additionally, Custodio et al. (2013) claim that companies with CEO generalists typically outperform others, particularly in settings that demand flexibility and creativity (Custodio et al., 2013).

Research has indicated that when comparing generalist and specialist CEOs, generalist CEOs have become more significant regarding CEO function (Custodio et al., 2013). Generalist CEOs are likely to address a broader range of social domains, and their firms will likely participate in a more comprehensive range of responsible activities (Lu et al., 2024), such as CSR (Sungbeen Park et al., 2024) and carbon risk emission (Hossain et al., 2023). A generalist CEO can better comprehend the complex interdependence between a firm and its stakeholders by possessing a wide range of knowledge and abilities (Lu et al., 2024; Qian et al., 2021). Lee et al. (2024) claim that firms led by a generalist CEO positively moderate the relationship between intangible capital and firm performance. With confidence, a generalist CEO is more likely to report better internal control weaknesses (Xu, 2024). Concerning overinvestment and underinvestment (i.e. inefficient labour investment) are two critical types of labour investment biases. There is ample evidence supporting the argument that top-level executives like CEOs engage in over-investment when they fund negative net present value (NPV) projects due to inadequate oversight, and they engage in under-investment when they refrain from funding positive NPV projects (Biddle et al., 2009). It is unclear whether CEO investment may lead to

similar distortions in labour investment. The cost of modification with labour investment compared to non-labour investment like capital expenditure and R&D is different in that labour is commonly adjusted, and so, it has a continual effect on firm-level performance compared with investment in capital expenditure and R&D (Habib & Hasan, 2021; Hamermesh, 1995; Merz & Yashiv, 2007). However, many studies have criticised CEO generalists, stating they might not have the in-depth industry-specific knowledge required to make wise choices in highly specialised or technical fields. They rely more heavily on previous cognitive maps, which results in a negative learning transfer (Hamori & Koyuncu, 2015). Similarly, the technical line of business, where complex scientific expertise or technical knowledge is essential, might suffer under a generalist CEO (Rushton & Evans, 2006).

2.3 Linking generalist CEO's ability to labour investment efficiency

Corporate governance literature recognises CEOs as the organisation team's central part (Goel & Thakor, 2008; Park & Lee, 2022). Empirical evidence supports generalist CEOs have broad-based experience across functions and industries, with broader perspectives that enhance labour investment efficiency (Gounopoulos et al., 2021). Their diverse skills permit them to make more adaptive decisions, particularly in labour, which is crucial for optimizing workforce productivity (Li & Patel, 2019). Further, generalist CEOs' flexibility enables them to better navigate complex labour dynamics, especially in volatile markets where there is a need for efficient labour investment (Custodio et al., 2013). The type of professional experience and dynamic network that CEOs require depends on the level of competitive environment in the industry (Custodio et al., 2013; Gabaix & Landier, 2008).

CEOs often make strategic decisions, such as final appointment decisions of human resources for their companies (Sharon, 2016). CEO hiring decisions strongly impact firm-level outcomes (Breit et al., 2019). Employing excess/limited can hinder a firm's performance, add additional costs to employment, and lower output while hiring the right candidate can increase expected productivity and accelerate business growth (Merz & Yashiv, 2007; Sharon, 2016). According to Gan's (2019) findings, increased CEO efficiency leads to increased firm-level investment, implying that the CEO's general ability supports better performance at the company level, including labour investment.

However, CEOs who tend to overinvest and are overconfident may not be able to obtain the expected outcome of investment efficiency effectively (Hirshleifer et al., 2012). Findings from the existing studies indicate that a CEO's more incredible general abilities can increase

value by enabling them to make better decisions and anticipate future changes (Gan, 2019; Trueman, 1986), less capable CEOs tend to emulate the actions of their predecessors out of fear of facing consequences from shareholders (Scharfstein & Stein, 1990) which distorts corporate investment decisions (Duchin & Sosyura, 2013). While linking the generalist CEO with labour investment, Cao and Rees (2020) assert that employee-friendly investment significantly impacts labour investment efficiency in human capital-intensive firms. According to the author, more robust labour efficiency leads to higher levels of knowledge capital and more competitive product markets. Based on our findings, a CEO with excellent general abilities will invest labour more efficiently because they can enhance the sensible use of labour resources.

On the theoretical ground, agency theory claims that executive leaders like CEO generalists may be more adept at aligning labour investment with empire-building. In This context, Schumpeter and Swedberg (2021) and Williamson (1963) postulated that executives may turn to empire builders through excessive labour and non-labour investment. Previous studies also claim that CEOs over-invest in employees, i.e., over-hire, to gain more power or status in the company (Habib & Hasan, 2021; Marris, 1998). Another perspective suggests that CEOs may be unwilling to fire unproductive employees because of a preference to avoid a quiet life due to the firing of employees (Bertrand & Mullainathan, 2003). Similarly, human capital theory posits that individuals' skills, knowledge, and experiences significantly impact organisational outcomes (Becker, 1962). This theory offers significant insights into the decisions made by the head of human resources, also considered by the CEO, have a substantial impact on employment (Strober, 1990). These assumptions receive empirical support from (Custodio et al., 2013; Murphy & Zabojnik, 2004; Teece, 2007), stating that general managers with dynamic capabilities have become more important in dealing with environmental complexity and obtaining superior long-term performance. Further, the importance of general skills has increased due to changes in the product market brought about by competition from overseas markets (Cunat & Guadalupe, 2009). In line with connecting the CEO generalist with agency theory, firms' investment policies influence the possible conflict of interest between the CEO generalist and shareholders, which could result in both over and underinvestment in labour (Shleifer & Vishny, 1989; Stulz, 1990).

In the era of organisational dynamics, CEO generalists and instrumental leadership have essential roles in addressing the investment dynamics (Sergiovanni & Corbally, 1986). CEO generalists' broad perspectives and adaptability are crucial for navigating complex and dynamic

environments (Akhtar et al., 2018). CEO generalists are thought to improve organisational performance and adaptability because of their broad perspective (Hambrick & Mason, 1984). Leveraging executives' strengths in the right situations requires understanding their unique qualities, applications, and limitations (Datta & Iskandar-Datta, 2014). However, conflicting with agency and human capital theories, instrumental leadership theory claims that corporate executive leaders should have expert knowledge to enable adaptation and resource allocation to improve performance, which is absent from generalist CEOs (Antonakis & House, 2014). Similarly, functional leadership theory highlights that a leader's efficacy aligns with their capacity to carry out duties or satisfy demands to accomplish the group's goals (Adair, 1979; Fleishman et al., 1991). Through the eyes of functional leadership theory (Fleishman et al., 1991), prior research proposes a negative relationship between CEO generalists and firm performance (Li & Patel, 2019).

Based on the above contradicting arguments and empirical evidence, we form the following two hypotheses:

H1A: There is a positive association between generalist CEO and labour investment efficiency

H1B: There is a negative association between generalist CEO and labour investment efficiency

3. Research method

3.1 Sample and data sources

We collect financial data of US firms from Compustat, stock returns from CRSP, GAI data from Custodio et al. (2013), corporate governance data from BoardEx, institutional ownership data from the database of Thomson Financial Institutional Holdings (13f) and industry labour union data from Hirsch and Macpherson (2003). The sample starts with 74,712 firm-year observations with all the data needed to estimate Eq. (1), beginning in 2000. When combined with GAI data, it is then reduced to 24,201 firm-year observations to estimate Eq. (2). Based on the currently available data, the final sample covers 2000–2022. All continuous variables are winsorised at the first percentiles to reduce the impact of outliers.

3.2 The measure of inefficient labour investment

To construct efficient labour investment, our dependent variable, we regress net hiring, or the percentage change in the number of employees, over several firm fundamental economic

variables (see Eq. (1)). Appendix 2 presents the findings. After calculating the residual, we designate it as abnormal net hiring. Since the residuals can have both positive and negative values, Eq. (2) uses the absolute values of the residuals as the dependent variable, making interpretation easier (Ben-Nasr & Alshwer, 2016; Jung et al., 2014). We then multiply the absolute value by (-1) to determine EFFILI in Eq. (2).

$$NET\_HIRE_{i,t} = \beta_0 + \beta_1 SALES\_GROWTH_{i,t} + \beta_2 SALES\_GROWTH_{i,t-1} + \beta_3 chROA_{i,t} + \beta_4 ROA_{i,t-1} + \beta_5 ROA_{i,t} + \beta_6 RETURN_{i,t} + \beta_7 FIRM\_SIZE\_R_{i,t-1} + \beta_8 QUICK_{i,t-1} + \beta_9 chQUICK_{i,t-1} + \beta_{10} chQUICK_{i,t} + \beta_{11} LEV_{i,t-1} + \beta_{12} AUR_{i,t-1} + \beta_{13} LOSS\_BIN1_{i,t-1} + \beta_{14} LOSS\_BIN2_{i,t-1} + \beta_{15} LOSS\_BIN3_{i,t-1} + \beta_{16} LOSS\_BIN4_{i,t-1} + \beta_{17} LOSS\_BIN5_{i,t-1} + INDUSTRY\ FE + \varepsilon_{i,t} \quad (1)$$

where: NET_HIRE_{it} is the percentage change in the number of employees from financial year t-1 to financial year t for firm i. SALES_GROWTH is the percentage change in sales; ROA is the return on assets, RETURN is the total annual stock return; FIRM_SIZE_R is the percentile rank of firm size; QUICK is the ratio of cash and short-term investments plus receivables to current liabilities; LEV is measured as long-term debt plus debt in current liabilities, scaled by the book value of assets; AUR is the ratio of annual sales to total assets; and LOSS_BINs are five dummy variables indicating each interval of prior-year ROA of length 0.005 from 0 to −0.025. For instance, Loss_Bin1 takes the value 1 if prior-year ROA is between −0.005 and 0, and zero otherwise; and Loss_Bin2 equals 1 if prior year ROA is between −0.010 and − 0.005 and zero otherwise. Industry FE represents dummy variables for each industry using the Fama and French (1997) 48-industry classification code. The inclusion of these variables in Eq. (1) is motivated by Pinnuck and Lillis (2007) and Jung et al. (2014) (see Appendix A for the definitions of and justifications for the variables).

