Delayed Retirement and Firm Value: Evidence from Chinese Listed Firms*

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Abstract: Raising the statutory retirement age has become a policy adopted worldwide in response to an aging population, yet the consequences for firms and the associated social costs remain understudied. This paper examines how China's 2024 delayed-retirement announcement affected listed firms' values. Using an event-study approach, we find a significant stock price decline, suggesting that investors view delayed retirement as an increase in labor costs and a decrease in expected profits. Losses of value are larger for firms with higher managerial and ordinary wages and for those with younger management teams. Heterogeneity analyses show that the negative effect of managerial wages on stock prices is more pronounced in smaller firms, while the negative impact of ordinary wages is stronger in non-family and non-high-tech firms. By contrast, older management teams partially offset the value loss, particularly in larger and non-high-tech firms.

Keywords: Delayed retirement, firm value, China, event study

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1. Introduction

Driven by sustained declines in fertility and increasing life expectancy, the world is rapidly transitioning into an aging society. In 2022, the global population aged 65 and above reached 717 million—approximately 9.7% of the world's total—and United Nations projections indicate this share will rise to 11.7% by 2030 (United Nations, 2022). Both developed and developing economies are facing the multifaceted challenges posed by aging. To mitigate the resulting fiscal pressures on public pension systems and the contraction of the labor force, governments worldwide have increasingly resorted to raising statutory retirement ages—commonly referred to as delayed-retirement reforms.[1]

A substantial body of literature has examined the effects of delayed-retirement reforms at the individual and household levels. For instance, studies of pension reforms in the Netherlands, Austria, the United Kingdom, France, and the United States demonstrate that policy changes markedly alter retirement decisions and labor-market outcomes (Staubli and Zweimüller, 2013; Behaghel and Blau, 2012; Cribb et al., 2016; Rabaté and Rochut, 2020; Rabaté et al., 2024). Related evidence further shows that delayed-retirement reforms affect household saving behavior and health (Bertoni et al., 2018; Etgeton et al., 2023). However, the firm-level consequences of these reforms remain largely under-explored.[2]

To address this gap, we present evidence from China, the world's second-largest economy, whose institutional and capital-market environment, however, differs significantly from those of Western countries We particularly focus on China because, first, the 13 September 2024 reform was large and exogenous; pre-announcement opacity prevented market anticipation, in contrast to leaky legislative debates elsewhere, and therefore created an ideal setting for policy experiment and clean identification strategy; second, China's reform increases retirement ages by about three months per year for men and for women previously retiring at age 55, and by

[1] Retirement-age reforms have been adopted in many aging economies. See Table 1 for selected cross-country examples.

[2] Unlike Hut (2024), who studies within-firm outcomes of a Dutch retirement-age reform, and Chino (2025), who analyzes Japan's age-dependent employment protection, we examine China's 2024 statutory retirement-age increase from an external valuation perspective. We link stock-market reactions to firms' wage levels, managerial age profiles, and broader characteristics. Moreover, in Chino (2025), the policy protects only older workers who choose to remain employed, whereas our setting involves a general increase in the statutory retirement age.

about six months per year for women previously retiring at age 50. This pace is faster than the roughly one to two months per cohort year observed in the United States and Germany and more compressed than the staged increases adopted in the United Kingdom, thereby implying a sharper labor-cost shock; third, China is a rapidly growing market. However, it has a distinct institutional environment such as strong government influence and age-based wage scales, limited stock-market efficiency and low investor sophistication (Allen et al., 2005; Liu et al., 2023; Cui et al., 2025). These features may amplify the economic consequences of the delayed retirement policy, making its impact more detectable and theoretically intriguing.

This paper proceeds as follows. First, we build a simple static model using Lazear (1979)'s deferred compensation framework. In this model, long-term contracts between firms and workers determine lifetime wage profiles, and workers are typically paid below their marginal product when young and receive wages above their marginal product when old. Our model extends Lazear (1979)'s work and shows that an increase in older workers due to delayed retirement reduces firm profits. Second, we conduct an event study around the announcement and document a decline in market value measured by cumulative abnormal returns (CARs): by trading day +5, the average CAR is −1.69%. This corresponds to an average loss of roughly RMB 192.57 million (USD 27.04 million) per firm. This pattern is consistent with investors anticipating higher labor costs and reduced adjustment flexibility, which depresses expected profits, weakens cash flows, and increases risk.

In addition to the average market reaction, we examine which firm characteristics shape the impact of the policy. These characteristics include average managerial wages, average ordinary-employee wages, and average managerial age. In the cross-section analysis, we find that both wage measures are negatively associated with CARs, whereas managerial age has a positive impact. Heterogeneity analyses further show that the negative effect of managerial wages on firm value is more pronounced in smaller firms, while the negative impact of ordinary-employee wages is stronger in non-family and non-high-tech firms. By contrast, the positive role of managerial age is more pronounced in larger and non-high-tech firms.

Although our identification relies on China's 2024 reform announcement, the mechanisms we emphasize, such as deferred compensation, employment protection, and high firing costs for older workers, are not unique to China. To place the Chinese reform in a broader context, Table 1 compares retirement-age reforms across countries, and Table A1 summarizes related international evidence. While the Chinese institutional setting provides a particularly sharp environment for identification, our findings are also informative for understanding how capital markets may respond to delayed-retirement reforms in similar institutional settings.

This study makes three contributions to existing literature. First, it enriches the strand of research that examines the determinants of firm value through the lens of labor costs. While an extensive body of work has investigated how human-capital or human-resource factors influence firm value (e.g., Tehranian and Waegelein, 1985; Brickley et al., 1985; Abowd et al., 1990; Lin and Rozeff, 1993; Elayan et al., 1998; Palmon et al., 1997; Hallock, 1998; Farber and Hallock, 2009; Brauer and Zimmermann, 2019; Eshghi and Astvansh, 2024; Hannon and Milkovich, 1996; Arthur and Cook, 2004; Ruback and Zimmerman, 1984; Lee and Mas, 2012), most of these studies focus on voluntary, endogenous human-resource decisions—such as compensation schemes, layoffs, unionization, and employee-benefit plans. By contrast, this paper exploits the exogenous labor-market shock created by the delayed-retirement reform, thereby offering a novel perspective that complements the existing literature.

Second, we provide new evidence on the firm-level consequences of delayed-retirement reforms. The existing literature has predominantly examined individual- and household-level outcomes, including retirement behavior, employment, savings, and health (e.g., Staubli and Zweimüller, 2013; Bertoni et al., 2018; Rabaté and Rochut, 2020; Etgeton et al., 2023; Rabaté et al., 2024), while firm-level evidence remains scarce. Our paper contributes to this emerging literature by taking a financial-market perspective and documenting a negative valuation response to the unexpected announcement of China's delayed-retirement reform. Moreover, by exploiting daily stock-market data around the exogenous and sudden policy announcement, our short-window event-study design provides a particularly clean setting to identify the market valuation effects of the reform.

Last but not least, this paper may be of great interest to policy makers as it quantifies the social costs of delayed-retirement reforms. As the aging of populations intensifies worldwide, an increasing number of countries are contemplating or have already legislated for higher statutory retirement ages. However, the potential social costs of these reforms—particularly in terms of which firms bear them more—have been under-explored.[3] Using financial market data, we provide new evidence of such costs, which policy makers may overlook but are imposed by China's delayed retirement policy, one of the most significant demographic labor reforms worldwide thus far.

The remainder of the paper is organized as follows. Section 2 describes China's retirement system and the recent delayed-retirement reform. Section 3 reviews the related literature. Section 4 presents a simple theoretical model. Section 5 details the data sources, the event-study specification, and the cross-sectional regression design. Section 6 reports the empirical results. Section 7 presents the heterogeneity analyses. Section 8 concludes.

[3] One related exception is Chino (2025), which documents heterogeneous effects of age-dependent employment protection across firms, with stronger effects for financially distressed, low-growth, and R&D-intensive firms. However, Chino (2025) examines heterogeneity in annual Tobin's Q, whereas we focus on short-window stock-market reactions around the delayed-retirement policy announcement.

2. Background

2.1 China's Retirement System

China's statutory retirement ages have remained anchored in the regulations enacted in the early 1950s: 60 years for male workers, 50 years for female workers in ordinary positions, and 55 years for female employees in managerial or professional roles. Despite subsequent piecemeal adjustments and pilot reforms, this universal retirement-age framework has remained fundamentally unchanged for more than seven decades.[4] Yet this design, anchored in China's mid-twentieth-century level of economic development and demographic structure, has become increasingly misaligned with the nation's contemporary socioeconomic realities.

Driven by rapid socioeconomic development and marked improvements in public health and medical care, China's average life expectancy has risen substantially, reaching 78.6 years in 2023—approximately 2.18 times the level observed in the 1950s, according to the National Bureau of Statistics of China (NBS). This longevity gain, compounded by declining fertility, has steadily increased the share of middle-aged and elderly individuals. At the end of 2023, China's population aged 60 and older reached 297 million, NBS data show, accounting for 21.1 % of the total population and constituting the largest elderly cohort in the world. Consequently, the nation faces an ever-heavier pension burden: the old-age dependency ratio reached 22.5 % in 2023, according to NBS, implying that every 4.4 working-age adult supports one elderly person, and this ratio continues to rise.

At the same time, NBS data show that the average years of schooling among Chinese residents have increased markedly. In 2023, the average educational attainment of new labor-market entrants stood at 14 years, which postpones individuals' initial entry into the workforce and objectively reduces the utilization rate of human capital. The result is a substantial labor shortfall. According to Zhang et al. (2023), China's cumulative labor supply shortage between 2016 and 2039 is projected to reach 153 million workers, or roughly 11 % of the total population.

[4] For instance, subsequent regulations have introduced targeted adjustments—such as permitting early retirement for workers in arduous positions or special trades, while granting flexible extensions of the statutory retirement age for senior executives and technical personnel.

Population aging poses formidable fiscal challenges to China's public finances and social security system. Under the current pay-as-you-go pension framework, a shrinking working-age population reduces contribution inflows, while rising old-age dependency raises benefit outlays, intensifying the financial strain on pension schemes. According to data released by China's Ministry of Human Resources and Social Security, the cumulative balance of the basic pension insurance for urban enterprise employees grew from RMB 2.39 trillion in 2012 to RMB 5.26 trillion in 2021; yet the number of months that these reserves can cover declined from 18.5 to 11.2 over the same period. According to projections by the Chinese Academy of Social Sciences, the cumulative balance of China's Urban Employees' Basic Pension Fund will peak at RMB 6.99 trillion in 2027 and then decline precipitously, with the entire reserve projected to be depleted by 2035.

2.2 China's Delayed-Retirement Reform

Challenges such as insufficient labor supply, the disappearance of the demographic dividend, and mounting pension-payment pressures are by no means unique to China. Developed economies that confronted population aging earlier have widely resorted to raising retirement ages in response to similar demographic and fiscal pressures. Table 1 summarizes selected retirement-age reforms across countries.

[Insert Table 1 Here]

Against this broader international background, China's delayed-retirement reform was not an isolated policy response. China's policy deliberations on delayed retirement can be traced to 2012. In June of 2012, seven central ministries and commissions jointly issued the Social Security 12th Five-Year Plan, which first proposed "researching policies for the flexible postponement of pension-claiming ages". In 2013, the Decision of the CPC Central Committee on Some Major Issues Concerning Comprehensively Deepening Reform subsequently specified "formulating and researching a progressive policy for raising the statutory retirement age." At that time, delayed retirement provoked extensive social controversy. An online survey conducted by the state-run social-media platform People.cn in 2012 on "postponing the pension-claiming age" drew 450,000 participants, of whom 93.3 % expressed opposition. In

the following years, policy statements on delayed retirement remained largely confined to public remarks by officials at the Ministry of Human Resources and Social Security; the detailed implementation plan originally scheduled for release in 2016 was not unveiled as anticipated.

Since 2020, discussions regarding delayed retirement have appeared with increasing frequency in key national policy documents. In March 2021, the State Council formally committed to implementing a progressive increase in the statutory retirement age during the 14th Five-Year Plan period (2021–2025). In July 2024, the Third Plenary Session of the 20th CPC Central Congress adopted the Decision of the CPC Central Committee on Further Deepening Reform Comprehensively to Advance Chinese Modernization, which called for "prudently and steadily advancing the progressive reform of the statutory retirement age in accordance with the principles of voluntariness and flexibility." Then, on 13 September 2024, the State Council promulgated the Measures for the Progressive Increase of the Statutory Retirement Age, stipulating that, commencing on January 1, 2025 and over a 15-year horizon, the retirement age for male employees will be raised from 60 to 63 years, while for female employees it will rise from 50 and 55 to 55 and 58 respectively. The adjustment schedule prescribes a one-month increment every four months for male employees and for female employees previously retiring at 55, and a one-month increment every two months for female employees previously retiring at 50.

The formal announcement of China's delayed-retirement policy on 13 September 2024 constitutes a valid event-study window owing to its unexpected nature. We substantiate this claim in three ways: (1) Institutional timeline: before 13 September 2024, no public draft rules or consultation documents were released. Key design parameters—such as the cadence and magnitude of gradual adjustments and the ultimate target ages for different demographic groups—remained unspecified, making it infeasible for the public to form reliable expectations about the exact design or timing. (2) Attention dynamics: we collect the 2024 daily Baidu Search Index (analogous to Google Trends) for the keyword "delayed retirement" ("延迟退休"). Figure 1 shows that public attention remained at a consistently low level until the official

announcement. The spike in July 2024 reflected heightened interest following the directional language in the Third Plenary Session documents, yet as illustrated in Appendix Figure A1, similar transient surges occurred repeatedly and were not anticipatory responses to any concrete policy rollout. (3) Placebo tests: we take the two pre-announcement peaks—21 July 2024 and 10 September 2024—from Figure 1 as pseudo-event days (Figures A2 and A3). Examining the five trading days surrounding each date, we do not observe any anticipatory market reaction. Together, these patterns support treating the announcement as unexpected.

