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Research article

The impact of accounting conservatism on enterprise innovation investment

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ABSTRACT

This study investigates the influence of accounting conservatism on corporate innovation investment through the lens of information asymmetry theory. While existing literature acknowledges the importance of accounting conservatism in corporate decision-making, there remains a gap in understanding how it specifically affects innovation investment, particularly in varied market environments and regulatory contexts. Specifically, current research often overlooks the heterogeneity of the impact of accounting conservatism on innovation investment under different market environments and regulatory frameworks. Additionally, there is a lack of specialized studies on the unique group of Chinese listed companies. This study fills this gap by empirically analyzing data from Chinese A-share listed companies, revealing a negative correlation between accounting conservatism and corporate innovation investment. Through empirical analysis of the financial reports and research and development (R&D) investment data of Chinese A-share listed companies from 2015 to 2022, this study finds a significant negative correlation between accounting conservatism and corporate innovation investment. Specifically, as accounting conservatism increases, corporate investment in R&D shows a decreasing trend, with a correlation coefficient of −0.364. This result is further validated by hierarchical regression analysis, where the regression coefficient is −0.465, indicating that accounting conservatism has a significant inhibitory effect on corporate innovation investment. This study is pioneering in its examination of the relationship between accounting conservatism and corporate innovation investment within the unique market environment of China, taking into account its distinctive characteristics and rapidly evolving technological industry background. To quantify accounting conservatism, the research employs the C-Score and G-Score models, while employing a range of indicators to measure corporate innovation investment, including proportions of R&D expenditure, number of new products or services, patent applications, total R&D personnel, capital investments, and progress in innovation projects. This comprehensive evaluation method enhances the accuracy and reliability of the study. The contribution of this study is significant as it offers a fresh perspective on how accounting conservatism influences corporate innovation investment. By providing empirical data support, it assists investors and corporate managers in making informed financial decisions and shaping innovation strategies. Through hierarchical regression analysis, the study substantiates the detrimental impact of accounting conservatism on corporate innovation investment, thereby establishing new theoretical and practical foundations for further research and application in related fields.

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1. Introduction

As the global economy evolves and market competition intensifies, innovation has become a pivotal driver of corporate development in pursuit of sustainable competitive advantages [1]. Companies must continuously iterate and enhance products and services to meet the dynamic market demands. Consequently, investment in innovation not only represents a strategic choice but also fulfills an essential requirement to adapt to market changes. Against this backdrop, a company's research and development (R&D) investment serves a crucial indicator of its innovation capability and future growth potential [2,3]. However, enterprises encounter diverse considerations when making decisions, encompassing accounting conservatism, a conservative characteristic reflected in financial reporting [4]. Accounting conservatism in financial reports aims to provide more reliable financial information for investors; however, it may also exert a negative impact on enterprise innovation investment. Excessive accounting conservatism implies that companies tend to adopt conservative valuation methods in financial reporting to address future uncertainties and risks. This conservative approach can render companies more prudent in financial decision-making, thereby potentially limiting investment in innovation [5,6]. Companies must continually iterate and enhance their products and services to meet ever-changing market demands. Therefore, investment in innovation is not only a strategic choice but also a necessary requirement to adapt to market changes. In this context, a company's R&D investment becomes a crucial indicator of its innovation capability and future growth potential. However, in the decision-making process, companies must consider multiple factors, including accounting conservatism, a cautious characteristic reflected in financial reporting. Accounting conservatism aims to provide investors with more reliable financial information in financial reports. However, it may also have a negative impact on corporate innovation investment. Excessive accounting conservatism means that companies tend to employ conservative valuation methods in financial reporting to address future uncertainties and risks. This conservative approach can make companies more cautious in financial decision-making, thereby constraining investment in innovation.

While the critical role of financial reporting in corporate decision-making is widely acknowledged, previous research has predominantly focused on its relationship with investors and creditors, often neglecting its association with enterprise innovation investment [7]. Specifically, regarding the financial characteristic of accounting conservatism, scholars have not yet reached a consensus on its mechanism and impact on corporate innovation activities [8]. This reflects an early stage in understanding how corporate financial reporting influences decision-making in R&D for innovation. There remains a notable gap in the literature concerning the diverse impacts of accounting conservatism on R&D investment across diverse types of enterprises. In the context of Chinese listed companies, unique market environments and regulatory frameworks further complicate the understanding of how accounting conservatism affects enterprise innovation investment. In China's dynamic and evolving market, enterprises face intensifying international competition, pressures for innovation-driven growth, and challenges related to accounting regulation reforms. This necessitates a deeper exploration of how accounting conservatism shapes decision-making regarding innovation investment in this specific context. Moreover, variations in operational strategies, financial decision-making, and market adaptability among different enterprise types (such as private and state-owned enterprises) may lead to significant differences in the impact of accounting conservatism on innovation investment [9].