3.3 Measure of generalist CEO

Our study delves into the potential nexus between labour investment efficiency and generalist CEOs. The variable of interest is the generalist CEO. Following earlier research papers (Brockman et al., 2016; Chen et al., 2021; Gan, 2019; Lin et al., 2021), the CEO general ability index was measured based on the Custodio et al. (2013). Rather than being firm-specific, this index shows the CEO's transferable skills across various industries and companies (Custodio et al., 2013). The following five crucial elements for the general ability of CEOs are taken into account when using the Custodio et al. (2013, p. 474) to calculate the CEO's general ability index:

Elements	Definition
Number of Positions	The number of roles held by a CEO in his professional life. A CEO with more positions has probably worked in various organisational functions, including marketing, sales, finance, human resources, and production.
Number of firms	Number of companies a CEO was employed by. A CEO who has worked for several companies has most likely developed more transferable skills than company-specific ones.
Number of Industries	The number of industries a CEO worked in at the four-digit SIC level. A CEO who experienced various business environments while working for companies in multiple industries.
CEO Experience Dummy	The number of industries a CEO worked in at the four-digit SIC level.
Conglomerate Experience Dummy	A dummy variable with a value of 1 if the CEO works with multiple divisions in a company. A CEO with experience at a conglomerate is likely to have more alluring outside options because they have worked for a more complex organisation.

Using the General Ability Index, CEOs with an index above the yearly median are considered generalist CEOs (GAI_D). CEOs below the yearly median are known as specialist CEOs (Custodio et al., 2013).

3.4 Model to test the hypothesis

Ordinary least square (OLS) panel regression in the baseline model in our analysis in which the dependent variable is the efficient labour investment (EFFILI). We use industry and year-fixed effects within the baseline model to tackle the issue of unobserved firm heterogeneity during the study period and keep our model initially valid (Berry, 2010; Salomon & Wu, 2012). We test the hypothesis that the CEO's GAI will increase efficient labour investment using Equation (2). From Equation (1), we derive the dependent variable. Following Jung et al. (2014) and the spirit of Chen et al. (2011), we use the absolute values of the residuals from Eq. (1) and multiply them (-1) to obtain efficient labour investment (EFFILI).

$$EFFILI_{i,t} = \beta_0 + \beta_1\, GAI_{i,t-1} + \beta_2\, AQ_{i,t-1} + \beta_3 MTBi_{i,t-1} + \beta_4\, FIRM\_SIZE_{i,t-1} + \beta_5\, QUICK_{i,t-1} + \beta_6 LEV_{i,t-1} + \beta_7 DIV\_DUMMY_{i,t-1} + \beta_8 STD\_CFO_{i,t-1} + \beta_9 STD\_SALES_{i,t-1} + \beta_{10} TANGIBLES_{i,t-1} + \beta_{11} LOSS_{i,t-1} + \beta_{12} STD\_NET\_HIRE_{i,t-1} + \beta_{13} LABOUR\_INTENSITY_{i,t-1} + \beta_{14} |AB\_INV\_OTHER|_{i,t} + \beta_{15}\, BD\_SIZE_{i,t-1} + \beta_{16}\, CEODUAL_{i,t-1} + YEAR\ FE + INDUSTRY\ FE + \varepsilon_{i,t} \quad (2)$$

where: the dependent variable is $EFFILI_{i,t}$ for firm i at the end of financial year t. Following Custodio et al. (2013), the test variable is the aggregate CEO general ability index ($GAI_{i,t-1}$) measure for firm i at the end of financial year t_{-1}. The controls for firm characteristics and economic variables are motivated by Jung et al. (2014) and Ben-Nasr and Alshwer (2016) and are defined in Appendix A. In particular, we follow Khedmati et al. (2020) and control for investment opportunities, accrual quality, firm size, dividend payouts, cash flow, sales volatilities, tangibility, any losses, net hiring volatility, and labour intensity. We also control

corporate governance variables such as board size and CEO duality. Other non-labour investments (capital expenditure, R&D expenditure and acquisitions) are likely to have an influence, so we follow prior research, such as Ghaly et al. (2015) and Ben-Nasr and Alshwer (2016) and control for any indirect effect of inefficient investment from other investment decisions. We add year-fixed effects alongside industry-fixed effects in Eqn. (2) to control for time-specific factors (i.e. temporal trends) and unobserved heterogeneity across industries that impact all sampled firms equally (Wooldridge, 2010).

3.5 Descriptive statistics

We present the descriptive statistics for the variables used in our baseline Eq. (2) model in Panel B, Table 2. The mean and median of EFILI are -0.099 and -0.064, respectively. The mean (median) of $GAI_{i,t-1}$ equals 0.029 (-0.125). Every other variable aligns with previous studies (Custodio et al., 2013; Jung et al., 2014; Khedmati et al., 2020). About one-third of sampled firms have over-investment in labour, whereas two-thirds have under-investment in labour. The sampled firms' economic statistics are as follows. The mean value of the sample firms' market-to-book ratio is 3.458; the average firm size is 7.378. The mean quick ratio is 1.813, the average leverage ratio is 0.232, the average standard deviation of cash-flow-from-operation is 0.056, and the average sales volatility is 0.161. The TANGIBILITY has a mean of 0.253, an average of 18.8% of the firm-year observations report losses. The average institutional ownership is 29.8 %. The mean value of labour intensity is 0.007, MA_SCORE is 0.004, and board size is 9.044. Finally, the mean value of CEODUAL is 0.312. Concerning the explicit types of investments, the mean of AB_INV_OTHER is 0.111.

[Insert Table 2 about here]

We summarise the Pearson correlation results among INEFFILI, GAI, and the control variables in Table 3. Consistent with our first hypothesis, both GAI and GAI are significantly positively associated with EFFILI, offering primary evidence that an increase in the GAI of the CEO increases efficient labour investment. The correlations for the control variables are as expected and are consistent with prior research (Custodio et al., 2013; Khedmati et al., 2020). In particular, EFFILI is negatively associated with abnormal other investments (-0.30) and accrual quality (-0.12) but positively related to firm size (0.17) and tangibles (0.04).

[Insert Table 3 about here]

4. Empirical results

4.1 Baseline results

We report estimates of Eq. (2) to test the association between generalist CEOs and efficient labour investment in Table 4. We included industry and year-fixed effects, adjusted the standard errors for heteroscedasticity and clustered at the firm level to address potential intra-cluster correlation (Cameron & Miller, 2015). We also include a range of firm characteristics and corporate governance variables as control variables with firm-fixed effects in column 3. In all specifications in Table 4, the coefficients of GAI are positive and significant. For instance, in column 1, the estimate from OLS regression of efficient labour investment (EFFILI) on the CEO general ability index (GAI) is positive (coefficient = 0.0061, $p<0.01$), suggesting that the increase in the general ability index of CEOs increases labour investment efficiency. The economic significance of this finding shows that a one standard deviation increase in the CEO's general ability index is associated with a 0.57% (= 0.0061*0.942) increase in efficient labour investment. Given the mean of EFFILI of -9.9%, a one standard deviation increase in GAI increases labour investment efficiency by 5.75% from the mean (calculated as .57/.099 where EFFILI=0.099, coefficient of GAI = 0.0061 and standard deviation of GAI = 0.942). Based on the coefficient for GAI, a firm with a GAI in the 75th percentile is associated with 188% more labour investment efficiency compared to a firm with a GAI in the 25^{th} percentile [(0.0061*.595)/(.0061*-0.677)-1], consistent with CEOs with higher GAI have higher labour investment efficiency. To further cross-check the baseline results, we use random effects (including industry and year FE), firm fixed effects and Fama MacBeth's (1973) method to account for any possible cross-sectional relationship of the regression residuals. The coefficient on GAI remains positive and significant at the 1% level in all specifications (Table 4). These findings, therefore, strongly support our H1A. Compared to Mo et al. (2019) and Lai et al. (2021), who showed that overconfident CEO have low EFFILI, we provide new evidence on how CEO GAI increases labour investment efficiency. Specifically, we show that skilled CEOs make more strategic and effective labour investment decisions, ensuring optimal resource utilization and minimizing inefficiencies. These results align with theoretical expectations that managerial competence contributes to better decision-making, in contrast to the distortions caused by overconfidence, as documented by Mo et al. (2019).

Regarding control variables, we find some evidence that companies with larger market capitalizations, firm size and higher dividend payments lead to higher EFFILI. On the contrary, higher debt, losses, accrual quality, and misalignment of other investments lead to lower EFFILI. Regarding corporate governance, having a chairman and CEO promotes effective labour investment. When all results are combined, these findings imply that self-selection bias and possible cross-sectional correlation of the regression residuals do not complicate our baseline finding that a general ability index increases efficient labour investment. Our findings imply that strong decision-making generally results from the CEO's managerial ability to achieve investment efficiency (Gan, 2019). Our results, therefore, have applications for management and shareholders. For instance, when choosing a new CEO and board members, shareholders can discuss the generalist CEO with the independent board members. Because of the potential additional hiring costs that the company may incur due to inefficient labour investment, our results have broader relevance.