[Insert Figure 1 Here]

Consequently, this paper examines the short-term impact on firm values of China's formal announcement of delayed-retirement policy on 13 September 2024. Unlike earlier principled signals or vague expectations, the 13 September announcement definitively disclosed implementation details and the effective date, providing the market with complete and unambiguous information. This paper therefore designates this date as the event date.

3. Related literature

This paper contributes to two strands of literature. First, it relates to studies that examine how human capital affects firm value. However, prior work has predominantly investigated the valuation effects of voluntary human-resource arrangements. Early studies such as Tehranian and Waegelein (1985) and Brickley et al. (1985) document positive shareholder wealth effects following announcements of short-term executive compensation plans. Abowd et al. (1990) analyze the market reaction to five categories of human-resource decisions such as general HR system announcements, compensation and benefits, staffing, shutdowns and relocations, and miscellaneous. They find that announcements related to permanent staff reductions and shutdown/relocations enhance firm value.

Subsequent research has examined the valuation effects of diverse human-resource decisions. A substantial body of this work analyzes market reactions to job-loss announcements, yet the empirical evidence remains inconclusive (Lin and Rozeff, 1993; Elayan et al., 1998; Palmon et al., 1997; Hallock, 1998; Farber and Hallock, 2009; Brauer and Zimmermann, 2019). Eshghi and Astvansh (2024) show that the market reaction depends on the nature of the layoffs. For instance, announcements signaling proactive cost cutting elicit no response, whereas passive reductions in response to declining demand may lead to negative valuation effects. Hannon and Milkovich (1996) document positive market reactions to human-resource reputation announcements (e.g., firms designated as “best for women”), and Arthur and Cook (2004) find that the disclosure of work-family HR policies likewise enhances firm value.

A related stream of literature examines the valuation effects of firm-level unionization, documenting negative impacts on equity value in both the short and long run (Ruback and Zimmerman, 1984; Lee and Mas, 2012). Additionally, several studies examine how firm-employee relations affect stock price crash risk. Ben-Nasr and Ghouma (2018) find that employee benefit plans can facilitate managerial concealment of bad news, thereby increasing crash risk. Conversely, Zuo et al. (2022) document that higher employee litigation rates elevate firms’ stock price crash risk. Collectively, existing literature shows that HR announcements

convey information to equity markets, enabling investors to revise expectations of future profits and thereby altering firm value.

Unlike the above studies, which focus on the market reaction to firms' endogenous human resource arrangements, this paper aligns more closely with the small body of research examining the impact of exogenous labor-market shocks on firm value. Such studies concentrate on how investors, conditioned on available information, forecast the effect of external shocks on firms' future operations and thereby assess firm value. Existing literature typically treats minimum-wage policies as exogenous shocks to firms' labor costs. For example, Pacheco and Naiker (2006) use an event-study methodology and find that New Zealand's 2001 major reform to youth minimum wages did not have a significant effect on firm value. In contrast, Bell and Machin (2018) document, via an event study of the United Kingdom's 2015 minimum-wage policy change, that a higher minimum wage increased labor costs and led to deteriorated stock-market performance among low-wage firms. Because wages generally rise with age (Lazear, 1979, 1981; Loewenstein and Sicherman, 1991; Frank and Hutchens, 1993), delayed retirement implies an extended period during which firms must pay higher wages.

This paper treats the delayed-retirement policy as an exogenous shock to firms' labor costs. Existing studies mainly examine how fluctuations in the labor costs of ordinary or non-managerial employees affect firm value, leaving scarce empirical evidence on how changes in managerial labor costs influence firm value. By separately measuring firm-level managerial wages and ordinary employee wages, we find that the negative effect of the labor-cost shock induced by delayed retirement on firm value is larger in firms with higher managerial wages. Although employee wages also predict a significant decline in firm value, the estimated coefficient is smaller. Thus, this study not only supplements causal evidence on the impact of labor shocks on firm stock-market value from the perspective of delayed retirement, but also highlights the critical role of managerial compensation costs.

Furthermore, our findings complement a broader literature on the economic consequences of delayed-retirement reforms. Existing studies have predominantly examined individual

retirement decisions, employment, savings, and health, while Appendix Table A1 provides a summary of the related evidence. For example, Rabaté et al. (2024) show that increases in the Dutch statutory retirement age substantially reduced retirement and increased continued employment, with pronounced substitution across social-insurance programs. Parallel evidence is reported by Staubli and Zweimüller (2013) for Austria's early-retirement-age reforms, by Cribb et al. (2016) for the United Kingdom, and by Rabaté and Rochut (2020) for France. Beyond labor-market outcomes, Etgeton et al. (2023) find that the 1999 German pension reform reduced household saving rates, while Bertoni et al. (2018) show that the 2004 Italian reform increased physical exercise and improved pre-retirement health among middle-aged men.

While prior research has predominantly examined individual- and household-level consequences of delayed retirement, firm-level evidence remains scarce. Among the few exceptions, Hut (2024) exploits a Dutch reform and shows that the reform-induced rise in older employees constitutes a cost shock to firms, leading to reduced hiring of younger workers, lower investment, and weaker profitability. Our analysis differs in three aspects. First, rather than focusing on within-firm adjustments in employment and capital expenditure, we adopt an external valuation perspective and study how capital markets price the reform's effect on expected profits at the announcement. Second, whereas Hut (2024) emphasizes heterogeneity related to financial constraints, we relate valuation losses to wage levels and age structures, and examine broader firm characteristics. Third, beyond documenting operating outcomes, we quantify the impact on market value, capturing investors' immediate reassessment of future profits. Taken together, these distinctions render our findings complementary to Hut (2024) and provide a more comprehensive view of delayed retirement's impact both within firms and in capital markets.

A contemporaneous study analyzes Japan's age-dependent employment protection, which mandates continued employment beyond the statutory retirement age, and documents adverse effects on labor costs, profitability, and firm value (Chino, 2025). Our study differs along three dimensions. First, in terms of policy, we examine China's statutory retirement-age increase—a broad delayed-exit reform—rather than age-targeted employment protection. Second, in terms

of mechanism, the Japanese setting operates through mandatory retention, whereas the Chinese reform operates through a shift in the retirement horizon. The Japanese evidence elucidates the consequences of protection-induced retention, whereas our analysis isolates how markets price retirement-age increases per se and traces the heterogeneity of valuation effects by wage levels and age profiles. Third, in Chino (2025), the affected group is selective. The employment protection law only covers older workers who want to continue working, rather than all individuals reaching retirement age. Finally, whereas Chino (2025) studies a 2012 reform episode, our setting leverages China's 2024 announcement, providing more recent evidence on the valuation of retirement-age reforms.

4. Theoretical model

To guide the subsequent empirical analysis, this subsection employs a simple static model to examine how the increase in labor supply of older workers caused by delayed retirement affects firm profits. Under the Efficient Market Hypothesis, investors rationally value equities and fully incorporate all available information into their investment decisions (Fama, 1970). If the hypothesis holds, stock prices will fully reflect firms' intrinsic values. Consequently, a firm's market capitalization can be interpreted as investors' expectation of the net present value of its future profits (Horsky and Swyngedouw, 1987). Therefore, when a delayed-retirement policy is introduced, investors' reactions will hinge on their rational assessment of the policy's impact on expected corporate profits.

For a competitive firm seeking to maximize its own profit, the production function is specified in Cobb-Douglas form as follows:

$$Y = AK^{\alpha}L^{\beta}, \alpha + \beta < 1 \tag{1}$$

where A denotes total factor productivity (TFP), K denotes the capital input in production, and L denotes the quantity of labor employed. Decomposing the workforce into older workers (L_o) and younger workers (L_y), the firm's production function becomes:

$$Y = AK^{\alpha}\left(L_y\right)^{\beta}(\theta L_o)^{\gamma}, \alpha + \beta + \gamma < 1 \tag{2}$$

where θ is the efficiency coefficient capturing the relative productivity change associated with employees' aging. Empirically, $\theta > 0$, yet its precise magnitude is indeterminate. Although medical evidence indicates declines in muscular strength, vision, cardiopulmonary capacity, and other physiological indicators with age, accumulated work experience, work attitudes, and interpersonal skills concurrently increase (Burtless and Moffitt, 1985; Ng and Feldman, 2010, 2013; Börsch-Supan and Weiss, 2016). Consequently, whether θ is larger than 1 (implying productivity rises with age) or lies between 0 and 1 (implying productivity declines with age) remains an open empirical question.

Let w_o and w_y denote the wage rates of older worker L_o and young worker L_y, respectively. According to traditional human-capital theory, wages generally rise with age, hence $w_o > w_y$ (Mincer, 1970, 1997). However, unlike in a perfectly competitive market, wages and productivity are not perfectly aligned over the life cycle. In Lazear's (1979) deferred-compensation model, long-term contracts between firms and workers govern lifetime wage profiles: workers are typically paid below their marginal product when young and compensated with wages above their marginal product when old.[5] Under this arrangement, firms retain older workers until retirement rather than dismiss them or smoothly reduce their wages. Beyond this "soft constraint" generated by deferred compensation, China's institutional setting features upward wage rigidity and employment-protection rules that make separations costly (Ding and Zhou, 2025). Since the 2008 implementation of *the Labor Contract Law of the People's Republic of China*, dismissal costs have risen substantially. [6]Tenure is pivotal in determining statutory entitlements: in OECD countries, severance pay at 20 years' tenure is about seven times that at 9 months (Hut, 2024), whereas under China's formula the multiple is 20. Consequently, dismissing older workers is extremely costly, and firms often have to retain them.

Within this framework, denote marginal products of younger and older labor by mp_y and mp_o. Then wages can be expressed as $w_y = mp_y - \delta_y$ and $w_o = mp_o + \delta_o$ with $\delta_y \geq 0$, $\delta_o \geq 0$ reflecting deferred compensation, so that young workers are paid below and older workers above their contemporaneous marginal products. Let r denote the cost of capital K.

Further, define the degree of exogenous labor increase—i.e., the policy intensity of delayed retirement—as $\tau \geq 0$. The stock of older workers becomes $L_o = (1 + \tau)\bar{L}_o$, where $\bar{L}_o$ is the firm's pre-policy stock of older workers. In practice, τ may differ across firms. For example,

[5] This pattern is supported by empirical findings (Lazear and Moore, 1984; Hutchens, 1987; Kotlikoff and Gokhale, 1992).

[6] Specifically, workers may only be laid off after having been given written notice at a minimum of 30 days prior to the discontinuation of the work contract, employers owe workers a severance pay in the amount of a minimum of one month's wages for each year worked (with service of more than six months but less than a year counted as one year, and service of less than six months compensated at half a month's wages), and they cannot lay off workers on the grounds of certain health issues (job-related disease or injuries, pregnancy, child-care, etc.) or if they had worked for the company for at least 15 consecutive years and are within five years of the statutory retirement age. Besides, severance payments must be given to employees who are dismissed after a fixed-term contract expires in case that employees would be willing to renew the contract. What is more, employers who violate the law are subject to severe punishment.

firms with stronger unions or stricter internal labor-protection norms may retain more older workers. However, such firm-type variation is limited in China, as mentioned above, statutory employment protections and dismissal costs are set nationally and do not meaningfully vary by firm type. In the Chinese institutional context, we argue that an important factor shaping the firm-specific τ is the firm's age structure. The delayed retirement reform in China is implemented gradually on a cohort schedule with fixed cadence. Therefore, workers who are closer to the statutory retirement age at the reform's start face smaller mandated extensions than younger cohorts.[7] This yields predictable, cohort-specific shifts in working life that map mechanically into a firm-level τ determined by workforce age composition.

However, this framework is not specific to China and applies across institutional settings. What differs across countries is how τ is determined. Outside China, τ may be shaped by ownership structure, family control, managerial preferences, the strength of unions, industry characteristics, and related factors. These differences change the value of τ but do not alter the model's comparative statics.

The firm's profit function is then expressed as:

$$\pi = Y - w_y L_y - w_o L_o - rK \tag{3}$$

Given the exogenous older-worker stock $L_o = (1+\tau)\bar{L}_o$, the firm chooses capital K and young labor L_y to maximize profits. Let $(K^*, {L_y}^*)$ denote the optimal choices and define the corresponding value function to be $\Pi(\tau)$. Differentiating $\Pi(\tau)$ with respect to the delayed-retirement intensity τ yields

$$\begin{aligned} \frac{d\Pi}{d\tau} &= \left[\frac{\partial \pi}{\partial L_o}\cdot\frac{dL_o}{d\tau} + \frac{\partial \pi}{\partial L_y}\cdot\frac{dL_y}{d\tau} + \frac{\partial \pi}{\partial K}\cdot\frac{dK}{d\tau} + \frac{\partial \pi}{\partial \tau}\right]_{L_y={L_y}^*, L_o={L_o}^*} \\ &= \left(\frac{\partial Y}{\partial L_o} - w_o\right)\bar{L}_o = \left({mp^*}_o - w_o\right)\bar{L}_o = -\delta_o \bar{L}_o < 0 \end{aligned} \tag{4}$$

[7] The adjustment schedule increases the statutory retirement age in fixed increments: one month every four months for men and for women previously retiring at age 55, and one month every two months for women previously retiring at age 50. For example, a man born in January 1965 faces a one-month extension, a man born in September 1965 faces a three-month extension, and a man born in January 1975 faces an extension of two years and seven months.

Proposition 1: *The exogenous increase in older-worker labor supply induced by the delayed-retirement policy reduces firms' expected profits.*

Economically, this prediction is intuitive. Because of deferred compensation and wage rigidity, many older workers are paid above their marginal product, and firms face legal and institutional constraints that require retention until retirement. The wage–productivity gap therefore becomes a cost burden. Therefore, investors are likely to perceive the policy as a signal of heightened future labor-cost burdens (via extended working lives of older employees), thereby exerting a negative effect on firms' stock market values. In Section 6, we test this prediction by employing the cumulative abnormal stock return obtained from an event-study methodology as the proxy for firms' market value.