In summary, current research on accounting conservatism and corporate innovation investment has several limitations. First, there is a lack of extensive empirical studies spanning different countries and industries. Second, most studies concentrate on single variables or local factors, overlooking other potential influencing factors. Third, few studies delve into the mechanisms through which accounting conservatism affects corporate innovation investment, with many remaining at the theoretical level.

Consequently, the current research lacks thorough and careful analysis of the relationship between accounting conservatism and enterprise innovation investment in the unique environment of listed companies in China. This study aims to fill this research gap by empirically analyzing data from Chinese A-share listed companies to explore the relationship between accounting conservatism and corporate innovation investment. The objective is to provide deeper insights for business managers and investors, offering specific data support to facilitate more scientifically effective financial decision-making and innovation strategies. This study examines 2354 listed companies in China's A-share scientific and technological innovation investment as subjects to explore the impact of accounting conservatism on enterprise innovation investment. It aims provide more accurate guidance for enterprise managers and decision-makers, promoting scientifically sound financial decision-making and formulation of innovation strategies. This study contributes to the field by addressing the aforementioned research gap through empirical data analysis. It quantifies accounting conservatism using financial reports and R&D investment data from Chinese A-share listed companies spanning 2015 to 2022, utilizing the C-Score and G-Score models. The study employs hierarchical regression analysis to validate the impact of accounting conservatism on corporate innovation investment, incorporating multiple control variables to enhance result reliability. The findings demonstrate a significant negative correlation between higher levels of accounting conservatism and corporate innovation investment. Thus, this study provides empirical data to support business managers and investors in making more scientifically grounded financial decisions and developing innovation strategies. It enriches existing literature and expands the research perspective on the relationship between accounting conservatism and corporate innovation investment.

2. Literature review and research hypothesis

2.1. Accounting conservatism and enterprise innovation investment

In studies exploring the determinants of innovation investment within enterprises, Xu et al. (2021) discussed the interaction among

government subsidies, R&D input, and innovation performance in listed pharmaceutical companies in China. Their findings underscored that government R&D subsidies could stimulate enterprise R&D investment. Particularly within private enterprises, a positive correlation was identified between government R&D subsidies and R&D input [10]. Shao et al. (2020) argued that the influence of environmental regulations on enterprise innovation was intricately linked to enterprise competitiveness and the regional economies' sustainable development, though existing studies did not converge on a consistent viewpoint [11]. Somwethee et al. (2023) explored the influence of entrepreneurial and innovative capabilities on sustainable organizational performance, revealing that entrepreneurial capability significantly fostered sustainable organizational performance and innovative ability [12]. Safitri et al. (2020) studied the relationship among R&D investment, ecological efficiency, and environmental investment, and enterprise value in manufacturing, plantation, and mining companies listed on the Indonesia Stock Exchange. Their research unveiled a significant positive correlation between R&D investment and both ecological efficiency and enterprise value [13]. Zheng et al. (2021) investigated the impact of high-tech enterprise identification, institutional environment, and R&D investment on regional innovation performance [14]. Their findings illustrated that the identification of these enterprises predominantly had a positive impact on R&D investment. Additionally, the institutional environment exhibited a positive moderating effect on the relationship between R&D investment and a negative moderating effect on the relationship between the tax burden and innovation. Zhu et al. (2020), utilizing multiple regression analysis, found that government subsidies and actor investments could promote performance. However, government subsidies exhibited a crowding-out effect on innovation investment [15]. Li et al. (2023) examined the relationship between artificial intelligence (AI) and enterprise innovation efficiency. The research results demonstrated that the application of AI remarkably enhanced the innovation efficiency of enterprises [16]. Yu et al. (2022) posited that factors such as the enterprises' region, scale, technology level and amount of R&D investment were the influencing factors of their R&D investment [17]. Dai et al. (2022) suggested that the development of the digital economy contributed to increased investment in R&D funds and R&D personnel [18].

In previous studies examining the correlation between accounting conservatism and enterprise innovation investment, several findings have emerged. For instance, Pasko et al. (2021) identified a significant positive association between the independence and size of the board of directors and accounting conservatism in Chinese information technology enterprises [19]. Zhong et al. (2020) suggested a substantial inverted U-shaped relationship between customer concentration and enterprises' sustainable innovation. They observed that during periods of high economic policy uncertainty, leveraging customer relationships could maximize benefits, with increased customer concentration notably facilitating sustainable innovation [20]. Shen et al. (2022) investigated accounting conservatism's influence on R&D manipulation. The results denoted that accounting conservatism effectively restrained R&D manipulation, while internal controls and tax enforcement could weak this effect [21]. Laux et al. (2020) proposed that accounting conservatism could promote innovation. According to their innovation model, managers initially invest costly efforts to develop viable innovations and then decide whether to implement them based on private information about their probability of success [22]. Noh et al. (2023) believed that the strategic use of virtual assets and risk investments was positively correlated with accounting conservatism. This correlation arises from the desire to deter entrants (competitive adjustment) and accommodated stakeholders' risk adjustments within the financial reporting system [23]. Kim et al. (2019) explored the influence mechanism of accounting conservatism on target price deviation. They held that analysts' earnings forecasts were negatively correlated with accounting conservatism [24]. Ma et al. (2022) studied the differential impact of accounting conservatism on investment decisions between public and private companies. Their analysis showed that accounting conservatism could inhibit inefficient investments [25]. Chiou et al. (2020) examined whether managers' investment efficiency and accounting conservatism affected specific risks perceived by investors. Their empirical results indicated that accounting conservatism improved information quality and reduced managers' investment efficiency [26].