[Insert Table 4 about here]

4.2 Endogeneity concerns

Endogenous problems are significant in corporate governance and accounting literature (Brown et al., 2011). While explaining the association between generalist CEO and efficient labour investment, there may be a variable that affects their relationship that we have not included in Eq. (2), even though our study does not potentially suffer from simultaneity and reverse causality issues (Larcker & Rusticus, 2010). One key concern with our results of generalist CEOs' performance towards labour investment efficiency is a sample selection bias caused by endogeneity in allocating CEOs to firms. Previous literature shows that more significant and medium-sized companies experiencing growth seek to hire a CEO to provide strategic direction (Ling et al., 2008). More specifically, multinational and large-sized firms exclusively hire CEO. CEO appointments are procedural, as the selection decisions are as per the decisions of the board of directors. To address the endogeneity issue, we follow previous studies (Khedmati et al., 2020; Luong et al., 2023; Nguyen & Zhao, 2021; Shipman et al., 2017) and employ two reasonably further sophisticated estimators, namely, the PSM and instrumental variables 2SLS regression, to account for the endogeneity question.

Firstly, we use a PSM analysis to account for the variation in observable firm-related phenomena (Zhiming Ma et al., 2021) and possible functional misspecification in our model (Armstrong et al., 2010). To perform the PSM analysis, we estimate the propensity score for

the treatment group (1 for the value equal to and above the GAI industry and year median i.e. firms hire generalist CEO) and control group (0 for the value below the GAI industry and year median i.e. firms hires specialist CEO) with the same control variables in Eq. (2). We match treatment and control firms using a PSM procedure, which uses the nearest neighbour with replacement matching, to make sure that our treated and control firms are comparable. To ensure that each treated unit matches with control units with nearly identical propensity scores, we set a calliper distance at 0.001 times the standard deviation of the propensity score. Using the predicted scores, we effectively matched around 66% of observations, resulting in a 16,096 sample. The univariate mean comparisons between the characteristics of treatment and control firms, along with the corresponding t-statistics, are presented in Panel A of Table 5. The findings show that the treatment and control firms' average values for many matching variables are qualitatively similar. However, the mean value of efficient labour investment (EFFILI) significantly differs between the treatment and control firms. We then run our baseline model to measure whether this difference is due to GAI using the post-matched sample in Panel B of Table 5. The results show that GAI coefficients positively correlate with EFFILI (coefficients range from 0.006 to 0.0093, $p<0.00$) from all specifications. The results indicate that the increase in the CEO general ability index increases the propensity of labour investment efficiency. We find similar results to baseline results and other specifications, showing that firms with generalist CEOs are associated with labour investment efficiency.

[Insert Table 5 about here]

Secondly, we employ 2SLS regression to solve endogeneity issues due to unobservable variables associated with the CEO general ability index that can affect efficient labour investment. We follow previous literature (Custodio et al., 2013; Lai et al., 2021; Nguyen & Zhao, 2021) to identify exogenous calibre and association that can significantly change the CEO general ability index, namely CEO general management graduates such as MBA qualifications (CEO_MBA), the proportion of labour union membership in the industry, CEO turnover and industry tournament incentive. We note a more excellent supply of generalist CEOs since strict enforcement encourages outside managers to develop a broad range of managerial abilities (Z. Ma et al., 2021) through additional general managerial academic courses like MBA. Similarly, we predict that the monitoring effect of union membership is likely to influence the CEO's performance (Jung et al., 2014). Inherently, the focus of executives' aspirations to progress in their careers is to obtain the benefits available at higher corporate ladder positions, considered an industry tournament incentive (ITI) or pay gap

(Elsayed & Elbardan, 2018). Considering skills and knowledge, we expect the CEO_MBA degree to enhance general managerial abilities.

In contrast, labour membership can impact the CEO's decision-making function, CEO departure results in network contraction, and ITI encourages the performance of EFFILI to improve. However, we don't expect these variables to directly connect to labour investment efficiency (the error term). Therefore, we consider CEO_MBA, LAB_UNION, CEO_DEPART, and ITI to meet the exclusion condition and are solid and valid for instrumental variables. We then execute 2SLS in GAI and EFFILI regression with four instrumental variables that capture the exogenous shocks to the association between GAI and EFFILI.

We report the first-stage and second-stage regression results in Table 6. In the first stage, we regress GAI on four exogenous events, CEO_MBA, LAB_UNION, CEO_DEPART and ITI, with control variables from Eqn (2). The findings of the first-stage regression reveal that CEO_MBA, CEO departure and ITI have positive coefficients on GAI, confirming the predicted association due to additional management qualifications and performance motive to present higher performance and higher pay expectations. However, the coefficient of LAB_UNION is significantly negative, revealing the poor association with the CEO due to the participation of union membership. To provide strong validity support for our instruments, we considered Kleibergen-Paap rk Wald F statistics for weak identification test (p-value <=0.05).

We use the predicted value obtained from the first-stage regression as the primary variable of interest in the second-stage regression. The results of the second-stage regression in Table 6 show that the coefficients of all four GAI (instrumented) measures are positive and significant at a 5% level or lower. The magnitude of coefficients ranges from 0.019 to 0.297. These confirm that our primary results on the positive association of GAI and EFFLI remain robust after considering the endogeneity concerns.

[Insert Table 6 about here]

4.3 Additional tests

4.3.1 Channel analyses

We have established that a generalist CEO is positively related to labour investment efficiency. In exploring the relationship between a generalist CEO and labour investment efficiency, we examine which channels play a more dominant role in the behaviour of a CEO influencing labour investment efficiency. Here, we test whether generalist CEOs exhibit efficient labour investment when subject to empire-building, business strategies. Previous

research discusses potential channels, such as empire-building (Jensen, 1986; Shleifer & Vishny, 1989) and business strategy (Habib & Hasan, 2021; Hambrick & Mason, 1984) . We present three arguments—empire building and business strategy and that could influence a generalist CEO to make efficient labour investments.

Table 7 presents the results of channel analyses. We use growth in capital expenditure (ΔCAPEX) as a proxy for the agency problem based on previous research (Giroud & Mueller, 2010; Habib & Hasan, 2021; Jensen, 2005). Extant studies indicate that this proxy assesses the CEO's inclination to construct empires. We interact GAI with the variable proxying for empire-building incentives (i.e., GAI*ΔCAPEX) in the regression model to test empirically whether incentives for empire-building cause CEOs to invest in labour efficiently. Empire-building incentives for effective labour investments would be supported by a negative and significant coefficient on the interaction variables. Column 1 of Table 7 shows that (coefficient = -0.0016; $p < 0.01$), indicating that the empire-building perspective of the CEOs negatively impacts labour investment efficiency. Thus, extant studies show that these proxies gauge CEOs' propensity to build empires and may cause efficient labour investments.

From columns 2 to 5 of Table 7, we examine the potential business strategies channel through which CEO skills influence labour investment efficiency. A prior study shows that companies with a prospector-type business strategy led to inefficient labour investment. In contrast, companies with a defender-type business strategy lead to efficient labour investment (Habib & Hasan, 2021). Among the three different business strategies, we find the interaction of prospectors' strategy with GAI is positive and significant (coefficient = 0.0153, p<=.05), stating that in prospector firms, which pursue dynamic and exploratory strategies, CEO skills significantly enhance labour efficiency, strengthening the channel through which GAI operates.

[Insert Table 7 about here]

4.3.2 Moderating role of external and internal monitoring

We have determined that an increase in the CEO's general ability leads to a rise in labour investment efficiency; however, many studies highlight the influence of external and internal monitoring on the outcome of labour investment (Lai et al., 2021; Zhiming Ma et al., 2021; Wang & Wang, 2024). Therefore, we investigate the moderating effect of external and internal monitoring on the relationship between CEO-GAI and EFFILI. We first consider the role of the entrenchment index, governance index and managerial ability score as internal monitoring because internal monitoring strengthens the efficient investment in labour (Khedmati et al.,

2020; Sun & Zhang, 2021). We examine the impact of institutional ownership because the monitoring effort by long-term investors reduces agency conflicts (Ghaly et al., 2020) and strengthens the CEO's commitment to boosting labour investment efficiency (Le et al., 2024). We also consider analyst following because it is argued that analyst impacts the efficiency of firms' labour investment following (Lai et al., 2021; Lee & Mo, 2020; Mo & Lee, 2019). For example, Lai et al. (2021) exhibit that analysts following force the CEO to make EFFILI.

According to Table 8, the interaction terms between GAI and GSINDEX, MA_Score, institutional ownership, and analyst following have positive and significant coefficients. In contrast, the interaction terms with EINDEX have negative and significant coefficients on EFFILI, which are significant in all columns at the 10% level or higher. According to our research, the effect of the CEO's general ability on effective labour investment is moderated by both internal and external monitoring.

[Insert Table 8 about here]

4.3.3 Cross-sectional analyses

4.3.3.1 Extreme vs moderate overhiring/underhiring

We further extend our comparison by separately analysing the generalist CEO and labour investment efficiency between extreme (overhiring and underhiring) and moderate (overhiring and underhiring) in Panel B of Table 9. Here, we create two subsamples (extreme and moderate hiring) based on the residual quartile value from the eqn. (1). We consider extreme hiring combining the first and fourth quartiles and moderate hiring combining the second and third quartiles. We reran Eq. (2) based on quartile-based sub-samples. In Panel B of Table 9, we find positive and significant coefficients in the extreme sub-samples and negative and significant in the moderate subsample. These results show that the better effectiveness of CEO skills is more valuable in extreme overhiring/underhiring conditions, suggesting generalist CEOs are more adept at optimizing labour investment and managing labour resources in situations where extremely inefficient labour investment exists significantly.