From Equation (4) the negative effect on profits becomes larger as the wage of older workers w_o increases. Although w_o may be positively correlated with the marginal product mp^*_o, we include industry fixed effects and measure wages using within-firm average pay, which mitigates productivity-related confounding to some extent, though it may not remove it entirely. At the same time, from the perspective of investors, worker productivity is not directly observable, whereas wage levels provide a more visible signal of firms' potential labor cost burden under delayed retirement. This leads to the following proposition.

Proposition 2: *Firms with higher wages will experience a larger profit decline following the policy shock.*

In the empirical analysis that follows, we document a negative relationship between firms' CARs and both managerial and ordinary-employee wages, thereby providing evidence in support of this proposition.

The reform is gradual and cohort based, so older cohorts face shorter mandated extensions. Firms with older workforces therefore experience a smaller policy-induced increase in the supply of older labor , and thus a milder cost shock. This leads to the final proposition.

Proposition 3: *Firms with an older workforce will experience a smaller decline in profits following the delayed-retirement policy shock.*

Similarly, in the subsequent empirical analysis, we confirm a positive relationship between the average age of management teams (since data on the average age of ordinary employees at the firm level is unavailable) and firm value, which supports this proposition.

5. Data and Empirical Strategy

As discussed in the above section, a firm's stock market value mirrors the market's assessment of how the delayed-retirement policy will affect its expected profits. This subsection therefore employs an event-study methodology to empirically examine the impact of China's delayed-retirement policy on firms' stock market valuations.

5.1 Event Study

If markets are efficient, the difference between the actual and expected stock return around the event date (the abnormal return) constitutes a sufficient measure of the policy's impact on firm value. Following the standard short-term event-study methodology in finance, the abnormal return of firm *i* on trading day *t* is simply defined as:

$$AR = r_{it} - E[r_{it}|X_t] \tag{5}$$

where r_{it} denotes the realized daily stock return and $E[r_{it}|X_t]$ denotes the expected return conditional on the information set X_t.

Numerous studies estimate firm *i*'s sensitivity to the market index using the Capital Asset Pricing Model (CAPM) (i.e., X_t is the market return) and then use the predicted individual return as the expected return $E[r_{it}|X_t]$ (Sam and Zhang, 2020; Cook and Zhang, 2023; Gokkaya et al., 2023). Accordingly, the firm's daily return is expressed as:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \varepsilon_{it} \tag{6}$$

where r_{mt} denotes the return on the market portfolio comprising all stocks on trading day t. After estimating $\hat{\alpha}_i$ and $\hat{\beta}_i$, the abnormal return derived from the CAPM is simply given by:

$$AR_{it} = r_{it} - (\hat{\alpha}_i + \hat{\beta}_i r_{mt}) \tag{7}$$

Unlike the CAPM, which relies solely on market returns to forecast individual stock returns, the Fama and French (1993) three-factor model augments the CAPM with the size factor (SMB) and the value factor (HML). Consequently, a firm's daily return—and the resulting abnormal return—under the three-factor specification is expressed as:

$$r_{it} = \alpha_i + \beta_i r_{mt} + SMB_t + HML_t + \varepsilon_{it} \tag{8}$$

$$AR_{it} = r_{it} - (\hat{\alpha}_i + \hat{\beta}_i r_{mt} + SMB_t + HML_t) \tag{9}$$

However, in short-term event-study designs, failure to control for the book-to-market and momentum factors can induce specification biases (Allen and Wahid, 2024). This study therefore estimates abnormal returns using the Fama–French three-factor model and, in robustness checks, re-estimate them with the CAPM and Fama–French five-factor model to verify that the results are robust to the choice of factor specification. Relative to the three-factor model, the five-factor model proposed by Fama and French (2015) additionally incorporates the profitability factor (RMW) and the investment factor (CMA).

In practice, we designate 13 September 2024, the announcement date of the delayed retirement policy, as the event day. The estimation window comprises the 250 trading days ending 50 trading days before the event, i.e., [−250, −50]. After computing the daily abnormal returns AR_{it} using equations (8) and (9), we calculate each firm's CARs over the event window $[t_1, t_2]$ as:

$$CAR_i[t_1, t_2] = \sum_{t=t_1}^{t_2} AR_{it} \tag{10}$$

where t_1 denotes the first day and t_2 the last day of the event window. $CAR_i[t_1, t_2]$ captures the cumulative abnormal return change experienced by firm i over the interval $[t_1, t_2]$ due to the policy shock.

5.2 Regression Model

Beyond measuring the stock market's response to the delayed-retirement policy, we are particularly interested in whether investors accurately discriminate among firms, conditional on firm-specific characteristics, in estimating expected profits under the policy. Guided by the theoretical discussion above, we rely on the OLS specification presented in equation (11) to examine how firm-level wages and managerial age shape investors' profit expectations.

$$\begin{aligned} CAR_i = \beta_0 + \beta_1 Wage\ Managerial_i + \beta_2 Wage\ Ordinary_i \\ + \beta_3 Age\ Managerial_i + \beta_4 \sum Controls + \sigma_j + \varepsilon_i \end{aligned} \tag{11}$$

In equation (11), CAR_i denotes the cumulative abnormal return for firm i. In the baseline specification, we employ the [0, 5] event window, i.e., $CAR_i[0,5]$, as the primary dependent variable; alternative windows are used for robustness checks. $Wage\ Managerial_i$ and

$Wage\ Ordinary_i$ represent the average 2023 wages of management teams and of ordinary employees in firm i, respectively. Consistent with the theoretical discussion above, we hypothesize that both executive and ordinary wages negatively affect CARs: $\beta_1, \beta_2 < 0$ and $\beta_3 > 0$.

We acknowledge that using managerial age as a proxy for the age structure of the whole workforce has important limitations. First, management team members are typically older than ordinary employees, so this measure is likely to overstate the average age of all workers in the firm. Second, cross firm differences in managerial age may also reflect differences in promotion systems and selection into senior positions, which could affect firm value directly. Since we cannot observe the age distribution of ordinary employees at the firm level, we cannot implement sharper robustness checks based on workforce age. Our main interest, however, is in the relationship between worker age and firm value rather than in precisely measuring the absolute level of the firm's true average age.

[Insert Table 2 here]

Following Sam and Zhang (2020) and Shen et al. (2023), we control for firm size, leverage, book-to-market ratio, return on assets, institutional ownership, earnings per share, and revenue growth. Industry fixed effects at the two-digit SIC level σ_j are also included. Standard errors are clustered at the firm level, and ε_i denotes the residual. Variable definitions are provided in Table 2.

5.3 Sample and Data

Our initial sample consists of all A-share firms listed on the Shanghai and Shenzhen Stock Exchanges in 2023, the year preceding the policy announcement. Some of the firms are not included in our analyses: (1) financial firms are excluded owing to distinct accounting and regulatory standards; (2) firms designated as ST or *ST, reflecting financial distress, are removed; (3) firms domiciled outside Mainland China are dropped to ensure uniform applicability of the delayed-retirement policy. The final sample consists of 4,700 firms. All variables are obtained from the China Stock Market & Accounting Research (CSMAR)

database. To mitigate outlier effects, we winsorize continuous variables at the 1st and 99th percentiles. Table 3 presents the primary descriptive statistics used in our regressions.

[Insert Table 3 here]

6. Empirical Results

This section first documents the overall stock-market reaction following the delayed-retirement policy announcement. Using CARs as the dependent variable, we then show that firms with higher average managerial and ordinary-employee wages and with younger management teams experience larger cost shocks from the policy. Finally, we conduct a series of robustness tests to corroborate these findings.

6.1 Overall Market Reaction

Figure 2 plots the CARs around the announcement of China's delayed-retirement policy, based on our event-study estimates. Consistent with theoretical predictions, the policy announcement exerted a widespread negative impact on equity valuations. The policy was released on 13 September, after which markets closed for the Mid-Autumn holiday until 18 September. This interlude allowed investors to fully reassess the policy's implications for expected profits, and CARs began a sharp decline beginning with the second post-announcement trading day. By the fifth trading day after the announcement, the cumulative effect on market value had reached −1.69%. Following Krüger (2015), the five-day CAR implies a decline in firm value of about RMB 192.57 million, or approximately USD 27.04 million, when evaluated at the mean total market capitalization of sample firms on the trading day prior to the announcement (RMB 11.4 billion × 1.69%). At the same time, there is a modest upward pre-trend in CARs prior to the announcement, implying that our estimates likely understate the true impact of the policy and should be interpreted as a conservative lower bound on its negative effect on firm value.

[Insert Figure 2 here]

To motivate the subsequent empirical analyses, we split the sample at the median of firms' managerial wages, employee wages, and managerial age and plot the corresponding stock-price reactions to the policy announcement in Figures 3 to 5. Figure 3 reveals that the high-managerial-pay group experienced a larger decline in firm value, while the pre-announcement return patterns of the two groups are indistinguishable. This suggests investors anticipated a stronger profit shock for firms with higher managerial wages, as these firms must bear heavier labor-cost burdens under the delayed-retirement policy.

[Insert Figure 3 here]

Figure 4 compares the evolution of CARs around the delayed-retirement announcement between firms with high versus low ordinary employee wages. Although both groups experience value declines after the announcement, the raw split suggests a somewhat larger drop among firms with lower employee pay. We examine this relationship more formally in the next section.

[Insert Figure 4 here]

Figure 5 presents the aggregate market reaction across subsamples stratified by managerial age. Firms whose management teams are older exhibit a markedly smaller post-announcement decline in market value. Consistent with the theoretical discussion, this pattern reflects the phased nature of China's delayed-retirement policy: current cohorts closer to the statutory retirement age face shorter mandatory extensions, thereby imposing lower incremental labor costs on their firms. Consequently, younger managerial teams imply larger anticipated extensions of working life, a larger policy-induced labor-supply increment, and a more pronounced cost shock (Proposition 3).

[Insert Figure 5 here]

6.2 Regression Analysis

Table 4 presents the results of a multiple regression analysis whose dependent variable is estimated with the Fama–French three-factor model over the [0,5] event window. Columns (1)-(3) report the separate effects of managerial wages, ordinary-employee wages, and managerial age on $CAR_i[0,5]$, while column (4) includes all three variables together with the full set of controls.

[Insert Table 4 here]

The results show that both $Wage\ Managerial_i$ and $Wage\ Ordinary_i$ carry negative coefficients. Specifically, the coefficient on managerial wages is statistically significant at the 5% level in both columns (1) and (4). In contrast, the coefficient on ordinary-employee wages

is significant at the 10% level in column (2) but loses statistical significance in column (4). In terms of magnitude, column (4) implies that a 10% rise in managerial wages is associated with a 0.0305% decline in firm value, whereas a 10% rise in ordinary-employee wages is linked to a 0.0214% decline but statistically insignificant. These findings accord with our theoretical predictions and indicate that investors treat both managerial and employee compensation levels as informative signals of the labor-cost shock imposed by the delayed-retirement policy.

Moreover, managerial wages exert both a larger economic effect and greater statistical significance than ordinary-employee wages. This may reflect not only the substantially higher absolute level of managerial pay, which renders investors more sensitive to its incremental cost, but also the perception that firms can more flexibly adjust the employment and remuneration of ordinary employees, thereby mitigating future cost increases. At the same time, firms with higher managerial wages may be perceived by investors as suffering from more severe agency problems. Specifically, high managerial wages can signal weaker internal governance, greater managerial power and more room for rent extraction (Core et al., 1999; Bebchuk and Fried, 2003). Under this interpretation, after the delayed retirement policy is announced, investors may worry that such firms will find it difficult to absorb the expected cost burden through timely and effective internal adjustments and therefore demand a higher risk premium. This would also show up as a stronger negative relationship between managerial wages and CARs.

However, we do not believe that this mechanism can fully explain the stronger impact of managerial wages. First, our regressions already control for institutional ownership and a state owned enterprise indicator, two variables that the literature has treated as important determinants of agency problems and governance quality (Gillan and Starks, 2000; Hartzell and Starks, 2003; Lin et al., 2020). These controls should absorb part of the variation in internal governance. Second, the heterogeneity analysis in Section 7.1 indicates that wage-related valuation losses are attenuated in family firms relative to non-family firms. If higher wages simply proxy for rent extraction or weak governance, the associated valuation penalty should be stronger, not weaker, in family firms, which are often viewed as more susceptible to minority-shareholder expropriation and control-related agency problems (La Porta et al., 1999;

Burkart and Shleifer, 2003). This pattern is therefore difficult to reconcile with a pure governance-based interpretation.

Finally, consistent with the theoretical predictions, the coefficient on managerial age is positive and statistically significant at the 5% level, reflecting that the delayed-retirement policy exerts a smaller (or even negligible) effect on older executives nearing retirement, thereby implying a smaller expected profit loss for their firms.[8]

These regression results provide direct support for the core mechanism highlighted in the theoretical analysis. Because older workers are often paid above their marginal product and firms must retain them for longer under the delayed-retirement reform, investors interpret the policy as an adverse labor-cost shock and revise downward their expectations of future profits. However, the negative relationship between average wages and CARs may capture not only direct wage costs but also higher social-insurance contributions and a greater expected regulatory burden. For example, after the reform investors may anticipate stricter employment protection for older workers and more intensive compliance inspections. Data limitations prevent us from disentangling these channels empirically. Within our theoretical framework, however, they can all be viewed as different manifestations of the same underlying labor-cost shock, which is the central mechanism of interest.

6.3 Robustness Checks

6.3.1 Alternative CARs Measures

First, we verify robustness by re-estimating CARs over alternative event windows. Precisely identifying when the policy reached market participants is essential for causal inference (Henderson, 1990); any pre-announcement leakage would bias our estimates. We therefore

[8] One possible concern is that the effect of managerial age may be nonlinear. In particular, for younger managers, the additional labor cost induced by delayed retirement would be realized further in the future and may therefore be discounted more heavily by the market. To assess this possibility, we augment the specification by including a squared term of log managerial age. The estimates on log managerial age and its squared term are both statistically insignificant, providing no empirical support for this interpretation.

redefine the dependent variable as the CARs over the [−1, 5] window. Column (1) of Table 5 shows that the results remain consistent with the baseline. [9]

[Insert Table 5 here]

Second, we recompute expected normal returns $E[r_{it}|X_t]$ using alternative asset-pricing models. Whereas the baseline employs the Fama–French three-factor model, we now estimate $E[r_{it}|X_t]$via the CAPM and the Fama–French five-factor model (adding the RMW profitability and CMA investment factors). Table 6 indicates that the baseline cross-sectional relationships are broadly robust to alternative asset-pricing models, although the precision of some estimates declines across specifications.