Recent studies have introduced new perspectives on the relationship between accounting conservatism and corporate innovation investment. For instance, Lestari et al. (2024) explored how accounting conservatism influences firms' risk-taking behavior and consequently affects innovation investment [27]. Their findings suggest that in certain cases, accounting conservatism may cause firms to prioritize short-term financial stability, leading to reduced investments in long-term innovation projects. Additionally, Guermazi et al. (2023), through cross-national comparative analysis, identified that differences in national accounting standards may moderate the relationship between accounting conservatism and innovation. They indicated that under more stringent accounting standards, firms might decrease innovation activities due to conservative financial reporting practices [28]. Conversely, some studies present evidence contradicting the mainstream view that accounting conservatism inhibits innovation. For example, Lin et al. (2024) found that in highly uncertain market environments, accounting conservatism could mitigate information asymmetry among external investors, enhance their confidence in firms' future cash flows, and thereby facilitate firms in obtaining more external financing to support innovation activities [29]. Xu (2024), through case studies, highlighted that accounting conservatism may prompt management to focus more on internal risk management in certain scenarios. This approach ensures financial prudence while effectively allocating resources to support innovation projects [30].

Existing studies have explored various aspects of the determinants of corporate innovation investment and the impact of accounting conservatism, yet they often exhibit certain limitations and gaps, providing a basis for extending and deepening the scope of this study. When examining the determinants of corporate innovation investment, Xu et al. (2021) and Zhu et al. (2020) discussed the effects of government subsidies on firms' R&D investment and innovation performance. While they found that government subsidies have incentivizing effects, they also highlighted potential crowding-out effects. However, their studies primarily focused on specific industries, such as the pharmaceutical sector, without encompassing a broad range of firm types and longitudinal data. Additionally, Shao et al. (2020) and Zheng et al. (2021) revealed the influence of environmental regulations and high-tech enterprise certification on corporate innovation. Yet, these studies often overlooked other potentially significant factors such as internal governance structures and external financing environments. In the realm of research on the relationship between accounting conservatism and corporate

innovation investment, Pasko et al. (2021), Shen et al. (2022), and Laux et al. (2020) respectively explored the roles of board independence, the constraining effect of accounting conservatism on R&D manipulation, and theoretical models suggesting conservatism promotes innovation. While these studies offer valuable insights, most remain theoretical and lack extensive empirical data support. Particularly, Laux et al. (2020) heavily relied on constructing theoretical models to address asymmetric information issues managers face in innovation decisions, which partly motivates the use of information asymmetry theory as a foundational aspect of this study. Furthermore, Noh et al. (2023) and Kim et al. (2019) focused on the association between virtual assets, target price deviation, and accounting conservatism, while Ma et al. (2022) and Chiou et al. (2020) examined the impact of accounting conservatism on investment efficiency in public and private enterprises. Although these studies explored various aspects of the impact of accounting conservatism, they primarily concentrated on investment efficiency and risk management, failing to comprehensively cover its specific effects on corporate innovation investment.

In summary, existing research has made significant contributions to exploring the factors influencing enterprise innovation investment. However, these studies still exhibit notable limitations. Firstly, while they emphasize the positive incentive effect of government R&D subsidies on enterprise innovation investment, they insufficiently consider other factors that may also affect this investment, such as market competition and enterprise internal management. This limits the comprehensiveness of the conclusion. Additionally, studies mentioning the environmental regulation's impact on innovation lack in-depth analysis of specific environmental regulatory measures and how enterprises adapt to them. This leaves the practical applicability of research conclusions requiring further verification. Moreover, some studies emphasize the influence of entrepreneurial and innovative capabilities on sustainable organizational performance, as well as the positive correlation between R&D investment, ecological efficiency, and enterprise value. Nevertheless, these studies lack thorough consideration of industry differences and cultural backgrounds, casting doubt on the universality of their conclusions in different contexts. In the realm of study on the correlation between accounting conservatism and enterprise innovation investment, despite researchers proposing the effect of accounting conservatism on corporate decisions, there remains a relatively limited depth of explanation and exploration of the underlying mechanisms. These shortcomings motivate this study to delve into the specific mechanisms through which accounting conservatism affects enterprise innovation investment. The main purpose is to address the gaps in existing research and offer more accurate guidance for business decision-makers.