4.3.3.2 High capital expenditure vs low capital expenditure firms

Previous studies suggest that businesses typically invest in non-labour at the same time as they invest in labour, which might cause EFFILI to change simultaneously (Ben-Nasr & Alshwer, 2016; Jung et al., 2014). There are several significant differences between labour investment and non-labour investment. To a certain degree, labour investment supplements

other investment forms (Benmelech et al., 2011). In practice, investment in labour moves together with non-labour investments (Ben-Nasr & Alshwer, 2016; Jung et al., 2014; Khedmati et al., 2020). We argue that non-labour investments are the reason behind our findings. We address this concern from the beginning by controlling AB_INV_OTHER, i.e., the absolute value of abnormal other investments. We predict a moderating effect of labour-intensive on the connection between the CEO's general ability and efficient labour investment. Thus, based on this prediction, we investigate the impact of labour-intensive investments on the relationship between efficient labour investment and the CEO general ability index. We examine the effect of capital expenditure on the association between efficient labour investment and the CEO general ability index. To test this effect, we divide the sample into two groups for each investment according to high and low investments. We categorise high investment if the investment is above the yearly median.

Panel D of Table 9 reports the findings. In the high capital expenditure subsample, the coefficient for GAI (CEO skill) is statistically insignificant (p-value = 0.63). However, in the low capital expenditure subsample, the coefficient for GAI is statistically significant at the 1% level (p-value = 0.00). This finding suggests that CEOs with higher general skills are associated with substantially increasing labour investment efficiency in firms with lower capital expenditures. Further, the result implies that higher CEO skills are more effective at maximizing labour investment efficiency when capital expenditures are constrained.

[Insert Table 9 about here]

4.4 Sensitivity analysis

4.4.1 Additional controls

We perform multiple sensitivity tests to verify the robustness of our results. First, we inject additional internal corporate governance variables, including CEOs' traits, to examine the impact of the general ability index's effect on efficient labour investment. To execute this choice, we re-estimate Eq. (2) using additional controlling for CEO age, CEO tenure, and CEO compensation (Table 10). The outcomes support our primary discovery: the general ability index increases efficient labour investment. By including the additional internal control variables, the stability of the baseline regression results remains unaffected.

[Insert Table 10 about here]

4.4.2 Alternative measures

We employ different metrics for the CEO general ability index and efficient labour investment to demonstrate our findings' strength further. First, we use industry-adjusted (IND_ADJ_GAI), year-adjusted (YEAR_ADJ_GAI) and mean-adjusted GAI (MEAN_ADJ_GAI) as an alternative measure of GAI. Second, following Kaplan and Lee (2024) we use two alternatives for efficient labour investment, i.e. ALT1_EFFILI and ALT2_EFFILI. We calculate the difference between actual and expected net hiring in both cases. We then multiply the absolute value of the difference by (-1) to determine EFFILI. In the first alternative, expected net hiring is determined based on the industry median for each year. In contrast, in the second case, expected net hiring is calculated based on the regression of net hiring on last year's sales growth.

The results in Columns 1 - 3 of Panel A, Table 11 show the regression results using alternative measures of GAI. We obtain coefficients of 0.0061 ($p < 0.01$), 0.007 ($p<0.001$) and 0.0061 ($p<0.001$) on alternative measures of CEO ability. We achieve very similar results using alternative measures of GAI. Overall, results using IND_ADJ_GAI, YEAR_ADJ_GAI and MEAN_ADJ_GAI as a proxy for the CEO general ability index are like those reported in our baseline results in Table 4. Similarly, Panel B of Table 11 reports the regression results as an alternative measure of EFFILI. Columns 3 and 4 of Table 11 reveal that all the CEOs' general ability index coefficients are positively associated with ALT1_EFFILI and ALT2_EFFILI, showing a consistent association using alternative measures. These findings demonstrate that our study is not limited to a single labour investment efficiency measure.

[Insert Table 11 about here]

5. Conclusion

In this paper, we investigate whether a generalist CEO leads to making efficient labour investments. Previous research has indicated that a generalist CEO can make better internal control reporting. We discover a positive correlation between labour investment efficiency and the CEO general ability index. Using US sample firms from 2000 to 2022, we find consistent results in random effect, fixed effect and Fama Macbeth method even after controlling for several CEO characteristics variables. Our findings demonstrate that a CEO's general ability increases efficient labour investment, even after adjusting for other factors, such as other

investments, corporate governance, and using alternative metrics for labour investment efficiency.

We reveal which channel is more dominant for generalist CEOs concerning efficient labour investment. Our findings suggest prospectors-type firms cause generalist CEOs to make efficient labour investments. We also document that external and internal monitoring moderates the association of generalist CEOs to make efficient labour investments. When we split the samples into extreme and moderate overhiring and underhiring, we find that CEO skills are valuable in extreme overhiring and underhiring conditions as compared to moderate overhiring / underhiring for increasing labour investment efficiency. Our results also show that generalist CEOs increase labour investment efficiency in low-capital expenditure firms compared to high-capital expenditure firms. Our findings are robust when we have additional controls and alternative measures.

Our study makes valuation contributions to academia. First, it increases a growing body of literature on labour investment by assessing the role of the generalist CEO. Previous studies show that the prevalence of labour investment inefficiency issues is due to CEO overconfidence (Lai et al., 2021), CEO-director ties (Khedmati et al., 2020), long-term investors (Ghaly et al., 2015) and lower quality accounting (Jung et al., 2014). We identify an essential leadership characteristic, a generalist CEO, which increases the firm's labour investment efficiency.

Second, we extend the literature on the generalist CEO and its concerns for firms managing labour investment. The majority of previous literature connects generalist CEOs' ability with corporate social responsibility (S. Park et al., 2024), credit rating (Zhiming Ma et al., 2021), pay premium (Zbib & Asare, 2023), carbon emissions (Hossain et al., 2023) and audit pricing (Z. Ma et al., 2021). We contribute to this body of work by proving that generalist CEOs positively associate with labour investment efficiency, a finding that holds up well across several analyses.

Our findings are especially pertinent considering the growing emphasis on labour investment efficiency, which has drawn the interest of stakeholders and policymakers seeking to promote sustainable employment practices. This increased awareness and the continuous focus on raising corporate governance standards underscores the importance of comprehending the connection between labour investment efficiency and CEO skill. Effective labour investment efficiency and generalist CEO are positively correlated, emphasising how crucial CEO competencies are to promoting labour investment efficiency.

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Table 1 Sample selection and distribution.

Panel A: Sample selection procedure.

Description	Observations
Total firm-year observations with non-missing financial data (2000–2022)	74,712
Less: missing observations after combining the data sets	50,511
Final observations for analyses (2000-2022)	24,201
Unique firms (2000-2022)	1,835

Panel B: Industry distribution.

Industry category	**Observations**	**% Observations**
Business Services	3,073	12.70
Electronic Equipment	2,073	8.57
Retail	1,729	7.14
Pharmaceutical Products	1,356	5.60
Machinery	1,180	4.88
Medical Equipment	1,029	4.25
Petroleum and Natural Gas	1,017	4.20
Wholesale	995	4.11
Computers	970	4.01
Transportation	930	3.84
Others	9,849	40.70
Total	**24201**	**100**

This table presents the sample and industry distribution. Panel A presents the sample selection. Panel B presents the industry distribution. We describe the variables in Appendix A.

Table 2 Descriptive statistics.

Panel A: Descriptive statistics for variables in Eq. (1) (N=74,712).

	Mean	Std. Dev.	p25	p50	p75
NET_HIRE	0.080	0.282	-0.036	0.031	0.134
$SALES\_GROWTH_{i,t-1}$	0.201	0.721	-0.016	0.084	0.228
$SALES\_GROWTH_{i,t}$	0.156	0.481	-0.019	0.080	0.213
$chROA_{i,t}$	0.009	0.328	-0.045	-0.001	0.040
chROAi,t-1	0.007	0.196	-0.036	-0.000	0.031
$ROA_{i,t}$	0.014	0.363	-0.014	0.060	0.128
$RETURN_{i,t-1}$	0.142	0.598	-0.224	0.046	0.336
$FIRM\_SIZE_{i,t-1}$	5.959	2.231	4.326	5.862	7.529
FIRM_SIZE_R $_{i,t-1}$	55.818	29.066	31.000	59.222	82.000
QUICK $_{i,t-1}$	1.984	2.189	0.787	1.258	2.225
chQUICK $_{i,t-1}$	0.099	0.596	-0.186	0.003	0.206
chQUICK $_{i,t}$	0.108	0.608	-0.178	0.008	0.210
LEV $_{i,t-1}$	0.236	0.243	0.044	0.202	0.354
AUR $_{i,t-1}$	1.076	0.764	0.527	0.928	1.419
LOSS_BIN1 $_{i,t-1}$	0.011	0.100	0.000	0.000	0.000
LOSS_BIN2 $_{i,t-1}$	0.011	0.102	0.000	0.000	0.000
LOSS_BIN3 $_{i,t-1}$	0.010	0.098	0.000	0.000	0.000
LOSS_BIN4 $_{i,t-1}$	0.010	0.099	0.000	0.000	0.000
LOSS_BIN5 $_{i,t-1}$	0.009	0.090	0.000	0.000	0.000

Panel B: Descriptive statistics for variables in Eq. (2) (N=24,201).