[Insert Table 6 here]

6.3.2 Excluding Contemporaneous Confounding Events

To ensure that our estimates are not driven by concurrent noisy events, we exclude firms experiencing any of the following within two trading days before or after the delayed-retirement announcement: IPOs, periodic reports, seasoned equity offerings, rights issues, convertible-bond issuances, other financings, equity changes or M&As, operating transactions, shareholder meetings, share pledges or freezes, litigation/arbitration, board or supervisory board events, sudden incidents, violations, changes in directors/supervisors/senior officers, donations, and other corporate events. The resulting sample comprises 2,570 firms.

Table 7 reports the results. The negative relation between CARs and managerial wages, and the positive relation between CARs and managerial age, remain robust. Although the coefficient on ordinary-employee wages is no longer statistically significant, its sign remains negative. Overall, these findings indicate that our results are unlikely to be driven by contemporaneous events other than the delayed-retirement policy announcement.

[9] We further examine CARs calculated over shorter windows, namely [0,1], [0,2], [0,3], and [0,4], with results reported in Appendix Table A2. Across these windows, the coefficient on managerial age remains significant and increases monotonically, indicating that the market progressively incorporates the age effect into valuations. By contrast, although the negative coefficients on managerial and ordinary-employee wages also grow in magnitude, they do not become statistically significant until the fifth trading day. This suggests that investors incorporate the age effect relatively quickly, whereas the negative wage effects emerge more gradually and become statistically visible only over longer windows.

[Insert Table 7 here]

Another concern is that the Chinese government may have announced other important policies or information at the same time as the delayed-retirement decision, which could drive the observed decline in firm value. The decision on delayed retirement was adopted at the eleventh session of the Standing Committee of the Fourteenth National People's Congress on 13 September 2024. At this meeting, in addition to the decision on delayed retirement, the legislature also adopted revisions to the National Defense Education Law and the Statistics Law and released a number of items related to foreign affairs and personnel appointments. We see no clear reason why these other legal revisions and announcements would systematically depress the valuations of listed firms or generate the wage- and age-based heterogeneity patterns documented in our analysis. It is therefore unlikely that they drive our main findings.[10]

6.3.3 Alternative Event Date

As shown in Figure 1, the Baidu Search Index for "delayed retirement" began to edge upward before 13 September 2024. This uptick coincided with the 10 September session of the Standing Committee of the National People's Congress, which deliberated but did not formally adopt the State Council's draft decision on gradually raising the statutory retirement age; the final policy details were officially released only on 13 September. To address potential bias arising from an incorrectly specified event day, we replicate the regressions in Table 4 using 10 September as the event date. Table 8 shows that the cross-sectional patterns become much weaker when 10 September is used as the event date. Additionally, appendix Figure A3 also reports no significant abnormal returns or CARs around that date, supporting our choice of 13 September as the event day.

[Insert Table 8 here]

[10] https://english.www.gov.cn/news/202409/13/content_WS66e3fa50c6d0868f4e8eaee1.html

6.3.4 Addressing omitted variable bias

(1) Propensity Score Matching. Although we have controlled for numerous factors that may drive market reactions, omitted variables and self-selection could still generate spurious correlations between firm value and the average wages of management teams, ordinary employees, or managerial age. To further assess whether the results are driven by observable firm characteristics, we employ propensity score matching proposed by Rosenbaum and Rubin (1983) as a robustness check.

[Insert Table 9 here]

Specifically, because the three core explanatory variables are continuous, we create binary indicators equal to one if managerial wages, employee wages, or managerial age exceeds the sample median. For managerial wages, we define $High_Wage_Managerial$, which equals one when managerial pay is above the median. Using this indicator as the treatment variable and the baseline controls as matching covariates, we estimate the propensity scores via a logit model. The resulting propensity scores are used as weights in a weighted least squares replication of equation (11). We repeat this procedure for employee wages and managerial age. The post-matching results are broadly consistent with those in Table 4.

(2) Alternative Fixed Effects. Although propensity score matching can substantially mitigate concerns about omitted variables, firms with high wages or older workforces may still differ in unobserved city-level dimensions such as local innovation intensity or employment protection policy. To further address this concern, Table 10 reports regressions that add city fixed effects, which absorb any time-invariant unobserved heterogeneity at the city level. The wage coefficients continue to be negative, although the estimate for managerial wages becomes less precise in the fully controlled specification, while the coefficient on ordinary-employee wages remains negative and statistically significant. Hence, the city-fixed-effects results leave the main pattern of the baseline results intact.

[Insert Table 10 here]

6.4 Alternative channels and interpretation

In the above analysis, we attribute the decline in firm value to the increase in labor costs induced by the announcement of delayed-retirement policy. We acknowledge, however, that other mechanisms and alternative explanations may also play a role. In this subsection we discuss these possibilities.

6.4.1 "Disappointment" Interpretation

An alternative explanation is that markets anticipated a strongly pro-firm reform and the announcement disappointed, leading to negative overall market returns. We argue that this interpretation is not supported in our setting. On the one hand, in section 2.2 we show that the reform was unlikely to have been anticipated, so the observed valuation changes are unlikely to reflect pre-priced pro-firm expectations. On the other hand, our cross-sectional regressions are more consistent with the cost channel than with a weaker-than-expected mechanism. We find that firms with higher wage levels experience larger valuation declines, while firms with an older management team experience smaller declines. Under a pure disappointment story, it is difficult to explain why exactly these firms would have been viewed ex ante as the primary beneficiaries.

Moreover, as discussed in section 2, compared with earlier delayed-retirement reforms, the current reform in China is relatively ambitious rather than modest. It is therefore unlikely that investors expected a much stronger pro-firm package and then perceived the actual announcement as a disappointment. Overall, we view the disappointment channel as an implausible main explanation for the decline in firm value.

6.4.2 Investor Sentiment[11]

A further possible mechanism is that the decline in firm value following the announcement of the delayed-retirement reform reflects changes in investor sentiment rather than a rational reassessment of expected profits. For example, some investors may interpret the reform as a

[11] Baker and Wurgler (2006) define investor sentiment as "uninformed, speculative demand that varies across firms due to subjective valuations and limits to arbitrage."

signal of more severe population aging (demographic pessimism) or as an indication of weaker fiscal conditions and lower long-run growth prospects. Others may see the reform as a sign of greater policy uncertainty going forward. Any of these interpretations could raise the required rate of return on Chinese equities and depress stock prices even if expected cash flows and profits were unchanged.

From a conceptual perspective, however, we regard this sentiment channel as unlikely to be the dominant mechanism. As section 2 describes, debates on population aging and the need to raise retirement ages have featured prominently in official documents and public discussions for many years, so the market has long been aware of China's demographic and pension challenges. The announcement mainly disclosed the detailed schedule and implementation path of the reform rather than revealing aging or fiscal pressure for the first time. It is therefore difficult to argue that the announcement triggered a fundamental reassessment of China's long-run macroeconomic prospects.

Empirically, although we cannot cleanly decompose the observed CARs into a "rational cash-flow component" and a "sentiment component", we can test whether firms that are more sensitive to shifts in investor sentiment experience larger valuation losses. Baker and Wurgler (2006) show that investor sentiment has stronger effects on securities whose valuations are highly subjective and difficult to arbitrage, such as small stocks, young stocks, high-volatility stocks, unprofitable stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks. Guided by this framework, we use the CSMAR database to construct the following sentiment-exposure variables based on firms' characteristics prior to the reform: the log of free-float market capitalization in 2023, the log of firm age, an indicator for high-volatility firms (return volatility above the sample mean, estimated from daily log returns over the 250 trading days before 13 September 2024), an indicator for negative net profit in 2023, an indicator for whether the firm paid any cash dividends between 1 January 2024 and the event date, and the book-to-market ratio and its square. We then regress CARs on these sentiment-exposure proxies together with standard controls. The results are reported in Table 11. If the investor-sentiment mechanism were the main driver of the valuation losses, we would expect more negative CARs

for firms that are smaller and younger, more volatile, loss-making, non-dividend-paying and located in the extreme tails of the book-to-market distribution.

[Insert Table 11 here]

The regression results run counter to the predictions of a sentiment-driven explanation. High-volatility and loss-making firms, which are typically regarded as most sensitive to sentiment, do not experience larger valuation declines. The loss dummy is positively related to CARs, which implies that unprofitable firms, if anything, suffer smaller valuation losses, inconsistent with a sentiment-based mechanism. Dividend-paying firms show more negative CARs than non-payers, whereas a sentiment channel would predict stronger reactions among non-dividend-paying firms. Free-float market capitalization is either unrelated to or positively associated with CARs, in contrast to Baker and Wurgler's (2006) emphasis on small stocks as more sentiment-driven. Institutional ownership is not significantly related to CARs, again opposite to the idea that stocks with low institutional ownership are more sentiment-sensitive. Finally, although book-to-market enters the regression in quadratic form, the estimated relationship is insignificant, which is the opposite of the U-shaped pattern documented by Baker and Wurgler (2006).

Only firm age enters with a positive coefficient that could be read as weakly consistent with a sentiment channel. This pattern is also consistent with our cost mechanism. Older firms are more likely to employ older workers, for whom the incremental extension of working life is smaller under the gradual implementation schedule, so the effective cost shock from the reform is attenuated.

Taken together, these results suggest that while we cannot completely rule out that an investor-sentiment mechanism played some role, the sentiment channel is unlikely to be the first-order driver of the observed valuation losses.

7. Heterogeneity Analysis

Building on the established relationships between managerial wages, employee wages, managerial age, and cumulative abnormal returns, this section conducts heterogeneity analyses to identify firm characteristics that amplify these effects on firm value. Specifically, we examine whether the impact of the delayed-retirement announcement on firm value differs systematically (i) between family and non-family firms, (ii) between high-tech and non-high-tech firms, and (iii) across firm sizes. First, family versus non-family firms capture differences in ownership concentration and corporate governance: family firms typically have more concentrated control rights and greater scope for internal coordination, which may affect their ability to absorb a given cost shock at a given wage and age structure.[12] Second, high-tech versus non-high-tech firms reflect differences in technology intensity and labor intensity, so that the labor-cost shock from delayed retirement may have different implications across sectors. Finally, larger versus smaller firms capture differences in financing constraints and scale economies: larger firms generally have better access to external finance and more flexible internal organization, which may provide greater scope to buffer the same wage and age shock.

[Insert Table 12 here]

7.1 Family firms vs non-family firms

Family firms are widespread in China and have significantly contributed to the country's rapid economic growth. Unlike those in developed countries, which have existed for over a century, Chinese family firms have emerged only since the 1980s. Most have been managed by their founders since inception, and these founders are now approaching retirement age (Chen et al., 2021). Hence, distinguishing the effects of delayed retirement on family versus non-family firms is crucial. In this study, family firms are identified using the Chinese Family Firm Research Database (CFFD), which defines a family firm as one meeting three criteria: (1) the ultimate controller is a natural person or a family linked by blood or marriage; (2) this person or family is directly or indirectly the largest shareholder of the listed firm; and (3) at least two or more family members hold shares or positions in the listed or affiliated firms.

[12] We do not further examine heterogeneity between state-owned and non-state-owned firms, because in China most non-state-owned firms are family firms.

We interact a family-firm dummy with managerial wages, ordinary-employee wages, and managerial age, and include these interaction terms in the regression. Column (1) of Table 12 shows that the family-firm dummy carries a negative and statistically significant coefficient, indicating that family firms, on average, experience a larger decline in firm value following the delayed-retirement announcement. Once we account for these interaction terms, the negative association between wages and firm value is stronger in non-family firms than in family firms. The interaction term involving ordinary-employee wages is larger in magnitude and statistically significant, while the interaction term involving managerial wages is positive but estimated less precisely. This difference likely reflects divergent corporate-governance structures. Compared with non-family firms, family firms typically exhibit more concentrated ownership and control (Berle and Means, 1932), which may facilitate internal coordination and organizational adjustments to anticipated labor-cost pressures, particularly those related to rank-and-file employees. As a result, investors appear to perceive wage-related cost shocks as less value-detrimental in family firms, thereby attenuating the negative valuation impact associated with higher compensation levels.

Moreover, the coefficient on managerial age is more positive in family firms, although the interaction term is not statistically significant. On one hand, this reflects the greater stability of executive teams in family firms; on the other hand, founders in family firms typically pass control to designated heirs or other family members upon retirement (Burkart et al., 2003; Cao et al., 2015). Consequently, the current managerial age structure serves as a more reliable predictor of future age composition in these firms.[13]

[13] It is noteworthy that the vast majority of private enterprises in China are family firms (Xu et al., 2024), implying that the observed heterogeneity may also stem from differences in ownership type. On the one hand, personnel decisions in state-owned enterprises are often made by central or local governments, so adjustments in response to the delayed-retirement policy are not necessarily aligned with profit-maximization objectives (Bai and Xu, 2005; Chang and Wong, 2009), leading to a larger impact of compensation levels on firm value. On the other hand, because managerial appointments in SOEs are primarily government-determined, managerial age conveys a weaker signal.

7.2 High-tech vs non-high-tech industries

Further, to reveal cross-industry variation in the social costs imposed by the delayed-retirement policy, we examine whether the effects of managerial and ordinary-employee wages and of managerial age on firm value differ significantly between high-tech and non-high-tech firms. Following the National Bureau of Statistics' "Classification of High-Technology Industries (Manufacturing), 2017," we classify firms operating in pharmaceutical manufacturing; aircraft, spacecraft, and related equipment; electronic and communication equipment; computers and office equipment; medical devices and measuring instruments; and information chemicals as high-technology industries. We then interact a high-tech dummy with managerial wages, ordinary-employee wages, and managerial age and include these terms in the regression; the results are reported in column (2) of Table 12.