This study further explores the impact of accounting conservatism on corporate innovation investment through empirical analysis, addressing gaps in existing research. Specifically, the study utilizes financial reports and R&D investment data from Chinese A-share listed companies spanning from 2015 to 2022. It quantifies accounting conservatism using the C-Score and G-Score models and verifies its inhibitory effect on corporate innovation investment through hierarchical regression analysis. Compared to prior studies, this research not only includes a broader range of company types and time periods but also incorporates multiple control variables to enhance the reliability of results, thereby providing more comprehensive and scientifically grounded empirical support. Overall, through empirical data and comprehensive analysis, this study delves into the negative impact of accounting conservatism on corporate innovation investment, offering specific data support and strategic recommendations for corporate managers and investors. This enriches the existing literature while broadens the research perspective on the relationship between accounting conservatism and corporate innovation investment, thereby enhancing the depth and breadth of the literature review section.

2.2. Research hypothesis

Existing studies have demonstrated that factors such as government R&D subsidies, environmental regulations, and entrepreneurial capabilities significantly influence corporate innovation investment. However, scholars have not yet reached a consensus on the relationship between accounting conservatism and corporate innovation investment. This reflects a preliminary understanding of how corporate financial reporting impacts decisions regarding innovation R&D. This study, grounded in information asymmetry theory, explores the impact of accounting conservatism on corporate innovation investment. Information asymmetry theory suggests that in economic transactions, differences in the acquisition and processing of information between parties can create gaps, potentially reducing market efficiency and leading to decision errors. In the context of corporate innovation investment, information asymmetry mainly manifests as differences in understanding between internal management and external investors regarding corporate innovation capabilities and market prospects. This study posits the following hypotheses to investigate the impact of accounting conservatism on corporate innovation investment.

Hypothesis 1. There is a negative correlation between accounting conservatism and corporate innovation investment, indicating that higher levels of accounting conservatism correspond to lower levels of corporate innovation investment. This hypothesis directly derives from the concept of "uncertainty" in information asymmetry theory. Accounting conservatism mandates companies to promptly recognize losses and cautiously recognize revenues in financial reporting. Such conservative accounting practices may heighten external investors' uncertainty regarding future earnings, thereby increasing apprehensions about risks associated with corporate innovation investment. Given the challenge for external investors to accurately evaluate the potential value and risks of innovation projects, they may prefer to invest in companies that exhibit more conservative financial reporting, perceiving them as lower risk. Consequently, elevated accounting conservatism might prompt corporate management to decrease investments in innovation projects due to concerns over investor responses.

Hypothesis 2. Accounting conservatism has a more pronounced inhibitory effect on corporate innovation investment in high-tech enterprises. This hypothesis is grounded in the concept of "information quality" in information asymmetry theory. High-tech enterprises often encounter heightened market and technological uncertainties, which amplify the challenge for external investors in acquiring and interpreting pertinent information. In such contexts, accounting conservatism could exacerbate information asymmetry

because conservative financial reporting might not adequately portray the full scope and potential value of the enterprise's innovation initiatives. Consequently, management in high-tech enterprises may adopt a more cautious approach, resulting in conservative decisions concerning innovation investment.

This study aims to empirically validate these hypotheses to provide deeper insights into how accounting conservatism influences corporate innovation investment. The objective is to offer specific data support for corporate managers and investors, enabling them to formulate more scientifically effective financial decisions and innovation strategies.

3. Data and methodology

3.1. Overview of the working model

This study employs hierarchical regression analysis to verify the impact of accounting conservatism on corporate innovation investment. The choice of hierarchical regression models is based on several reasons: Firstly, hierarchical regression models allow for the control of potential confounding variables that might influence the relationship between accounting conservatism and corporate innovation investment. By systematically introducing control variables, the study aims to more accurately estimate the effect of the core independent variable (accounting conservatism) on the dependent variable (corporate innovation investment), thereby enhancing the accuracy and reliability of the research findings. Secondly, hierarchical regression models can mitigate issues of multicollinearity that may arise between variables in empirical research. Traditional regression models can face multi-collinearity problems due to correlations between variables, which can undermine the stability and explanatory power of model estimates. Hierarchical regression addresses these concerns by sequentially introducing variables, thereby producing more robust estimation results. Thirdly, hierarchical regression models are well-suited for the hierarchical data structure inherent in this study. The sample comprises multiple observations of companies over different years, forming a nested data structure. Hierarchical regression models can accommodate this structure by incorporating random effects or fixed effects to capture unobserved heterogeneity, thereby yielding more precise estimates. Lastly, hierarchical regression models are widely utilized in existing literature as an effective statistical method for analyzing complex economic phenomena such as corporate innovation investment. By adopting hierarchical regression models, the study aligns with established practices in empirical research and leverages prior knowledge to interpret and validate its findings. In conclusion, hierarchical regression models are selected as the analytical method for this study due to their capability to control for confounding variables, address multi-collinearity issues, accommodate hierarchical data structures, and their established use in empirical research. This approach aims to provide a rigorous and reliable analytical framework to examine the impact of accounting conservatism on corporate innovation investment.