	Mean	Std. Dev.	p25	p50	p75
EFFILI	-0.099	0.132	-0.114	-0.064	-0.031
$GAI_{i,t-1}$	0.029	0.942	-0.677	-0.125	0.595
$AQ_{i,t-1}$	0.038	0.050	0.016	0.026	0.044
$MTB_{i,t-1}$	3.458	6.457	1.523	2.475	4.135
$FIRM\_SIZE_{i,t-1}$	7.378	1.619	6.250	7.266	8.402
QUICK $_{i,t-1}$	1.813	1.817	0.823	1.265	2.068
LEV $_{i,t-1}$	0.232	0.230	0.049	0.207	0.340
DIV_DUMMY $_{i,t-1}$	0.480	0.494	0.000	0.000	1.000
STD_CF $_{i,t-1}$	0.056	0.276	0.023	0.037	0.059
STD_SALES $_{i,t-1}$	0.161	0.572	0.066	0.111	0.190
TANGIBLES $_{i,t-1}$	0.253	0.213	0.092	0.186	0.352
LOSS $_{i,t-1}$	0.188	0.378	0.000	0.000	0.000
STD_NET_HIRE $_{i,t-1}$	0.235	2.579	0.062	0.112	0.199
LABOUR_INTENSITY $_{i,t-1}$	0.007	0.022	0.002	0.003	0.007
$AB\_INV\_OTHER_{i,t}$	0.111	0.136	0.058	0.091	0.125
$BD\_SIZE_{i,t-1}$	9.044	2.195	7.000	9.000	10.000
$CEODUAL_{i,t-1}$	0.312	0.463	0.000	0.000	1.000

This table presents the descriptive statistics. Panel A presents the descriptive statistics of the variable based on Eq. (1). Panel B shows the descriptive statistics of the variables based on Eq. (2). We describe the variables in Appendix A.

Table 3 Pearson correlation matrix.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	EFFILI	1.00																	
2	$GAI_{i,t-1}$	0.09***	1.00																
3	$AQ_{i,t-1}$	-0.12***	-0.03***	1.00															
4	$MTB_{i,t-1}$	0.02***	0.02***	0.00	1.00														
5	$FIRM\_SIZE_{i,t-1}$	0.17***	0.27***	-0.25***	0.04***	1.00													
6	$QUICK_{i,t-1}$	-0.15***	-0.11***	0.13***	0.01	-0.33***	1.00												
7	$LEV_{i,t-1}$	0.00	0.12***	0.02***	-0.06***	0.23***	-0.25***	1.00											
8	$DIV\_DUMMY_{i,t-1}$	0.12***	0.06***	-0.20***	0.03***	0.34***	-0.22***	0.04***	1.00										
9	$STD\_CF_{i,t-1}$	-0.08***	-0.04***	0.20***	0.05***	-0.15***	0.07***	0.02***	-0.09***	1.00									
10	$STD\_SALES_{i,t-1}$	-0.06***	-0.04***	0.22***	-0.00	-0.11***	-0.02***	0.01	-0.07***	0.39***	1.00								
11	$TANGIBLES_{i,t-1}$	0.04***	-0.05***	-0.10***	-0.07***	0.17***	-0.28***	0.19***	0.15***	-0.04***	-0.07***	1.00							
12	$LOSS_{i,t-1}$	-0.10***	0.02**	0.19***	-0.08***	-0.17***	0.07***	0.11***	-0.24***	0.10***	0.05***	0.01	1.00						
13	$STD\_NET\_HIRE_{i,t-1}$	-0.04***	-0.00	0.04***	-0.00	-0.02***	0.01	0.03***	-0.06***	0.02**	0.05***	-0.01*	0.05***	1.00					
14	$LABOUR\_INTENSITY_{i,t-1}$	0.00	-0.04***	-0.02***	-0.00	-0.07***	-0.06***	-0.04***	0.03***	0.03***	0.12***	0.02***	-0.03***	0.08***	1.00				
15	$AB\_INV\_OTHER_{i,t}$	-0.30***	-0.04***	0.09***	0.02***	-0.09***	0.06***	0.04***	-0.08***	0.12***	0.12***	-0.05***	0.07***	0.03***	0.00	1.00			
16	$BD\_SIZE_{i,t-1}$	0.12***	0.19***	-0.17***	0.05***	0.60***	-0.30***	0.18***	0.34***	-0.08***	-0.05***	0.13***	-0.13***	-0.02***	-0.03***	-0.07***	1.00		
17	$CEODUAL_{i,t-1}$	0.02***	-0.02***	-0.01	-0.01	-0.04***	0.00	-0.02***	0.04***	-0.01*	0.00	0.03***	-0.07***	-0.01*	-0.00	-0.02***	-0.05***	1.00	1.00

This table presents the Pearson correlation coefficients between the variables employed in testing Eq. (2). Correlation values are in the lower diagonal. We describe the variables in Appendix A.

Table 4 GAI and efficient labour investment.

DV=EFFILI	OLS	Random effects	Fixed effects	Fama-McBeth
	(3)	(1)	(2)	(4)
$GAI_{i,t-1}$	0.0061***	0.0070***	0.0087***	0.0065***
	(0.00)	(0.00)	(0.00)	(0.00)
$AQ_{i,t-1}$	-0.1150***	-0.0741***	-0.0249	-0.0431
	(0.00)	(0.00)	(0.23)	(0.18)
$MTB_{i,t-1}$	0.0003*	0.0001	0.0000	0.0005**
	(0.07)	(0.36)	(0.91)	(0.02)
$FIRM\_SIZE_{i,t-1}$	0.0058***	0.0067***	0.0121***	0.0042***
	(0.00)	(0.00)	(0.00)	(0.00)
$QUICK_{i,t-1}$	-0.0078***	-0.0081***	-0.0086***	-0.0074***
	(0.00)	(0.00)	(0.00)	(0.00)
$LEV_{i,t-1}$	-0.0162**	-0.0144***	-0.0094	-0.0144**
	(0.02)	(0.00)	(0.13)	(0.02)
$DIV\_DUMMY_{i,t-1}$	0.0052**	0.0036	-0.0029	0.0067**
	(0.03)	(0.12)	(0.38)	(0.04)
$STD\_CF_{i,t-1}$	-0.0076	-0.0037	0.0026	-0.1113***
	(0.36)	(0.52)	(0.69)	(0.00)
$STD\_SALE_{i,t-1}$	-0.0016	0.0038	0.0079*	-0.0318***
	(0.89)	(0.36)	(0.09)	(0.01)
$TANGIBLES_{i,t-1}$	0.0140	0.0208***	0.0403***	-0.0125*
	(0.12)	(0.01)	(0.00)	(0.05)
$LOSS_{i,t-1}$	-0.0127***	-0.0090***	-0.0045*	-0.0145***
	(0.00)	(0.00)	(0.08)	(0.01)
$STD\_NET\_HIRE_{i,t-1}$	-0.0028	0.0005	0.0047***	-0.0112**
	(0.23)	(0.62)	(0.00)	(0.02)
$LABOUR\_INTENSITY_{i,t-1}$	0.0177	0.0411	0.0980	-0.0231
	(0.73)	(0.43)	(0.24)	(0.64)
$AB\_INV\_OTHER_{i,t}$	-0.2538***	-0.2722***	-0.2963***	-0.2659***
	(0.00)	(0.00)	(0.00)	(0.00)
$BD\_SIZE_{i,t-1}$	0.0002	0.0006	0.0012*	0.0002
	(0.75)	(0.30)	(0.10)	(0.69)
$CEODUAL_{i,t-1}$	0.0053***	0.0044**	0.0029	0.0061**
	(0.01)	(0.03)	(0.21)	(0.02)
Constant	-0.0883***	-0.0969***	-0.1772***	-0.0713***
	(0.00)	(0.00)	(0.00)	(0.00)
Year FE	YES	YES	YES	NO
Industry FE	YES	YES	NO	NO
Firm FE	NO	NO	YES	NO
R^2	0.1435	0.1056	0.1077	0.1575
N	21025	21025	21025	21025

This table presents the results on the impact of the CEOs general ability index on efficient labour investment. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Table 5 Propensity score matching analysis.

Panel A: Difference in characteristics between treated firms and control firms.

Variable	Treated	Control	Diff.	*t*-statistic	*P*-value
EFFILI	-0.0909	-0.0984	0.0075	3.82	0.00
$GAI_{i,t-1}$	0.7249	-0.6292	1.3541	142.54	0.00
$AQ_{i,t-1}$	0.0379	0.0377	0.0003	0.37	0.71
$MTB_{i,t-1}$	3.3374	3.316	0.0214	0.22	0.83
$FIRM\_SIZE_{i,t-1}$	7.4799	7.4832	-0.0033	-0.14	0.89
$QUICK_{i,t-1}$	1.6968	1.689	0.0078	0.31	0.75
$LEV_{i,t-1}$	0.2373	0.2353	0.0020	0.59	0.56
$DIV\_DUMMY_{i,t-1}$	0.5140	0.5139	0.0001	0.02	0.99
$STD\_CF_{i,t-1}$	0.0473	0.0473	-0.0001	-0.11	0.91
$STD\_SALES_{i,t-1}$	0.1463	0.1457	0.0006	0.25	0.80
$TANGIBLES_{i,t-1}$	0.2579	0.2576	0.0003	0.1	0.92
$LOSS_{i,t-1}$	0.1817	0.1789	0.0029	0.49	0.62
$STD\_NET\_HIRE_{i,t-1}$	0.2048	0.2086	-0.0038	-0.26	0.79
$LABOUR\_INTENSITY_{i,t-1}$	0.0072	0.0072	-0.0000	-0.06	0.96
AB_INV_OTHER	0.1057	0.1073	-0.0017	-0.86	0.39
$BD\_SIZE_{i,t-1}$	9.1688	9.1686	0.0002	0.00	0.99
$CEODUAL_{i,t-1}$	0.3060	0.3013	0.0047	0.65	0.52

Panel B: Regression results with the matched sample from propensity score.