Regarding managerial characteristics, the regression shows that the effect of managerial wages on firm value does not differ significantly between high-tech and non-high-tech firms. The interaction term is negative, and its magnitude is more than an order of magnitude smaller than the corresponding interaction for ordinary-employee wages, which suggests that investors view the incremental cost burden associated with managerial pay under delayed retirement as relatively universal across industries. By contrast, the positive effect of managerial age is amplified in non-high-tech firms. High-tech firms face fiercer technological competition and must pursue continuous innovation for survival (Schilling and Hill, 1998); hence investors demand higher managerial expertise and impose extra penalties for age-related cognitive decline and reduced adaptability to new technologies (Salthouse, 2019), partially offsetting the buffering effect of shorter delayed-retirement durations in older cohorts.

Finally, the negative effect of ordinary-employee wages on firm value is significantly larger in non-high-tech industry firms. This aligns with the capital- and technology-intensive nature of high-tech sectors. Relative to high-tech firms, non-high-tech firms exhibit higher labor intensity and allocate substantial resources not only to wages but also to employee training and developmental infrastructure (Mbanyele et al., 2024). Consequently, the delayed-retirement policy imposes greater cost pressure on non-high-tech industries, where labor costs already

account for a larger share of total expenses and where investments in workforce management and development are substantial.

7.3 Heterogeneity by firm size

Smaller firms, lacking collateral and credit history, typically face more severe financing constraints—commonly termed “scale discrimination” (Berger and Udell, 2006; Beck et al., 2011; Cull et al., 2015). This phenomenon is particularly pronounced in China’s relatively underdeveloped financial markets, where a highly concentrated banking system dominated by large state-owned banks is inherently ill-suited to serving small and medium-sized enterprises (Shi et al., 2023). Consequently, smaller firms possess weaker capacity to alleviate cost shocks through external financing.

Column (3) of Table 12 shows that firm size is negatively associated with CARs on average, suggesting that larger firms experience a greater drop in firm value following the delayed-retirement announcement. This is consistent with the notion that larger firms employ more workers and are therefore exposed to a larger absolute labor-cost shock. Turning to the interaction terms, we find that the negative impact of managerial wages on firm value is attenuated in larger firms, which is consistent with a scale-related buffering effect. At the same time, the positive association between managerial age and firm value becomes stronger among larger firms. By contrast, the interaction involving ordinary-employee wages is small in magnitude, negative, and statistically insignificant, indicating that the valuation effect of employee wages does not differ meaningfully across firm sizes. Overall, these results suggest that investors are particularly concerned about managerial-wage-related cost pressures for small and medium-sized firms, whereas they do not impose additional size-contingent penalties for high ordinary-employee wages. One plausible explanation is that rank-and-file labor costs can be adjusted more flexibly through internal reallocation and workforce management regardless of firm size, while managerial compensation is more rigid and therefore more likely to be cushioned in large firms through better financing capacity and more diversified operations.

8. Conclusion

With declining birth rates and rising life expectancy, China is rapidly aging, experiencing a shrinking working-age population and mounting pressure on its public pension system. Since the retirement rules established in the 1950s have remained essentially unchanged, they have become markedly out of step with current demographic and economic realities. After more than a decade of deliberation, China announced on 13 September 2024 that the statutory retirement age will be progressively raised beginning 1 January 2025. Although the policy aims to enhance the sustainability of the public social-security system and expand labor supply, it is likely to generate a series of unintended economic consequences for firms.

Using an event-study methodology, this paper analyzes the impact of China's delayed retirement policy announcement on firms' stock market value. Empirical results show, first, that stock market value, measured by cumulative abnormal returns (CARs), declined after the announcement, reaching −1.69 % by the fifth trading day. This corresponds to an average loss of roughly RMB 192.57 million (USD 27.04 million) per firm. Second, firms with higher average managerial and ordinary-employee wages experienced larger CARs declines, indicating that investors expect these firms to incur greater future labor costs and face higher profit reduction risk.

Additionally, managerial age is positively and significantly associated with CARs, likely because China's progressive delay policy imposes shorter retirement extensions on older individuals, thereby reducing firms' incremental costs. Robustness checks using alternative CARs calculations, exclusion of contemporaneous events, alternative event days, and propensity-score matching all yield consistent results.

Further heterogeneity analyses reveal the following. First, partitioning on family ownership shows that the negative effects of managerial and ordinary-employee wages are larger in non-family firms, whereas the positive effect of managerial age is amplified in family firms. Second, classifying firms by high-tech status indicates that firm value declines are more sensitive to ordinary-employee wages in non-high-tech industries, while managerial wages exert no

significant effect; moreover, the positive impact of managerial age is also stronger in non-high-tech firms. Finally, size-based tests demonstrate that as firm size increases, the negative influence of managerial wages weakens and the positive influence of managerial age strengthens.

From a policy perspective, these patterns suggest that future reforms which raise statutory retirement ages should treat corporate spillovers as heterogeneous rather than uniform and pay particular attention to those types of firms that exhibit the largest stock-market losses in our data. Instead of a one-size-fits-all implementation, policymakers may need to combine a common reform path with carefully designed transition arrangements or complementary measures targeted at more exposed firms, while applying more standard schemes to firms that appear less affected. Since our evidence is based on listed firms, these policy implications should be regarded as indicative rather than prescriptive, but they highlight that delayed-retirement reforms can redistribute costs across different segments of the corporate sector.

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Figures

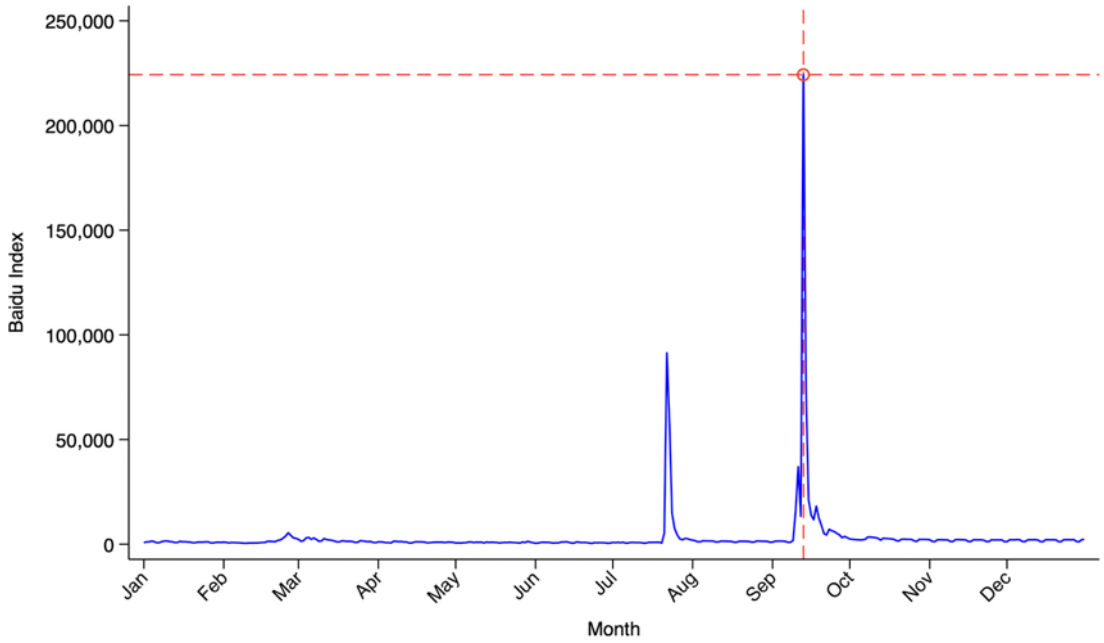


Figure 1 Baidu Search Index for delayed retirement

Note: Figure 1 presents 2024 daily Baidu Search Index (analogous to Google Trends) for the keyword "延迟退休" (delayed retirement).

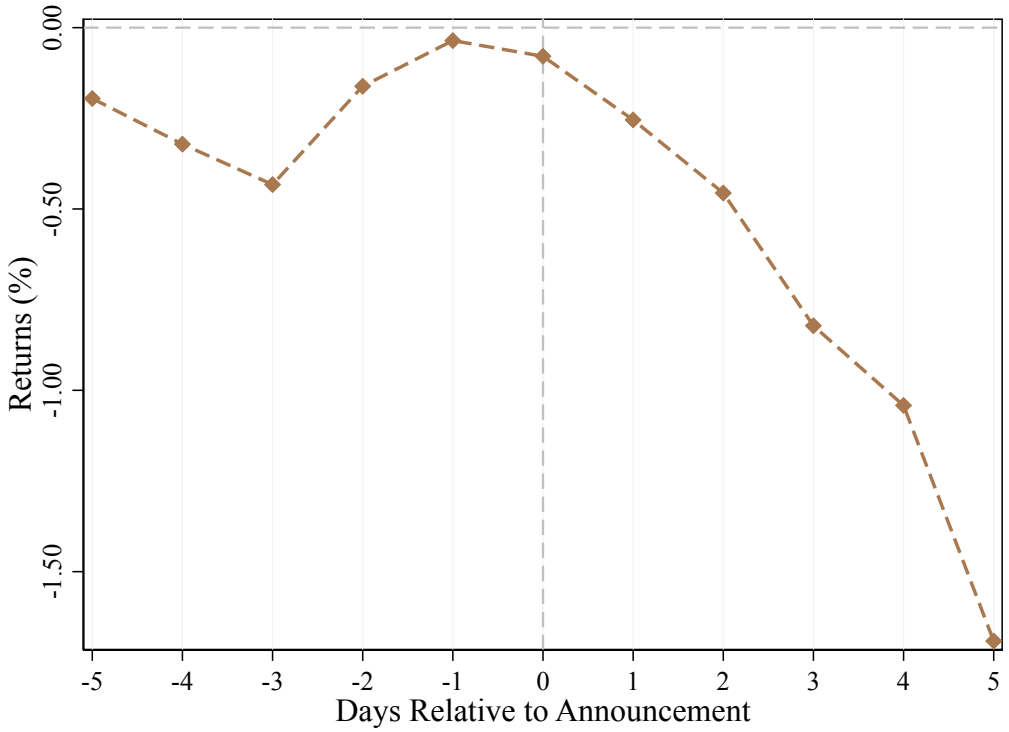


Figure 2 Overall market reaction

Note: Figure 2 presents the overall market reaction as cumulative abnormal returns around the announcement of China's delayed-retirement policy.

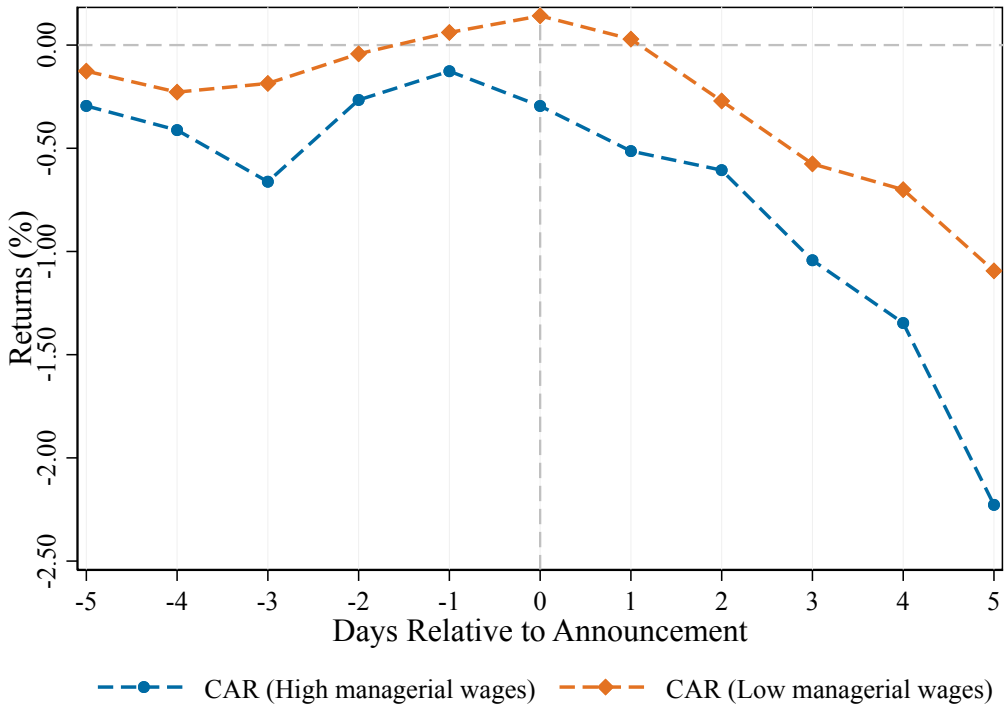


Figure 3 Overall market reaction (high vs low managerial wage firms)

Note: Figure 3 presents the overall market reaction as cumulative abnormal returns around the announcement of China's delayed-retirement policy, comparing firms with high versus low managerial wages.