Primarily, an extensive literature review is conducted to gain an in-depth understanding of the factors affecting enterprise

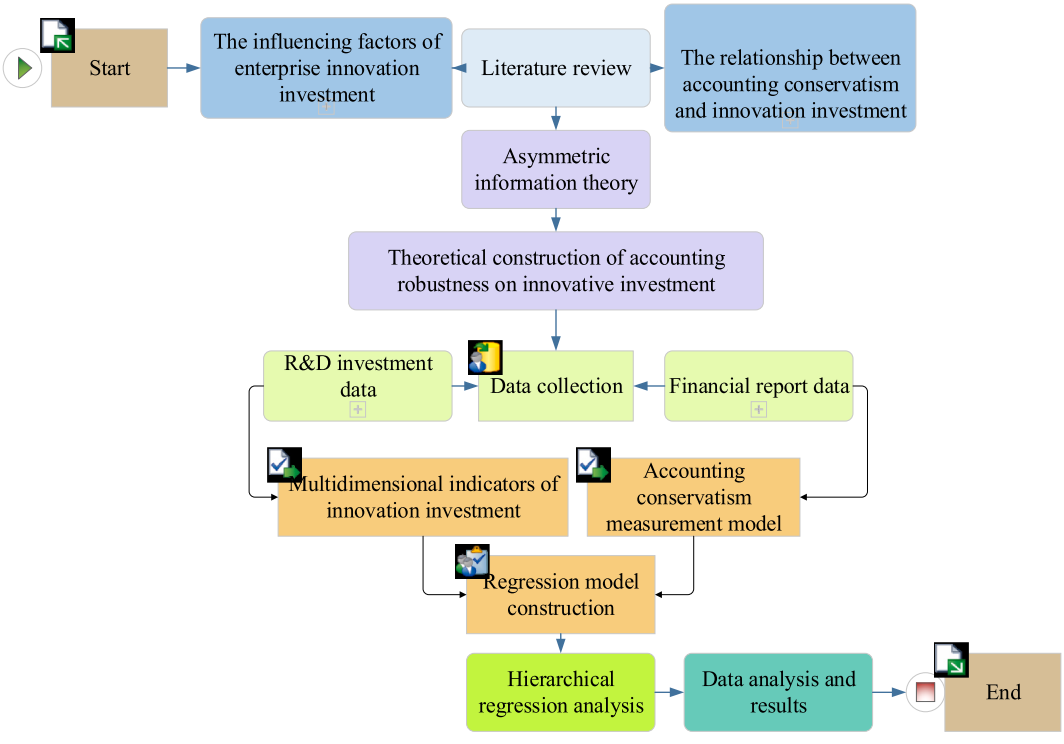


Fig. 1. Research workflow.

innovation investment and the current research on the relationship between innovation investment and accounting conservatism. This review helps establish the theoretical basis and knowledge framework for the research field. Guided by the information asymmetry theory, a theoretical framework is developed to examine the influence of accounting conservatism on enterprise innovation investment. Research hypotheses are formulated to clarify the inhibitory effect of accounting conservatism on innovation input, and possible control variables are considered to enhance the study's reliability. The financial reports and R&D investment data of China's A-share listed companies from 2015 to 2022 are selected for analysis. Special attention is given to high-tech enterprises to ensure that the research objects have substantial investments in innovative R&D. Enterprise innovation investment is quantified in multiple dimensions, involving the tally of R&D personnel, the proportion of R&D expenditure to sales, the volume of patent applications, and the count of new products or services. Accounting conservatism is measured using the C-Score and G-Score models. A regression model is constructed to verify the effect of accounting conservatism on innovation investment. In addition, the hierarchical regression analysis method is used to test the research hypothesis and evaluate the impact of accounting conservatism on enterprise innovation investment. Multiple control variables are introduced to account for other possible interfering factors. Descriptive statistical analysis is conducted to analyze the association between innovation investment and accounting conservatism. Through regression analysis, specific coefficients and relevant statistics are provided to verify the research hypothesis. Finally, the study explains the results and discusses the mechanisms through which accounting conservatism influences R&D investment. Contributions and limitations are discussed, and suggestions for future research are made. The workflow is presented in Fig. 1.