	OLS	Random effects	Fixed effects	Fama-McBeth
	(3)	(1)	(2)	(4)
$GAI_{i,t-1}$	0.0060***	0.0067***	0.0093***	0.0066***
	(0.00)	(0.00)	(0.00)	(0.00)
$AQ_{i,t-1}$	-0.0301	-0.0116	0.0266	-0.0219
	(0.30)	(0.65)	(0.35)	(0.44)
$MTB_{i,t-1}$	0.0005***	0.0004**	0.0002	0.0007**
	(0.01)	(0.02)	(0.21)	(0.02)
$FIRM\_SIZE_{i,t-1}$	0.0047***	0.0057***	0.0143***	0.0044***
	(0.00)	(0.00)	(0.00)	(0.00)
$QUICK_{i,t-1}$	-0.0073***	-0.0074***	-0.0082***	-0.0069***
	(0.00)	(0.00)	(0.00)	(0.00)
$LEV_{i,t-1}$	-0.0143**	-0.0146***	-0.0092	-0.0167**
	(0.04)	(0.01)	(0.24)	(0.04)
$DIV\_DUMMY_{i,t-1}$	0.0059**	0.0051**	-0.0020	0.0074**
	(0.02)	(0.05)	(0.60)	(0.03)
$STD\_CF_{i,t-1}$	-0.1210***	-0.0875***	0.0531	-0.1420***
	(0.00)	(0.00)	(0.12)	(0.00)
$STD\_SALE_{i,t-1}$	-0.0391***	-0.0299***	-0.0230**	-0.0367***
	(0.00)	(0.00)	(0.01)	(0.01)
$TANGIBLES_{i,t-1}$	0.0191**	0.0262***	0.0575***	-0.0044
	(0.03)	(0.00)	(0.00)	(0.50)
$LOSS_{i,t-1}$	-0.0111***	-0.0087***	-0.0033	-0.0127***
	(0.00)	(0.00)	(0.27)	(0.01)
$STD\_NET\_HIRE_{i,t-1}$	-0.0021	-0.0005	0.0026*	-0.0127***
	(0.35)	(0.64)	(0.07)	(0.01)
$LABOUR\_INTENSITY_{i,t-1}$	0.0144	0.0195	0.0534	-0.0227
	(0.76)	(0.73)	(0.61)	(0.70)
$AB\_INV\_OTHER_{i,t}$	-0.2655***	-0.2790***	-0.3113***	-0.2768***
	(0.00)	(0.00)	(0.00)	(0.00)
$BD\_SIZE_{i,t-1}$	0.0001	0.0004	0.0013	0.0000
	(0.89)	(0.52)	(0.13)	(0.95)

$CEODUAL_{i,t-1}$	0.0066***	0.0065***	0.0051*	0.0073**
	(0.00)	(0.00)	(0.06)	(0.02)
Constant	-0.0698***	-0.0834***	-0.2009***	-0.0732***
	(0.00)	(0.00)	(0.00)	(0.00)
Year FE	YES	YES	YES	NO
Industry FE	YES	YES	NO	NO
Firm FE	NO	NO	YES	NO
R^2	0.1433	0.1042	0.1084	0.1619
N	16096	16096	16096	16096

This table presents the propensity score matching results of the CEOs general ability index and efficient labour investment with other control variables. Panel A presents the mean differences of dependent, independent and control variables between the control and matched groups. Panel B presents the regression estimates using matched samples. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Table 6 Instrumental variables.

	Panel A: CEO_MBA		Panel B: LAB_UNION		Panel C: CEO_DEPART		Panel D: ITI	
	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage
$GAI_{i,t-1}$		0.019***		0.297*		0.039**		0.102**
		(0.00)		(0.08)		(0.01)		(0.03)
CEO_MBA	0.261***							
	(0.00)							
LAB_UNION			-0.142*					
			(0.06)					
CEO_DEPART					0.113***			
					(0.00)			
ITI							0.000**	
							(0.02)	
$AQ_{i,t-1}$	0.520***	-0.137***	0.502***	-0.276***	0.521***	-0.147***	0.511***	-0.168***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$MTB_{i,t-1}$	0.001	0.000**	0.001	0.000	0.001	0.000**	0.001	0.000
	(0.24)	(0.02)	(0.29)	(0.92)	(0.44)	(0.03)	(0.18)	(0.21)
$FIRM\_SIZE_{i,t-1}$	0.146***	0.004***	0.147***	-0.037	0.146***	0.001	0.155***	-0.009
	(0.00)	(0.00)	(0.00)	(0.13)	(0.00)	(0.74)	(0.00)	(0.24)
$QUICK_{i,t-1}$	-0.021***	-0.007***	-0.024***	-0.001	-0.024***	-0.007***	-0.024***	-0.005***
	(0.00)	(0.00)	(0.00)	(0.86)	(0.00)	(0.00)	(0.00)	(0.00)
$LEV_{i,t-1}$	0.260***	-0.016***	0.277***	-0.094**	0.254***	-0.022***	0.272***	-0.042***
	(0.00)	(0.00)	(0.00)	(0.05)	(0.00)	(0.00)	(0.00)	(0.00)
$DIV\_DUMMY_{i,t-1}$	-0.041***	0.007***	-0.026*	0.015**	-0.026*	0.007***	-0.012	0.007***
	(0.00)	(0.00)	(0.06)	(0.03)	(0.06)	(0.00)	(0.41)	(0.01)
$STD\_CF_{i,t-1}$	-0.006	-0.005	0.007	-0.008	-0.000	-0.005	-0.007	-0.011
	(0.88)	(0.61)	(0.86)	(0.40)	(1.00)	(0.59)	(0.90)	(0.25)
$STD\_SALE_{i,t-1}$	-0.091***	-0.000	-0.093***	0.027	-0.101***	0.002	-0.079**	0.009
	(0.00)	(1.00)	(0.00)	(0.12)	(0.00)	(0.80)	(0.01)	(0.25)
$TANGIBLES_{i,t-1}$	-0.508***	-0.006	-0.512***	0.144	-0.537***	0.005	-0.557***	0.041
	(0.00)	(0.28)	(0.00)	(0.11)	(0.00)	(0.60)	(0.00)	(0.12)
$LOSS_{i,t-1}$	0.139***	-0.014***	0.140***	-0.053**	0.128***	-0.017***	0.144***	-0.026***
	(0.00)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)
$STD\_NET\_HIRE_{i,t-1}$	0.002	-0.003**	0.000	-0.003	-0.000	-0.003**	-0.000	-0.003*
	(0.78)	(0.04)	(0.98)	(0.26)	(0.95)	(0.04)	(0.96)	(0.08)
$LABOUR\_INTENSITY_{i,t-1}$	-0.285	0.018	-0.438	0.127	-0.407	0.026	-1.768***	0.339***
	(0.29)	(0.46)	(0.11)	(0.20)	(0.14)	(0.33)	(0.00)	(0.01)
$AB\_INV\_OTHER_{i,t}$	-0.152***	-0.255***	-0.159***	-0.210***	-0.164***	-0.252***	-0.153***	-0.256***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$BD\_SIZE_{i,t-1}$	0.014***	0.000	0.017***	-0.005	0.016***	-0.000	0.012***	-0.001

	(0.00)	(0.99)	(0.00)	(0.13)	(0.00)	(0.55)	(0.00)	(0.20)
$CEODUAL_{i,t-1}$	0.012	0.005***	0.007	0.003	0.021	0.005***	0.006	0.003
	(0.35)	(0.01)	(0.60)	(0.49)	(0.12)	(0.01)	(0.65)	(0.13)
Constant	-1.154***	-0.075***	-1.099***	0.231	-1.121***	-0.053***	-1.081***	0.016
	(0.00)	(0.00)	(0.00)	(0.21)	(0.00)	(0.00)	(0.00)	(0.76)
R^2	0.1134	0.1214	0.0966		0.0996	0.0756	0.1055	0.3268
N	21025	21025	21025	21025	21025	21025	18720	18720
Weak identification test								
Kleibergen-Paap Wald rk F statistic	380.91		3.85		66.30		12.36	
p-value	(0.000)		(0.0496)		(0.000)		(0.000)	
Durbin chi2 test of exogeneity								
$\chi 2$ statistics		3.271		17.68		4.41		6.74
p-value		(0.07)		(0.00)		(0.036)		(0.009)

This table presents the regression results after correcting endogeneity employing OLS with instrumental variables. First-stage regression result uses the regression of GAI with exogenous events, including CEO_MBA in Panel A, LAB_UNION in Panel B, CEO_DEPART in Panel C and ITI in Panel D as instrumental variables with other control variables. In the second stage of regression results, EFFILI is regressed on the instrumented GAI and other control variables. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Table 7 Channel analyses.

	(1) EFFILI	(2) EFFILI	(3) EFFILI	(4) EFFILI	(5) EFFILI
$GAI_{i,t-1}$	0.0062***	0.0069***	0.0060***	0.0029	0.0067***
	(0.00)	(0.00)	(0.00)	(0.20)	(0.00)
Ch_CAPEX	-0.0022***				
	(0.00)				
$GAI_{i,t-1} \times Ch\_CAPEX_{i,t-1}$	-0.0016***				
	(0.00)				
DEFENDERS		0.0171***			0.0167***
		(0.00)			(0.00)
$GAI_{i,t-1} \times$DEFENDERS		-0.0051*			-0.0049*
		(0.05)			(0.06)
PROSPECTORS			-0.0407***		-0.0398***
			(0.00)		(0.00)
$GAI_{i,t-1} \times$PROSPECTORS			0.0153**		0.0145**
			(0.01)		(0.02)
ANALYSERS				-0.0081***	
				(0.00)	
$GAI_{i,t-1} \times$ANALYSERS				0.0039	
				(0.11)	
Constant	-0.0902***	-0.0869***	-0.0888***	-0.0787***	-0.0879***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Controls	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
R^2	0.1442	0.1445	0.1445	0.1431	0.1464
N	20907	20977	20977	20977	20977

This table presents the channel analyses. Empire building and business strategy are the key channels. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Table 8 Moderating role of external and internal monitoring.