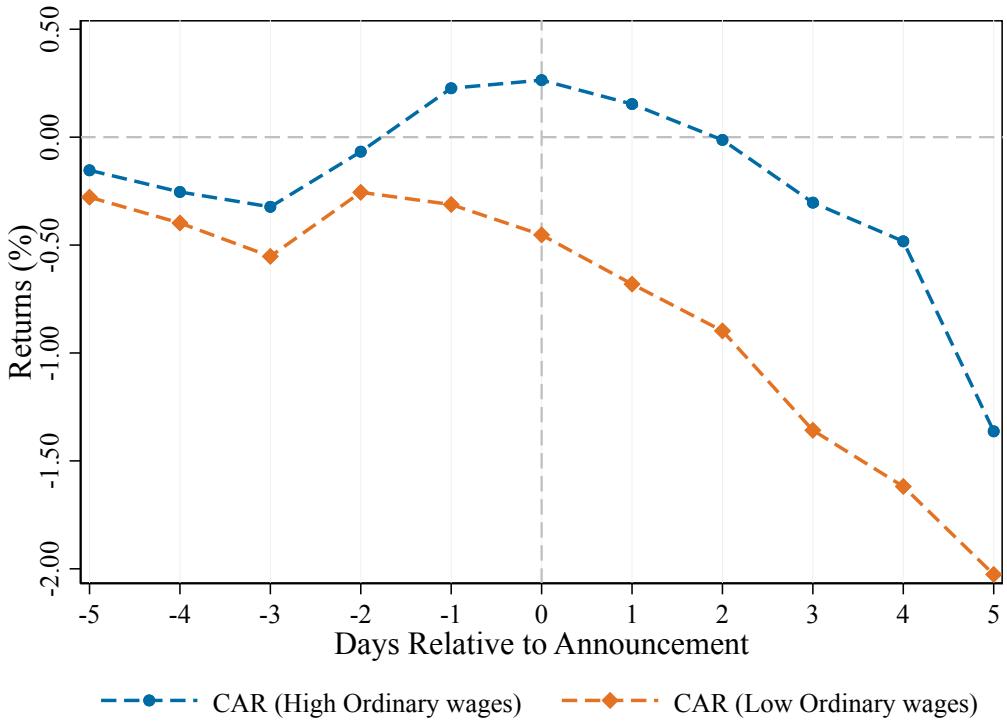


Figure 4 Overall market reaction (high vs low ordinary employee wage firms)

Note: Figure 4 presents the overall market reaction as cumulative abnormal returns around the announcement of China's delayed-retirement policy, comparing firms with high versus low ordinary employee wages.

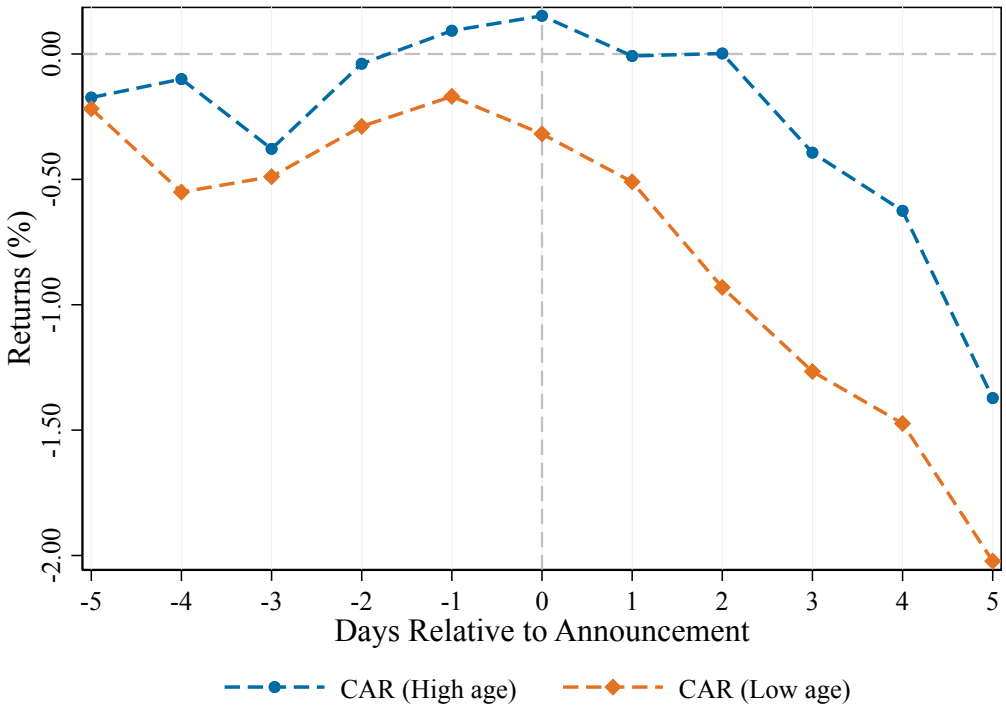


Figure 5 Overall market reaction (high vs low managerial age firms)

Note: Figure 5 presents the overall market reaction as cumulative abnormal returns around the announcement of China's delayed-retirement policy, comparing firms with high versus low managerial age.

Tables

Table 1 Selected retirement-age reforms across countries

Country	Implementation period	Age change	Pace of increase
United States	Legislated in 1983; phased in by birth cohort	65 to 67	About 2 months per affected birth cohort year
United Kingdom	2010–2028	Women: 60 to 65; then men and women: 65 to 67	Phased increases: women 60 to 65 in 2010–2018; then men and women 65 to 66 in 2018–2020 and 66 to 67 in 2026–2028
Germany	2012–2031	65 to 67	About 1 month initially, then 2 months per cohort year
France	Phased in for cohorts born after August 1961	62 to 64	3-month steps by birth cohort

Notes: Table 1 summarizes selected retirement-age reforms in the United States, the United Kingdom, Germany, and France. U.S. information is from the Social Security Administration. U.K. information is from the U.K. government and the House of Commons Library. German information is from BMAS and Deutsche Rentenversicherung. French information is from official government sources and SSA International Update.

Table 2 Definition of variables

Variable	Definition
Panel A. Variable used in event study	
r_{it}	The daily stock return rate: Measured using the daily stock return rate with cash dividends reinvested.
r_{mt}	The market risk premium factor: Measured using the difference between the daily market return (calculated using the float-adjusted market capitalization weighting method) with cash dividends reinvested and the daily risk-free rate (derived from the central bank's published three-month time deposit benchmark rate).
SMB_t	The size factor: Measured using the difference in returns between a portfolio of small-cap stocks and a portfolio of large-cap stocks. The portfolios are constructed based on the Fama-French 2x3 portfolio sorting methodology. The daily portfolio returns are calculated using float-adjusted market capitalization weighting.
HML_t	The value factor: Measured using the difference in returns between a portfolio of high book-to-market ratio stocks and a portfolio of low book-to-market ratio stocks. The portfolios are constructed based on the Fama-French 2x3 portfolio sorting methodology. The portfolio returns are calculated using float-adjusted market capitalization weighting.
Panel B. Variable used in regression model	
CAR_i	Cumulative abnormal return around event date using Fama-French 3 factor model.
$Wage\ Managerial_i$	The average wage of management teams: Measured using dividing the total annual wages of directors, supervisors, and senior executives by the size of the management teams. Here, the size of the management teams is calculated as the sum of the number of directors, senior executives, and supervisors, minus the number of independent directors and those directors, supervisors, or senior executives who did not receive compensation, and then taking the natural logarithm of this result.
$Wage\ Ordinary_i$	The average wage of ordinary employees: Measured by taking the natural logarithm of the following ratio: (Current year's employee compensation payable - Previous year's employee compensation payable + "Cash paid to and on behalf of employees" from the cash flow statement - Total annual compensation of directors, supervisors, and senior executives) divided by the number of non-management employees.
$Age\ Managerial_i$	The average age of management teams: Measured by taking the natural logarithm of its value.
$Firm\ Size_i$	Total assets, taking the natural logarithm.
$Leverage_i$	The ratio of total liabilities to total assets.
BM_i	The ratio of the book value of equity to the market value of equity.
ROA_i	The ratio of net income to total average assets.
EPS_i	Earnings per share.
$Instown_i$	The percentage of total shares held by institutional investors.
$Growth_i$	Revenue growth rate.
SOE_i	A dummy variable indicating the nature of the firm's ownership, coded as 1 for state-owned enterprises and 0 for non-state-owned enterprises.

Notes: Table 2 presents the notation and definitions of the main variables used in this paper.

Table 3 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
$CAR_i[0,5]$	4,674	-0.017	0.046	-0.151	0.14
$Wage\ Managerial_i$	4,649	13.199	0.562	11.946	14.908
$Wage\ Ordinary_i$	4,655	12.053	0.432	11.152	13.239
$Age\ Managerial_i$	4,678	3.911	0.065	3.75	4.056
$Firm\ Size_i$	4,678	22.375	1.269	20.273	26.457
$Leverage_i$	4,678	0.398	0.203	0.049	0.886
BM_i	4,655	0.654	0.247	0.156	1.258
ROA_i	4,678	0.027	0.058	-0.197	0.169
EPS_i	4,678	0.477	0.933	-1.994	4.859
$Growth_i$	4,661	0.216	0.627	-0.662	3.902
$Instown_i$	4,678	0.419	0.249	0.012	0.926
SOE_i	4,678	0.273	0.446	0	1

Notes: Table 3 presents the number of observations, mean, standard deviation, minimum, and maximum of the main variables in our sample. $CAR_i[0,5]$ is estimated using an event-study approach, and all other variables are obtained from the CSMAR database.

Table 4 Regression estimates of CARs

	(1)	(2)	(3)	(4)
$Dep.Var$	$CAR_i[0,5]$			
$Wage\ Managerial_i$	-0.00347**			-0.00305**
	(0.001)			(0.001)
$Wage\ Ordinary_i$		-0.00336*		-0.00214
		(0.002)		(0.002)
$Age\ Managerial_i$			0.0276***	0.0268**
			(0.010)	(0.010)
$Firm\ Size_i$	-0.00221**	-0.00273***	-0.00365***	-0.00249***
	(0.001)	(0.001)	(0.001)	(0.001)
$Leverage_i$	0.0102**	0.00959**	0.0106**	0.00948**
	(0.005)	(0.005)	(0.005)	(0.005)
BM_i	-0.00529	-0.00550	-0.00417	-0.00572
	(0.004)	(0.004)	(0.004)	(0.004)
ROA_i	-0.0988***	-0.102***	-0.102***	-0.105***
	(0.020)	(0.020)	(0.020)	(0.020)
EPS_i	0.00103	0.000797	0.00113	0.00126
	(0.001)	(0.001)	(0.001)	(0.001)
$Growth_i$	0.000519	0.000703	0.000667	0.000655
	(0.001)	(0.001)	(0.001)	(0.001)
$Instown_i$	-0.00171	-0.00189	-0.00248	-0.00174
	(0.003)	(0.003)	(0.003)	(0.003)
SOE_i	0.0110***	0.0121***	0.0112***	0.0109***
	(0.002)	(0.002)	(0.002)	(0.002)
$Constant$	0.0781***	0.0848***	-0.0441	0.000351
	(0.019)	(0.023)	(0.041)	(0.045)
$Industry\ FE$	Yes	Yes	Yes	Yes
N	4612	4618	4641	4612
$Adj.R^2$	0.150	0.150	0.148	0.151

Notes: Table 4 reports the OLS estimates from the regression model of Eq. (11). Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Table 5 Robustness checks−alternative event window

	(1)	(2)	(3)	(4)
$Dep.Var$:	$CAR_i[-1,5]$			
$Wage\ Managerial_i$	-0.00406***			-0.00371**
	(0.001)			(0.002)
$Wage\ Ordinary_i$		-0.00326[a]		-0.00179
		(0.002)		(0.002)
$Age\ Managerial_i$			0.0257**	0.0241**
			(0.012)	(0.012)
$Firm\ Size_i$	-0.0000529	-0.000753	-0.00165*	-0.000310
	(0.001)	(0.001)	(0.001)	(0.001)
$Leverage_i$	0.00879*	0.00840	0.00912*	0.00817
	(0.005)	(0.005)	(0.005)	(0.005)
BM_i	-0.00826**	-0.00818**	-0.00660*	-0.00861**
	(0.004)	(0.004)	(0.004)	(0.004)
ROA_i	-0.130***	-0.133***	-0.132***	-0.135***
	(0.021)	(0.021)	(0.021)	(0.021)
EPS_i	0.000417	0.000140	0.000454	0.000624
	(0.001)	(0.001)	(0.001)	(0.001)
$Growth_i$	0.00173	0.00191	0.00191	0.00185
	(0.001)	(0.001)	(0.001)	(0.001)
$Instown_i$	-0.00462	-0.00498	-0.00548*	-0.00466
	(0.003)	(0.003)	(0.003)	(0.003)
SOE_i	0.0142***	0.0154***	0.0147***	0.0141***
	(0.002)	(0.002)	(0.002)	(0.002)
$Constant$	0.0425**	0.0440*	-0.0769*	-0.0286
	(0.021)	(0.026)	(0.045)	(0.050)
$Industry\ FE$	Yes	Yes	Yes	Yes
N	4612	4618	4641	4612
$Adj.R^2$	0.158	0.157	0.155	0.158

Notes: Table 5 reports regression results using alternative event windows. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01, [a]p<0.15.