3.2. Information asymmetry theory

The information asymmetry theory is an economic theory concept that emphasizes the information disparity between sellers and buyers in economic transactions. This disparity results in one party having more or more accurate information, influencing decision-making processes [31–34]. Key concepts and hypotheses of this theory are exhibited in Table 1.

According to Table 1, the presence of accounting conservatism in corporate practices can be explained as a strategy to address information asymmetry. Internal managers possess a deeper understanding of the enterprise's situation, while external investors and stakeholders may be limited by restricted information. To mitigate the risks associated with asymmetric information, enterprises may opt for more conservative accounting policies, indicating higher accounting conservatism. In an environment of information asymmetry, innovation investment by enterprises is constrained. Investors faces challenges in accurately obtaining information about the enterprise's innovation plans and R&D outcomes. Consequently, enterprises, concerned about potential misunderstandings, may adopt relatively conservative strategies. This could manifest as a reduction in investment in innovative projects and tighter control of R&D expenditures to avoid negative reactions from investors towards perceived risks.

3.3. Hypothesis in the influence of accounting conservatism on enterprise innovation investment

Accounting conservatism requires enterprise managers to recognize losses promptly, which may prematurely reveal negative news and thereby understate accounting data. This results in information asymmetry among external information providers. To improve performance, managers tend to adopt conservative business strategies, focusing on short-term benefits and optimizing accounting data. However, for projects with long return cycles and slow effects, such as innovation and R&D activities, investment may be reduced. The information asymmetry theory highlights differences between parties in the process of information acquisition. The principle of accounting conservatism demands careful confirmation of internal accounting information, leading to information deviation between enterprises and accounting information users. This asymmetric information distribution limits external investors' knowledge of the development potential of enterprises, putting performance pressure on enterprise managers and restricting their ability to undertake innovation investments with long-term returns. Tang et al. (2021) studied accounting conservatism's role in mergers and acquisitions (M&A) target selection and risk. They found that companies with a high degree of accounting conservatism were likely to achieve profit targets and avoid loss targets due to risk-averse considerations. When acquiring loss-making targets, the risk control effect of accounting conservatism mitigated M&A risks and enhanced overall M&A performance, contingent upon control

Table 1
Key concepts and hypotheses of the information asymmetry theory.

Key concepts	Interpretation	Hypotheses
Incomplete information	Decision-makers inside and outside the enterprise have different levels of information on innovation and R&D investment.	Internally, enterprises may have a better understanding of their R&D capabilities and market demands, while external investors and observers may focus on public information such as financial statements.
Uncertainty	Innovation investment involves future technological and market changes, and there is a large uncertainty.	Information asymmetry exacerbates this uncertainty, affecting the degree of investment in innovation research and development by corporate decision makers.
Incentive mechanism	Under the condition of information asymmetry, enterprises may face incentive mechanism issues.	Decision-makers may reduce investment due to concerns about information leakage or market incomprehension of innovative projects, especially accounting conservatism reflected in financial statements leads to more conservative enterprises.
Market reaction	Information asymmetry may lead to irrational reactions in the market.	Investors may be overly pessimistic or optimistic about an enterprise's innovative R&D investment, causing stock price volatility, which could negatively impact corporate financing and future investment plans.

transfer, high long-term debt, and low management power [35]. Additionally, the principle of conservatism stipulates that revenues and assets should not be overestimated, while costs and liabilities should not be underestimated, and anticipated costs must be recognized. This increases pressure on managers to manage their business, reduces their risk tolerance, and makes the evaluation of R&D investment projects more rigorous. Consequently, managers may adopt a more conservative attitude, resulting in relatively cautious total spending on innovation R&D.

In summary, the principle of accounting conservatism not only increases the short-term operating pressure of enterprise managers but also exerts external pressure due to the nature of innovation investment. This ultimately inhibits enterprises' active investment in innovation R&D activities. The relationship between accounting conservatism and enterprise innovation investment is illustrated in Fig. 2.

3.4. Research object and data collection

This study utilizes publicly available financial reports and R&D investment information from Chinese A-share listed companies. The data, covering the period from 2015 to 2022, is sourced from the Qianzhan Database, accessible at Qianzhan Database. Data collection is conducted through the information disclosure platform designated by the China Securities Regulatory Commission and the financial data and R&D expenditures disclosed in the annual reports of the listed companies. To ensure the accuracy and reliability of the research, 2354 listed companies that meet the standards of the *Measures for the Administration of the Recognition of High and New Technology Enterprises* are selected as the research subjects. Before data analysis, several steps are taken to ensure data integrity and practicality.