DV=EFFILI	Panel A: Internal monitoring			Panel B: External monitoring	
	(1)	(2)	(3)	(4)	(5)
$GAI_{i,t-1}$	0.0128***	0.0090***	0.0043***	0.0065***	-0.0039
	(0.00)	(0.00)	(0.00)	(0.00)	(0.45)
EINDEX	0.0003				
	(0.78)				
$GAI_{i,t-1}$ ×EINDEX	-0.0021***				
	(0.00)				
GSINDEX		-0.0032**			
		(0.02)			
$GAI_{i,t-1}$×GSINDEX		0.0015**			
		(0.03)			
MA_SCORE_2022			-0.0027		
			(0.72)		
$GAI_{i,t-1}$×MA_SCORE_2022			0.0155**		
			(0.02)		
$INSTOWN\_PCT_{i,t-1}$				0.0085***	
				(0.00)	
$GAI_{i,t-1}$×$INSTOWN\_PCT_{i,t-1}$				0.0045*	
				(0.10)	
$ANALYST_{i,t-1}$					0.0064***
					(0.00)
$GAI_{i,t-1}$×$ANALYST_{i,t-1}$					0.0047**
					(0.02)
Constant	-0.0929***	-0.0918***	-0.0889***	-0.0808***	-0.0820***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Controls	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
R^2	0.1449	0.1831	0.1433	0.1406	0.1452
N	18594	14101	20828	20859	21008

This table presents the moderating effect of internal monitoring and external monitoring. Entrenchment index, governance index and managerial ability score are used as a proxy for internal monitoring, whereas institutional ownership and analyst following are used as a proxy for external monitoring. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Table 9 Cross-sectional analysis.

Panel A: Extreme and moderate hiring firms.

	Extreme hiring firms	Moderate hiring firms
	(1)	(2)
$GAI_{i,t-1}$	0.0106***	-0.0012***
	(0.00)	(0.00)
Constant	-0.2279***	-0.0347***
	(0.00)	(0.00)
Diff in coeff. and $\chi 2$	33.27***	
	(0.00)	
Controls	YES	YES
Year FE	YES	YES
Industry FE	YES	YES
R^2	0.1493	0.0973
N	7845	13180

Panel B: High Vs Low Capital Expenditure.

	High capital expenditure firms	Low capital expenditure firms
	(1)	(2)
$GAI_{i,t-1}$	0.0018	0.0075***
	(0.63)	(0.00)
Constant	-0.0476**	-0.1078***
	(0.04)	(0.00)
Diff in coeff. and $\chi 2$	4.71**	
	(0.03)	
Controls	YES	YES
Year FE	YES	YES
Industry FE	YES	YES
R^2	0.1721	0.1202
N	6160	14865

This table presents the estimates of Eq.(2) on various sample subsets. Panel A presents regression results of extreme and moderate hiring firms. Extreme firms are extreme overhiring and extreme underhiring firms. Moderate firms are moderate overhiring and moderate underhiring firms. Panel B presents the regression results of high-capital expenditure firms and low-capital-expenditure firms. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Table 10 Additional controls.

DV = EFFILI	OLS	Random effects	Fixed effects	Fama-McBeth
	(3)	(1)	(2)	(4)
$GAI_{i,t-1}$	0.0057***	0.0063***	0.0075***	0.0058**
	(0.00)	(0.00)	(0.00)	(0.01)
CEO_AGE	0.0001	0.0001	0.0000	0.0002
	(0.52)	(0.52)	(0.83)	(0.20)
CEO_TENURE	0.0007***	0.0006***	0.0004*	0.0005**
	(0.00)	(0.00)	(0.07)	(0.04)
CEO_COMPENSATION	-0.0000	-0.0000	0.0000	-0.0000*
	(0.59)	(0.69)	(0.88)	(0.09)
Constant	-0.0739***	-0.0841**	-0.1590***	-0.0867**
	(0.00)	(0.01)	(0.00)	(0.02)
Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	NO
Industry FE	YES	YES	NO	NO
Firm FE	NO	NO	YES	NO
R^2	0.1558	0.1113	0.1132	0.1942
N	17343	17343	17343	17343

This table presents the regression results of the effect of CEOs general ability index on labour investment efficiency after controlling for additional CEO characteristics. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Table 11 Alternative measures.

	Panel A: Alternative measures of GAI			Panel B: Alternative measure of EFFILI	
	DV= EFFILI			DV = ALT1_EFFILI	DV= ALT2_EFFILI
	(1)	(2)	(3)	(4)	(5)
$IND\_ADJ\_GAI_{i,t-1}$	0.0061***				
	(0.00)				
$YEAR\_ADJ\_GAI_{i,t-1}$		0.007***			
		(0.00)			
$MEAN\_ADJ\_GAI_{i,t-1}$			0.0061***		
			(0.00)		
$GAI_{i,t-1}$				0.0060***	0.0055***
				(0.00)	(0.00)
Constant	-0.0880***	-0.0874***	-0.0863***	-0.1141***	-0.1058***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Controls	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
R^2	0.1429	0.1429	0.1429	0.1337	0.1325
N	20936	20936	20936	21025	21025

This table presents the alternative measures of dependent and independent variables. Pane A: Columns 1,2 and 3 present the alternative measures of GAI, and Panel B: Columns 4, and 5 present the alternative measures of EEILI. P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.

Appendices

Appendix A Variable definitions

Variable	Description
Phase1: Model (1) variables	
NET_HIRE	Percentage change in the number of employees (EMP) from financial year t-1 to financial year t for firm i.
$SALES\_GROWTH_{i,t-1}$	Percentage change in sales (REVT) in financial year t-1 for firm i. This is included because it represents a change in demand for a firm's products and services and likely to affect executives' hiring decisions (Pinnuck & Lillis, 2007).
$SALES\_GROWTH_{i,t}$	Percentage change in sales (REVT) in financial year t for firm i. This is included because of the uncertainty as to the time lag between sales growth and change in the number of employees (Pinnuck & Lillis, 2007).
$chROA_{i,t}$	Change in return on assets in financial year t for firm i. This is included to control for the normal fundamental impact of a change in earnings on demand for labour (Pinnuck & Lillis, 2007).
$chROA_{i,t-1}$	Change in return on assets in financial year t−1 for firm i. This is included because of the uncertainty as to the time lag between profitability change and change in the number of employees (Jung et al., 2014).
$ROA_{i,t}$	Return on assets (NI/TA)) in financial year t for firm i. This is included as the level of profitability is likely to be a fundamental determinant of the level of investment in employees (Pinnuck & Lillis, 2007).
$RETURN_{i,t-1}$	Total stock return during financial year t for firm i. This proxies for future expected growth and for the effect of any omitted fundamental variables (Pinnuck & Lillis, 2007).
$FIRM\_SIZE_{i,t-1}$	Natural logarithm of market value (common shares outstanding at the beginning of the year * current share price (CSHO*PRCC_F)) at the end of financial year t-1 for firm i. This is included because firm size may influence employment growth rates and/or entry into a more mature or lower investment stage of the firm's life cycle. Also, size proxies for the likelihood that a firm might be facing cash flow shortages (Pinnuck & Lillis, 2007).
$FIRM\_SIZE\_R_{i,t-1}$	Percentile rank of $FIRM\_SIZE_{i,t-1.}$
$QUICK_{i,t-1}$	Quick ratio ((CHE+RECT)/LCT) at the end of financial year t-1 for firm i. This is included to proxy for short-term liquidity and to control for changes in employment due to cash flow shortages and short-term liquidity problems (Jung et al., 2014).
$chQUICK_{i,t-1}$	Percentage change in the quick ratio in financial year t-1 for firm i.
$chQUICK_{i,t}$	Percentage change in the quick ratio in financial year t for firm i.
$LEV_{i,t-1}$	Leverage for firm i, measured as the sum of debt in current liabilities and total long-term debt (DLC+DLTT) at the end of financial year t-1, divided by financial year t-1 total assets (AT) for firm i. This is included as a proxy for long-term financing requirements and for reduced funds available for investment, which may trigger delay in hiring or retrenching employees (Pinnuck & Lillis, 2007).