Table 6 Robustness checks−alternative asset-pricing models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Dep.Var{:}CAR_i[0,5]$	CAPM				Fama-French five-factor model			
$Wage\ Managerial_i$	-0.00291**			-0.00250*	-0.00264**			-0.00186
	(0.001)			(0.001)	(0.001)			(0.001)
$Wage\ Ordinary_i$		-0.00353*		-0.00241		-0.00448**		-0.00369**
		(0.002)		(0.002)		(0.002)		(0.002)
$Age\ Managerial_i$			0.0510***	0.0510***			0.0198*	0.0194*
			(0.011)	(0.011)			(0.010)	(0.010)
$Firm\ Size_i$	0.0112***	0.0108***	0.00962***	0.0105***	-0.00321***	-0.00340***	-0.00422***	-0.00330***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Leverage_i$	0.00289	0.00202	0.00382	0.00211	0.0135***	0.0121***	0.0143***	0.0121***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
BM_i	-0.0144***	-0.0148***	-0.0133***	-0.0147***	0.00103	0.000271	0.00190	0.000182
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
ROA_i	0.00973	0.00615	0.00214	-0.000706	-0.0383**	-0.0430**	-0.0412**	-0.0453**
	(0.020)	(0.020)	(0.021)	(0.021)	(0.019)	(0.019)	(0.019)	(0.019)
EPS_i	0.00183	0.00165	0.00205	0.00229*	0.00263**	0.00249**	0.00261**	0.00280**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Growth_i$	0.00128	0.00146	0.00143	0.00149	0.000158	0.000369	0.000236	0.000356
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Instown_i$	0.00329	0.00329	0.00210	0.00300	0.00310	0.00327	0.00228	0.00331
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
SOE_i	0.0188***	0.0198***	0.0187***	0.0184***	0.00611***	0.00716***	0.00641***	0.00641***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$Constant$	-0.271***	-0.258***	-0.475***	-0.432***	0.0833***	0.108***	-0.00686	0.0447
	(0.019)	(0.024)	(0.042)	(0.046)	(0.018)	(0.023)	(0.040)	(0.044)
$Industry\ FE$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4612	4618	4618	4612	4612	4618	4618	4612
$Adj.R^2$	0.299	0.299	0.302	0.303	0.0824	0.0830	0.0824	0.0836

Notes: Table 6 reports regression results using alternative asset-pricing models. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Table 7 Robustness checks−excluding contemporaneous confounding events

	(1)	(2)	(3)	(4)
$Dep.Var$	$CAR_i[0,5]$			
$Wage\ Managerial_i$	-0.00390**			-0.00379**
	(0.002)			(0.002)
$Wage\ Ordinary_i$		-0.00195		-0.000482
		(0.002)		(0.003)
$Age\ Managerial_i$			0.0427***	0.0422***
			(0.014)	(0.014)
$Firm\ Size_i$	-0.00200*	-0.00282**	-0.00371***	-0.00262**
	(0.001)	(0.001)	(0.001)	(0.001)
$Leverage_i$	0.0144**	0.0142**	0.0152***	0.0144**
	(0.006)	(0.006)	(0.006)	(0.006)
BM_i	-0.00685	-0.00642	-0.00564	-0.00689
	(0.005)	(0.005)	(0.005)	(0.005)
ROA_i	-0.102***	-0.103***	-0.108***	-0.108***
	(0.026)	(0.026)	(0.026)	(0.026)
EPS_i	0.00212	0.00181	0.00223	0.00256
	(0.002)	(0.002)	(0.002)	(0.002)
$Growth_i$	-0.000106	-0.00000718	0.00000852	0.00000599
	(0.001)	(0.001)	(0.001)	(0.001)
$Instown_i$	-0.00622	-0.00652*	-0.00726*	-0.00663*
	(0.004)	(0.004)	(0.004)	(0.004)
SOE_i	0.00959***	0.0105***	0.00958***	0.00899***
	(0.002)	(0.002)	(0.002)	(0.002)
$Constant$	0.0816***	0.0719**	-0.0992*	-0.0651
	(0.025)	(0.031)	(0.054)	(0.060)
$Industry\ FE$	Yes	Yes	Yes	Yes
N	2534	2539	2539	2534
$Adj.R^2$	0.166	0.164	0.167	0.168

Notes: Table 7 reports regression results excluding contemporaneous confounding events. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Table 8 Robustness checks−alternative event date

	(1)	(2)	(3)	(4)
$Dep.Var$		$CAR_i[0,5]$		
$Wage\ Managerial_i$	-0.00000190			-0.000656
	(0.001)			(0.001)
$Wage\ Ordinary_i$		0.00252		0.00279
		(0.002)		(0.002)
$Age\ Managerial_i$			0.0163	0.0166*
			(0.010)	(0.010)
$Firm\ Size_i$	0.00166*	0.00140*	0.00144*	0.00127
	(0.001)	(0.001)	(0.001)	(0.001)
$Leverage_i$	0.00674	0.00780*	0.00672	0.00786*
	(0.004)	(0.004)	(0.004)	(0.004)
BM_i	-0.0101***	-0.00930***	-0.0100***	-0.00930***
	(0.003)	(0.004)	(0.003)	(0.004)
ROA_i	-0.0521***	-0.0491***	-0.0542***	-0.0517***
	(0.019)	(0.019)	(0.019)	(0.019)
EPS_i	0.00122	0.00117	0.00134	0.00138
	(0.001)	(0.001)	(0.001)	(0.001)
$Growth_i$	0.00311***	0.00302***	0.00314***	0.00303***
	(0.001)	(0.001)	(0.001)	(0.001)
$Instown_i$	-0.00595**	-0.00635**	-0.00610**	-0.00648**
	(0.003)	(0.003)	(0.003)	(0.003)
SOE_i	0.0161***	0.0159***	0.0160***	0.0155***
	(0.002)	(0.002)	(0.002)	(0.002)
$Constant$	-0.0359**	-0.0611***	-0.0945**	-0.118***
	(0.018)	(0.023)	(0.038)	(0.043)
$Industry\ FE$	Yes	Yes	Yes	Yes
N	4610	4616	4616	4610
$Adj.R^2$	0.138	0.139	0.139	0.139

Notes: Table 8 reports regression results using alternative event date. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Table 9 Robustness checks−propensity score matching

	(1)	(2)	(3)
$Dep.Var$		$CAR_i[0,5]$	
$Wage\ Managerial_i$	-0.00272*		
	(0.002)		
$Wage\ Ordinary_i$		-0.00459**	
		(0.002)	
$Age\ Managerial_i$			0.0381***
			(0.011)
$Firm\ Size_i$	-0.00134	-0.00230**	-0.00435***
	(0.001)	(0.001)	(0.001)
$Leverage_i$	0.00893	0.00952	0.0132***
	(0.005)	(0.006)	(0.005)
BM_i	-0.000341	-0.00476	-0.00367
	(0.004)	(0.005)	(0.004)
ROA_i	-0.0563*	-0.108***	-0.101***
	(0.031)	(0.022)	(0.020)
EPS_i	-0.00131	0.00224	0.00186
	(0.002)	(0.001)	(0.001)
$Growth_i$	-0.000826	0.00321*	0.000956
	(0.001)	(0.002)	(0.001)
$Instown_i$	-0.00233	-0.00206	-0.00271
	(0.004)	(0.004)	(0.003)
SOE_i	0.00741***	0.0120***	0.00889***
	(0.002)	(0.002)	(0.002)
$Constant$	0.0467**	0.0894***	-0.0704
	(0.021)	(0.027)	(0.043)
$Industry\ FE$	Yes	Yes	Yes
N	4609	4589	4584
$Adj.R^2$	0.163	0.164	0.162

Notes: Table 9 reports regression results using propensity score matching. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Table 10 Robustness checks−regressions with city fixed effects

	(1)	(2)
$Dep.Var$	$CAR_i[0,5]$	
$Wage\ Managerial_i$	-0.00697***	-0.00207
	(0.001)	(0.002)
$Wage\ Ordinary_i$	-0.00152	-0.00363*
	(0.002)	(0.002)
$Age\ Managerial_i$	0.0240**	0.0244**
	(0.011)	(0.011)
$Firm\ Size_i$		-0.00241**
		(0.001)
$Leverage_i$		0.00851*
		(0.005)
BM_i		-0.00662*
		(0.004)
ROA_i		-0.100***
		(0.021)
EPS_i		0.000980
		(0.001)
$Growth_i$		0.000864
		(0.001)
$Instown_i$		-0.00216
		(0.003)
SOE_i		0.0106***
		(0.002)
$Constant$	-0.000199	0.0139
	(0.047)	(0.049)
$Controls$	No	Yes
$Industry\ FE$	Yes	Yes
$City\ FE$	Yes	Yes
N	4645	4612
$Adj.R^2$	0.136	0.157

Notes: Table 10 reports regression results using city fixed effects. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Table 11 Test for investor sentiment channel

	(1)	(2)
$Dep.Var$	$CAR_i[0,5]$	
$High\ volatility$	-0.00154	-0.00176
	(0.002)	(0.002)
$Is\ loss_i$	0.00734***	0.00599**
	(0.002)	(0.003)
$Is\ dividends_i$	-0.0126***	-0.0107***
	(0.002)	(0.002)
$log(Market\ capitalization)$	-0.00276***	0.00165
	(0.001)	(0.002)
$Firm\ age_i$	0.0140***	0.0105***
	(0.002)	(0.002)
$Instown_i$	0.00384	0.000790
	(0.003)	(0.003)
BM_i	-0.0302**	-0.0105
	(0.014)	(0.016)
BM_i^2	0.0188*	0.0135
	(0.010)	(0.010)
$Constant$	0.00147	0.0595***
	(0.015)	(0.023)
$Controls$	No	Yes
$Industry\ FE$	Yes	Yes
N	4651	4638
$Adj.R^2$	0.157	0.162

Notes: Table 11 reports regression results regressing CARs on sentiment-exposure proxies. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Table 12 Heterogeneity analysis

	(1)	(2)	(3)
$Dep.Var$		$CAR_i[0,5]$	
$Wage\ Managerial_i \times Family_i$	0.00292		
	(0.003)		
$Wage\ Ordinary_i \times Family_i$	0.00785**		
	(0.004)		
$Age\ Managerial_i \times Family_i$	0.0278		
	(0.020)		
$Wage\ Managerial_i \times High_tech_i$		-0.000173	
		(0.003)	
$Wage\ Ordinary_i \times High_tech_i$		0.00979**	
		(0.004)	
$Age\ Managerial_i \times High_tech_i$		-0.0414*	
		(0.021)	
$Wage\ Managerial_i \times Firm\ Size_i$			0.00408***
			(0.001)
$Wage\ Ordinary_i \times Firm\ Size_i$			-0.00143
			(0.001)
$Age\ Managerial_i \times Firm\ Size_i$			0.0165**
			(0.008)
$Wage\ Managerial_i$	-0.00455***	-0.00309*	-0.0968***
	(0.002)	(0.002)	(0.019)
$Wage\ Ordinary_i$	-0.00503**	-0.00539**	0.0269
	(0.002)	(0.002)	(0.028)
$Age\ Managerial_i$	0.0148	0.0396***	-0.340*
	(0.014)	(0.013)	(0.181)
$Family_i$	-0.244***		
	(0.089)		
$Firm\ Size_i$	-0.00231**	-0.00248***	-0.105***
	(0.001)	(0.001)	(0.032)
$Leverage_i$	0.00841*	0.0101**	0.0120***
	(0.005)	(0.005)	(0.004)
BM_i	-0.00484	-0.00569	-0.000138
	(0.004)	(0.004)	(0.004)
ROA_i	-0.105***	-0.102***	-0.0875***
	(0.020)	(0.020)	(0.021)
EPS_i	0.00141	0.00117	0.000897
	(0.001)	(0.001)	(0.001)
$Growth_i$	0.000644	0.000508	-0.000353
	(0.001)	(0.001)	(0.001)
$Instown_i$	-0.00182	-0.00185	0.00193
	(0.003)	(0.003)	(0.003)
SOE_i	0.00975***	0.0111***	0.0109***
	(0.002)	(0.002)	(0.002)
$Constant$	0.0993*	0.00284	2.337***
	(0.059)	(0.045)	(0.712)
$Industry\ FE$	Yes	Yes	Yes
N	4612	4612	4612
$Adj.R^2$	0.153	0.153	0.100

Notes: Table 12 reports results from heterogeneity analyses. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.

Appendix

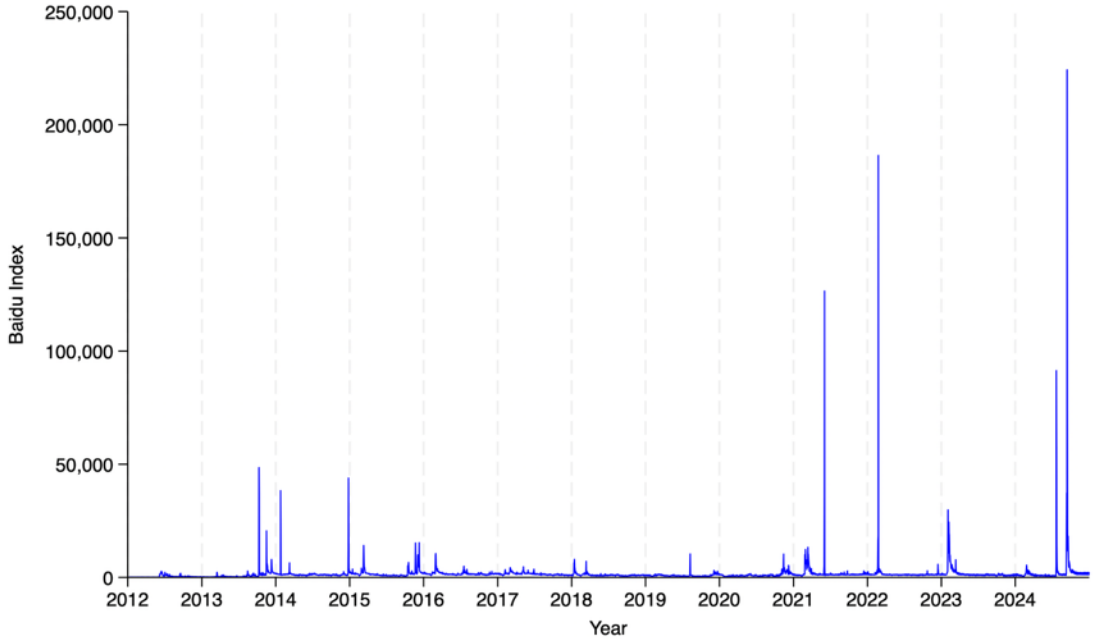


Figure A1 2012-2024 Baidu Search Index for delayed retirement

Note: Figure A1 presents the 2012-2024 Baidu Search Index (analogous to Google Trends) for the keyword “延迟退休” (delayed retirement).