(1) Enterprises with significant data gaps are excluded to maintain the integrity and practicability of empirical data.
(2) Enterprises in the financial industry are excluded, as this industry rarely involves R&D innovation activities and is regulated and managed differently from other sectors. Including financial companies could interfere with the analysis results.
(3) Enterprises marked with Special Treatment (ST) and ST* are removed. Those companies face a higher risk of delisting, significantly differing from of conventional listed enterprises, and their inclusion could skew the analysis results.

During the data preprocessing stage, a completeness check is initially conducted to eliminate samples with significant data gaps, ensuring the accuracy of the empirical analysis. For potential outliers or erroneous data in the financial reports, the following methods are adopted.

(1) Handling Missing Data: Missing R&D investment data is addressed through two approaches:
   - Filling in missing data using corresponding values from other years for the same company to maintain time series continuity.
   - Filling in missing data with the industry average for the same period to mitigate the impact of missing data on the overall analysis.
(2) Descriptive Statistical Analysis: Descriptive statistical analysis is performed on all financial indicators to identify and manage outliers beyond the normal range.
(3) Standardization Measures: To address variations in R&D investment scales and accounting treatments across companies, standardization measures are implemented:
   - The R&D expenditure ratio, calculated by dividing a company's R&D expenditure by its operating revenue, is used to reflect investment intensity in R&D relative to company size.
   - Descriptive statistical analysis is applied to all financial indicators, identifying outliers using the standard deviation method. Data points exceeding the mean ± 3 standard deviations are adjusted accordingly to maintain data integrity.

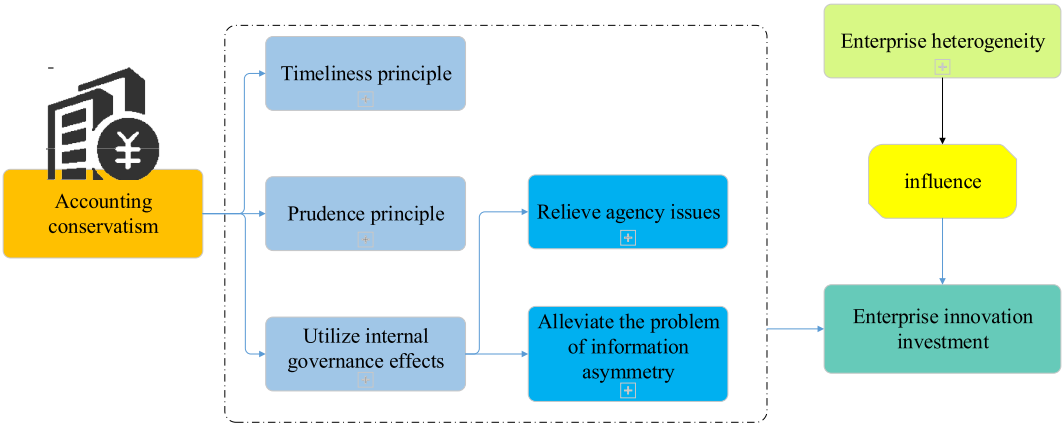


Fig. 2. Influence relationship of accounting conservatism on enterprise innovation investment.

- Key variables are standardized by setting their mean to 0 and standard deviation to 1, eliminating the influence of different scales on analysis results.

Through these preprocessing steps, the quality and robustness of the data and subsequent analysis results are ensured. Further data cleaning procedures are also conducted, including the removal of samples outside the research scope and formatting unstructured data in financial reports to facilitate comprehensive statistical analysis.

In collecting data, the legality and legitimacy of all data sources are ensured. The primary data for this study originated from publicly disclosed information, and no unauthorized or privacy-infringing data is utilized. During data processing, measures are taken to anonymize the data to uphold confidentiality. All sensitive information, such as company names and specific financial data, is appropriately desensitized to safeguard business secrets and market competitiveness. Furthermore, principles of objectivity and impartiality guided the research. Data analysis and interpretation are conducted based on factual evidence and scientific methods, avoiding subjective bias or conflicts of interest that could influence study outcomes. The findings are not altered or distorted under any external pressure or personal interests. Moreover, potential conflicts of interest are transparently disclosed, and steps are taken to mitigate their impact on the study's results. All authors involved in the research have declared no conflicts of interest related to this study. Lastly, careful consideration is given to the social impact and responsibility of the research. It is ensured that the publication and application of the findings would not have adverse effects on society, companies, or individuals. The discussion of results emphasized contributions to academia as well as practical implications and guidance for the industry.