$AUR_{i,t-1}$	It is the ratio of annual sales to total assets. It is included because it measures how efficiently managers are utilizing a firm's asset.
$LOSS\_BINX_{i,t-1}$	There are five separate loss bins to indicate each 0.005 interval of ROA from 0 to −0.025 in period t-1 for firm i. For example, LossBin1 is equal to 1 if ROA ranges from −0.005 to 0. LossBin2 is equal to 1 if ROA is `between −0.005 and−0.010′. LossBin3 is equal to 1 if ROA is 'between −0.010 and−0.015', LossBin4 is equal 1 if ROA is 'between −0.015 and−0.020', and LossBin5 is equal 1 if ROA is 'between −0.020 and−0.025' (Pinnuck & Lillis, 2007). The loss bins are included because Pinnuck and Lillis (2007) argue that firms making losses are more likely to cut back the labour force compared to those making profits.
Phase 2: Model (2) variables	
$EFFILI_{i,t}$	Efficient labour investment is the dependent variable in Eq. (2). It is the reverse absolute value of the residuals from Eq. (1) for firm I in financial t.
GAI	"First factor of applying principal components analysis (PCA) to five proxies of general managerial ability past Number of Positions, Number of Firms, Number of Industries, CEO Experience Dummy, and Conglomerate Experience Dummy" (Custodio et al., 2013, p. 489).
$AQ_{i,t-1}$	Accrual quality (AQ) = σ ($\upsilon_{i,t}$) is the standard deviation of firm *i*'s residuals, υi,t, calculated over years t-4 through *t*. Larger standard deviations of residuals indicate poorer accruals quality. $TCA = bo + b_1CFO_t + b2CFO_{t-1} + b_3CFO_{t+1} + \Delta Rev_{i,t} + \Delta PPE_{i,t} + \upsilon_{i,t}$ Where, $TCA_{i,t}=\Delta CA_{i,t}-\Delta CL_{i,t}-\Delta Cash_{i,t}+\Delta STDEBTj,t$ = total current accruals in year *t*, $CFO_{i,t}=NIBE_{i,t}-TAi,t$=firm *i*'s cash flow from operations in year *t*, NIBEi,t=firm *i*'s net income before extraordinary items (Compustat #18) in year *t*, TAi,t=(ΔCAi,t-ΔCLi,t-ΔCashi,t+ΔSTDEBTi,t-DEPNi,t)=firm *i*'s total accruals in year *t*, $\Delta CA_{i,t}$=firm *i*'s change in current assets (Compustat #4) between year *t*−1 and year *t*, $\Delta CL_{i,t}$=firm *i*'s change in current liabilities (Compustat #5) between year *t*−1 and year *t*, $\Delta Cash_{i,t}$=firm *i*'s change in cash (Compustat #1) between year *t*−1 and year *t*, $\Delta STDEBT_{i,t}$=firm *i*'s change in debt in current liabilities (Compustat #34) between year *t*−1 and year *t*, $DEPN_{i,t}$=firm *i*'s depreciation and amortization expense (Compustat #14) in year *t*, $\Delta Rev_{i,t}$=firm *i*'s change in revenues (Compustat #12) between year *t*−1 and year *t*, $PPE_{i,t}$=firm *i*'s gross value of *PPE* (Compustat #7) in year *t (Francis et al., 2005).*
$MTB_{i,t-1}$	Market-to-book ratio in year t−1 for firm i (CSHO*PRCC_F/SEQ).
$DIV\_DUMMY_{i,t-1}$	The indicator variable coded as 1 if firm i paid dividends (DVPSP_F) in financial year t-1 for firm i. This is included because executives may reduce dividend payments to providers of equity capital if they want to increase firm investment (Ryan Jr & Wiggins III, 2002).
$STD\_CF_{i,t-1}$	Standard deviation of firm i's cash flows from operations (OANCF) from financial year t-5 to t-1. This is included because the volatility of cash flow is likely to affect executives' investment decisions in a firm (Jung et al., 2014).
$STD\_SALES_{i,t-1}$	Standard deviation of firm i's sales from year t-5 to t-1. Volatility in sales revenue is likely to affect hiring decisions and, therefore, investment in labour (Jung et al., 2014).
$TANGIBLES_{i,t-1}$	Property, plant, and equipment (PPENT) at the end of financial year t-1, divided by total assets at the end of financial year t-1, for firm i. If a firm controls a lot of assets, it will likely hire more employees, and vice versa, affecting the firm's labour investments (Jung et al., 2014).

LOSS $_{i,t-1}$	Indicator variable coded as 1 if firm i had negative ROA for financial year t-1. Loss-making firms are less likely to invest in hiring more employees (Jung et al., 2014).
STD_NET_HIRE $_{i,t-1}$	Standard deviation of firm i's change in the number of employees from financial year t-5 to t-1 for firm i. The volatility in hiring may affect a firm's labour investment decisions (Jung et al., 2014).
LABOUR_INTENSITY $_{i,t-1}$	Labor intensity, measured as the number of employees divided by total assets at the end of financial year t-1 for firm i. The number of employees relative to the assets of a firm may suggest whether more or fewer employees should be hired. This has implications for executives' investment decisions in labour.
$\|AB\_INV\_OTHER_{i,t}\|$	Abnormal other (non-labour) investments, defined as the absolute magnitude of the residual from the following equation: $Invest\_Other_{it}=\beta_0+\beta_1 Sales\_Growth_{it-1}+\varepsilon_{it}$ where Invest_Other is the sum of capital expenditure (CAPX), research and development expenditures (XRD), less cash receipts from the sale of property, plant, and equipment (SPPE), all scaled by lagged total assets.
$BD\_SIZE_{i,t-1}$	Number of directors on the board.
$CEODUAL_{i,t-1}$	$CEODUAl_{i,t-1}$ Indicator variable coded one if the CEO is also the Chair of the board and zero otherwise.
Other variables	
CEO_MBA	Coded 1 if the CEO has an MBA degree
$LAB\_UNION_{i,t-1}$	Industry-level rate of labor unionization for financial year *t-1*. obtained from www.unionstats.com (Jung et al., 2014).
CEO_DEPART	Coded 1 if CEO departure obtained from https://data.mendeley.com/datasets/9mh4dg4rfn/5
ITI	Indurstry tournament incentive is the pay gap between the second-highest-paid CEO's total compensation within the same industry classification and the CEO's total compensation
Ch_CAPEX	Ch_CAPEX represents the difference in funds a company uses to acquire, upgrade, or maintain physical assets such as property, buildings, or equipment, reported as the annual cash outflow for these investments.
STRATEGY	Following Bentley et al. (2013) and further Habib and Hasan (2021, p. 93), the strategy score construction procedure as follows: "(i) the ratio of research and development to sales; (ii) the ratio of employees to sales; (iii) a measure of employee fluctuations; (iv) one-year percentage change in total sales; (v) the ratio of marketing (SG&A) to sales; and (vi) a measure of capital intensity. All variables are computed using a rolling average over the prior five years. Each of the six individual variables is ranked by forming quintiles within each two-digit SIC industry-year. Within each company-year, those observations with variables in the highest quintile are given a score of 5, in the second-highest quintile, a score of 4, and so on, and those observations with variables in the lowest quintile are given a score of 1 (except capital intensity, which is reversed-scored so that observations in the lowest (highest) quintile are given a score of 5 (1)). Then for each company-year, the scores across the six variables are summed such that a company could receive a maximum score of 30 (prospector-type) and a minimum score of 6 (defender-type)".
PROSPECTORS	A dummy variable coded 1 if the strategy score is between 24 and 30 (both inclusive), and 0 otherwise. We follow Bentley et al. (2013) to calculate strategy scores.
DEFENDERS	A dummy variable coded 1 if the strategy score is between 6 and 12 (both inclusive), and 0 otherwise.

ANALYSERS	A dummy variable coded 1 if the strategy score is between 13 and 23 (both inclusive), and 0 otherwise.
EINDEX	Entrenchment index (Bebchuk et al., 2009)
GSINDEX	Governance index of (Gompers et al., 2003)
MA_SCORE_2022$_{i,t-1}$	The industry-year decile rank of managerial ability scores (Demerjian et al., 2012). This is included because more able managers have been shown to engage in less non-value maximising activities (Jung et al., 2014).
INSTOWN_PCT $_{i,t-1}$	Institutional shareholdings at the end of financial year t-1 for firm i. Institutional investors would improve the monitoring environment; therefore, executives are less likely to make inefficient labour investment decisions.
ANALYST	Log of number of analysts hired/were in contract
CEO_AGE	Age of CEO in years
CEO_TENURE	Number of years as CEO in the current position
CEO_COMPEN	Total compensation of CEO (Salary + Bonus + Other Annual + Restricted Stock Grants + LTI)
ALT1_EFFLI	Absolute value of the difference between actual hiring and the expected hiring where the expected hiring is defined as the industry median for each year (Kaplan & Lee, 2024).
ĀLT2_EFFILI	Absolute value of the difference between actual hiring and the expected hiring where the expected hiring is from regressing actual hires on the sales growth of the previous year (Kaplan & Lee, 2024).

Appendix B Untabulated results

Panel A: Regression output for Eq. (1) (N=74,712).

	NET_HIRE
$SALES\_GROWTH_{i,t-1}$	0.0200***
	(0.00)
$SALES\_GROWTH_{i,t}$	0.2155***
	(0.00)
$chROA_{i,t}$	-0.0342***
	(0.00)
chROAi,t-1	-0.0015
	(0.73)
$ROA_{i,t}$	-0.0018
	(0.44)
$RETURN_{i,t-1}$	0.0479***
	(0.00)
FIRM_SIZE_R $_{i,t-1}$	0.0003***
	(0.00)
QUICK $_{i,t-1}$	0.0092***
	(0.00)
chQUICK $_{i,t-1}$	0.0212***
	(0.00)
chQUICK $_{i,t}$	-0.0177***
	(0.00)
LEV $_{i,t-1}$	-0.0212***
	(0.00)
AUR $_{i,t-1}$	0.0137***
	(0.00)
LOSS_BIN1 $_{i,t-1}$	-0.0308***
	(0.00)
LOSS_BIN2 $_{i,t-1}$	-0.0305***
	(0.00)
LOSS_BIN3 $_{i,t-1}$	-0.0259***
	(0.00)
LOSS_BIN4 $_{i,t-1}$	-0.0083
	(0.29)
LOSS_BIN5 $_{i,t-1}$	-0.0241***
	(0.01)
Constant	-0.0283**
	(0.04)
R^2	0.1878
N	74,712

This table presents the regression results obtained from Eq. (1). P values (in parentheses) are based on t-statistics clustered by firm. ***, ** and * denote significance at 1%, 5% and 10% levels, respectively. We describe the variables in Appendix A.