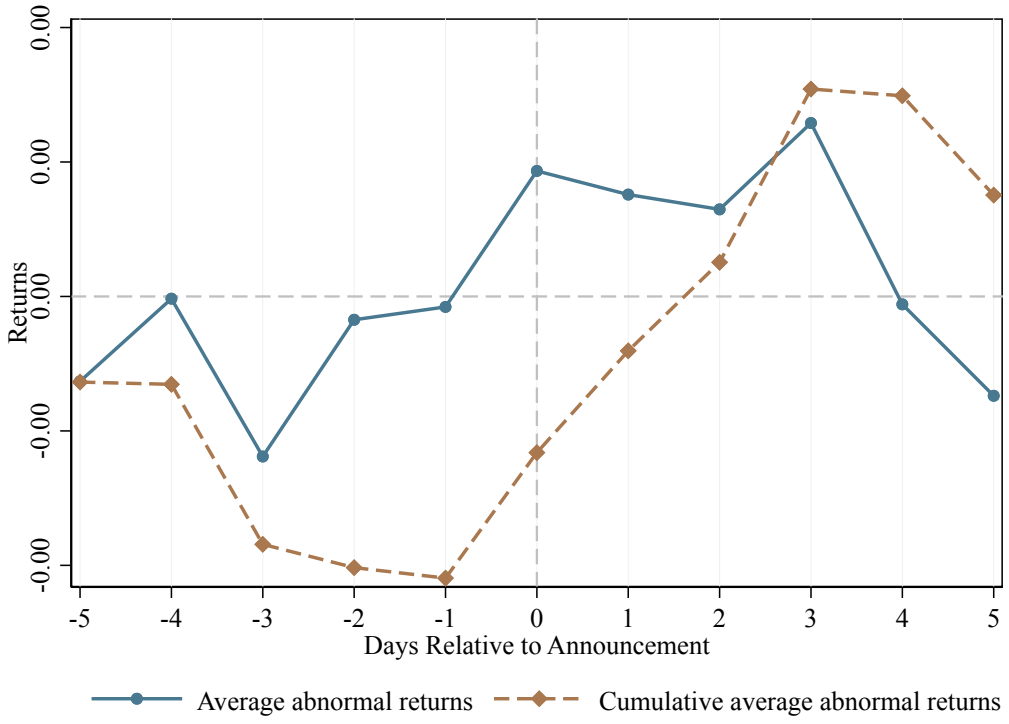


Figure A2 Overall market reaction with June 21 as the event date

Note: Figure A2 presents the overall market reaction, measured by average abnormal returns and cumulative average abnormal returns, using June 21 as the event date.

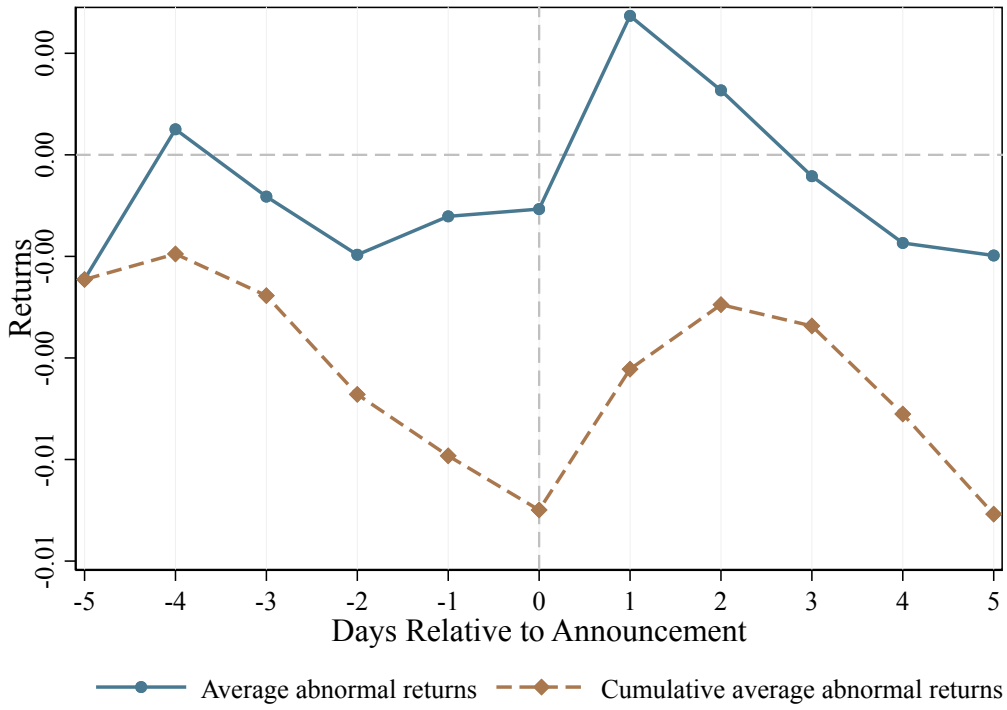


Figure A3 Overall market reaction with September 10 as the event date

Note: Figure A3 presents the overall market reaction, measured by average abnormal returns and cumulative average abnormal returns, using September 10 as the event date.

Table A1 Summary of studies on the economic consequences of delayed-retirement reforms

Author	Country / Reform	Journal	Identification	Summary of Findings
Chino (2025)	Japan; 2012 reform strengthening employment protection for older workers beyond age 60	*Journal of Corporate Finance*	Event study + DID	Firms with higher exposure to the reform experienced lower abnormal stock returns around the announcement of the reform and subsequent declines in Tobin's Q. Labor costs and average wages rose after the reform, but worker productivity did not improve. Patent applications also declined, suggesting weaker innovation. The negative effects were more pronounced among firms closer to financial distress or with lower growth potential.
Rabaté et al. (2024)	Netherlands; statutory retirement age increases, 2012–2019	*American Economic Journal: Economic Policy*	RD	Raising the statutory retirement age substantially reduced retirement and increased continued employment. Between the old and the new retirement age, the employment rate rose by 21.2 percentage points, while participation in social insurance increased by 22 percentage points, especially through disability insurance.
Hut (2024)	Netherlands; 2005 reform restricting early retirement for cohorts born in 1950 or after	*Journal of Human Resources*	RD+ Generalized DID	The reform increased the retention of older workers. For each additional retained older worker, firms employed about 0.6 fewer younger workers and reduced investment in machines and equipment. Negative effects on profitability were concentrated among low-free-cash-flow firms, while additional time to anticipate the reform mitigated these adverse effects.
Deshpande et al. (2024)	United States; 1983 Social Security Amendments raising the full retirement age from 65 to 67	*Review of Economics and Statistics*	Cohort analysis + RD	Increases in the full retirement age substantially shift benefit-claiming behavior, but retirement behavior remains sticky at the old full retirement age of 65. A two-month increase in the FRA raises claiming age by about 0.84 months and increases claiming at the new FRA by 12 percentage points, yet has no detectable effect on labor supply around ages 65 and 66. The paper provides suggestive evidence that employers help mediate this retirement stickiness.
Etgeton et al. (2023)	Germany; 1999 reform raising women's early retirement age from 60 to 63	*Journal of Public Economics*	RD-DD	The reform reduced private savings by about 0.6 percentage points, driven mainly by households with married women. Treated households increased leisure spending while disposable income remained unchanged, suggesting that they anticipated higher lifetime income from prolonged employment and adjusted savings downward to smooth consumption.
Geyer and Welteke (2021)	Germany; 1999 reform raising women's early retirement age from 60 to 63	*Journal of Human Resources*	RD	The reform increased employment among eligible women aged 60–62 by 13.5 percentage points. It also raised unemployment and inactivity, but mainly through passive substitution, as affected women remained longer in their previous labor market status rather than actively switching out of employment. Disability pension receipt changed little overall, although there is some evidence of a small increase in disability entry. The effects were stronger in eastern Germany.

Lindeboom and Montizaan (2020)	Netherlands; 2006 public-sector pension reform reducing pension wealth for workers born in 1950 or later	*Journal of Public Economics*	RD	The reform substantially shifted retirement expectations and actual retirement. Affected workers expected to work about 10.5 months longer, and actual retirement age increased by about 1.2 years. Participation in the tax-facilitated savings plan more than doubled among the treated, but most workers, especially lower-wage ones, mainly compensated for the pension loss by postponing retirement rather than by increasing private savings. High-wage workers were more likely to offset the reform through additional savings.
Oguzoglu et al. (2020)	Australia; 1993 reform raising women's age pension eligibility age from 60 to 65	*Economic Record*	DID	Increasing the female pension eligibility age reduced welfare receipt by 12.6 percentage points on average across affected ages, while raising alternative welfare receipt by 39.3 percentage points. However, about 90% of this substitution was mechanical rather than active. Spillover effects on partners were small, and the reform reduced monthly welfare expenditure by about 18% on average.
Rabaté and Rochut (2020)	France; 2010 reform raising the statutory eligibility age from 60 to 61	*Journal of Pension Economics & Finance*	DID	The reform increased employment by about 21 percentage points, but also generated strong substitution into unemployment, disability, sickness, and inactivity. Employment gains accounted for only about 40% of the decline in retirement, with the remainder reflecting crowding out toward other public insurance schemes, especially unemployment. Effects were strongest for individuals still employed at the eligibility age and much weaker for those already out of the labor force.
Rabaté (2019)	France; 2003 reform raising the mandatory retirement age from 60 to 65	*Journal of Public Economics*	DID+DDD	Mandatory retirement significantly increases labor-force exit among older workers. Workers in firms where mandatory retirement remained possible were about 10% more likely to exit employment. The effect was concentrated among workers eligible for a full-rate pension, stronger for high earners, workers with steeper wage profiles, and those in good health. The paper also estimates that mandatory retirement explains about 12% of the observed bunching in retirement at the full-rate age.
Bertoni, Brunello, and Mazzarella (2018)	Italy; 2004 pension reform raising the minimum retirement age	*Journal of Health Economics*	DID	A one-year increase in the potential working horizon increased regular exercise by 3.2 percentage points, reduced obesity, and improved self-reported health satisfaction among middle-aged Italian men. The reform had little effect on drinking and nutritional habits, suggesting that better health before retirement operated mainly through more exercise rather than dietary changes.
Cribb et al. (2016)	United Kingdom; 1995 reform raising women's early retirement age from 60 to 65	*Labour Economics*	DID	Raising the early retirement age from 60 to 62 increased women's employment at ages 60–61 by 6.3 percentage points. The reform also raised unemployment by 1.2 percentage points and inactivity due to sickness or disability by 4.0 percentage points, while sharply reducing self-reported retirement. The authors argue that the response is too large to be explained by wealth effects, credit constraints, or

				marginal financial incentives alone, and emphasize the role of the retirement age as a signal of the appropriate age to retire.
Atalay and Barrett (2015)	Australia; 1993 reform raising women's age pension eligibility age from 60 to 65	*Review of Economics and Statistics*	DID	A one-year increase in the pension eligibility age reduced the probability of retirement by about 12 to 19 percentage points. The reform also induced substantial program substitution, especially into disability support pension, implying that the reduction in public expenditure was much smaller than the mechanical reduction in pension liabilities.
Staubli and Zweimüller (2013)	Austria; early-retirement-age reforms, 2000 and 2003	*Journal of Public Economics*	DID	The reform delayed retirement and increased employment, but also raised unemployment through spillovers; disability effects were limited, and net fiscal savings were substantial.
Grip and Montizaan (2012)	Netherlands; 2006 public-sector pension reform reducing pension wealth for workers born in 1950 or later	*The Economic Journal*	RD	The reform had a strong negative effect on mental health before actual retirement. Two years after the reform, depression rates among the affected 1950 cohort were about 2.8 percentage points higher, roughly 40% above those of the 1949 cohort. The effects persisted over time, were stronger for workers facing larger income losses and for married men whose partner had no pension income.
Behaghel and Blau (2012)	United States; 1983 Social Security reform, focusing on the increase in the full retirement age from 65 to 66	*American Economic Journal: Economic Policy*	Cohort analysis + DID	The increase in the full retirement age caused the spike in benefit claiming at age 65 to move almost one-for-one with the new FRA. Effects on labor force exit and self-reported retirement were weaker but generally pointed in the same direction. The paper interprets the evidence as consistent with behavioral responses to the framing of the FRA, with stronger responses among individuals with higher cognitive ability.

Notes: Table A1 summarizes studies on the economic consequences of delayed-retirement reforms.

Table A2 Robustness checks−alternative event windows

	(1)	(2)	(3)	(4)
$Dep.Var$:	$CAR_i[0,1]$	$CAR_i[0,2]$	$CAR_i[0,3]$	$CAR_i[0,4]$
$Wage\ Managerial_i$	-0.000952	-0.000695	-0.000861	-0.00171
	(0.001)	(0.001)	(0.001)	(0.001)
$Wage\ Ordinary_i$	0.00203*	0.000645	-0.000960	-0.00193
	(0.001)	(0.001)	(0.002)	(0.002)
$Age\ Managerial_i$	0.0258***	0.0273***	0.0355***	0.0431***
	(0.006)	(0.007)	(0.009)	(0.010)
$Firm\ Size_i$	-0.00312***	0.000647	0.0000771	-0.000667
	(0.001)	(0.001)	(0.001)	(0.001)
$Leverage_i$	0.00554**	0.00560*	0.0101***	0.0115***
	(0.003)	(0.003)	(0.004)	(0.004)
BM_i	-0.00471**	-0.00960***	-0.00848***	-0.00746**
	(0.002)	(0.002)	(0.003)	(0.003)
ROA_i	-0.0221*	-0.00451	-0.0183	-0.0449**
	(0.012)	(0.012)	(0.015)	(0.019)
EPS_i	-0.0000961	-0.00104	-0.000665	-0.00147
	(0.001)	(0.001)	(0.001)	(0.001)
$Growth_i$	0.00167**	0.00121	0.00189**	0.00164
	(0.001)	(0.001)	(0.001)	(0.001)
$Instown_i$	-0.000138	-0.000684	-0.00681***	-0.0106***
	(0.002)	(0.002)	(0.002)	(0.003)
SOE_i	0.00993***	0.0125***	0.0161***	0.0184***
	(0.001)	(0.001)	(0.001)	(0.002)
$Constant$	-0.0464*	-0.123***	-0.125***	-0.117***
	(0.027)	(0.028)	(0.037)	(0.042)
$Industry\ FE$	Yes	Yes	Yes	Yes
N	4611	4611	4610	4611
$Adj.R^2$	0.112	0.153	0.182	0.184

Notes: Table A2 reports regression results using alternative event windows. Standard errors clustered at the firm level are reported in parentheses.*p < 0.1, **p < 0.05, ***p < 0.01.