3.5. Accounting conservatism measurement model and innovation investment index measurement

This study employs the C-Score and G-Score models to measure the accounting conservatism of listed companies. These models are indicators designed to detect manipulation in financial statements. The C-Score mainly focuses on profit manipulation, while the G-Score considers a broader range of financial indicators related to earnings, operating activities, and cash flow. Each indicator is weighted according to its significance, reflecting its relative contribution to conservatism. According to the conservatism index method, accounting conservatism involves promptly recognizing unfavorable information and delaying recognition of favorable information. The reverse regression model for profit manipulation is expressed as Equation (1):

$$\frac{EPS_{it}}{P_{i,t-1}} = \beta_0 + \beta_1 D_{it} + \beta_2 R_{it} + \beta_3 D_{it} \times R_{it} + \varepsilon \tag{1}$$

In Equation (1), EPS_{it} and $P_{i,t-1}$ denote the earnings per share and closing price of company i in year t and $t-1$; R_{it} represents the stock return rate ($R_{it} < 0, R_{it} = 1$ otherwise $R_{it} = 0$); D_{it} is a dummy variable; β_0, β_1, β_2, and β_3 are the regression coefficients; ε stands

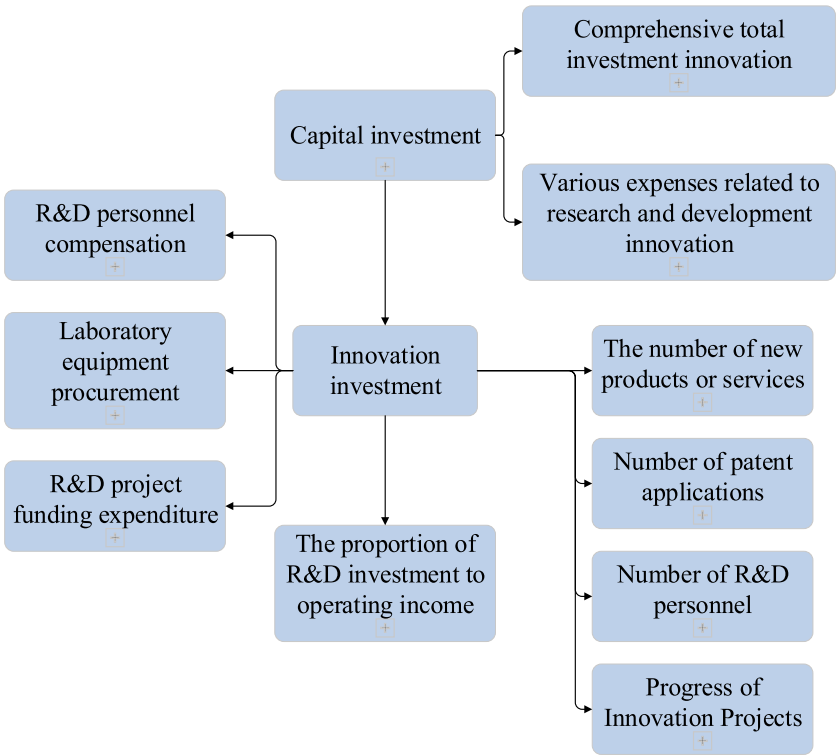


Fig. 3. Process for measuring enterprise innovation investment.

for the random error terms. The C-Score and G-Score models are shown in Equations (2) and (3):

$$C - Score = \lambda_0 + \lambda_1 Size + \lambda_2 MTB + \lambda_3 Lev = \beta_3 \tag{2}$$

$$G - Score = \mu_0 + \mu_1 Size + \mu_2 MTB + \mu_3 Lev = \beta_2 \tag{3}$$

Size refers to the size of the company; *MTB* signifies the price-to-book ratio; *Lev* indicates the asset-liability ratio; λ_0, λ_1, λ_2, λ_3, μ_0, μ_1, μ_2, and μ_3 are the regression coefficients. Equations (2) and (3) are incorporated into Equation (1), resulting in Equation (4):

$$\begin{aligned}\frac{EPS_{it}}{P_{i,t-1}} = {} & \beta_0 + \beta_1 D_i + R_i(\mu_0 + \mu_1 Size_i + \mu_2 MTB_i + \mu_3 Lev_i) + D_i \times R_i \times (\lambda_0 + \lambda_1 Size_i + \lambda_2 MTB_i + \lambda_3 Lev_i) \\ & + (\delta_1 Size_i + \delta_2 MTB_i + \delta_3 Lev_i + \delta_4 D_i \times Size_i + \delta_5 D_i \times MTB_i + \delta_6 D_i \times Lev_i) + \xi\end{aligned} \tag{4}$$

Through regression in Equation (4), the regression coefficients λ_0, λ_1, λ_2, and λ_3 are acquired, and the C-Score index value is derived.

Here, enterprise innovation investment is defined as the total investment in R&D innovation by an enterprise, quantified by the proportion of the total R&D investment of enterprise to its operating income. The process for measuring enterprise innovation investment is listed in Fig. 3.

Fig. 3 defines enterprise innovation investment as the comprehensive total investment in R&D innovation by an enterprise, including various expenses related to R&D innovation. The total R&D investment is calculated by considering expenditures such as salaries for R&D personnel, capital outlays for R&D projects, and purchase of laboratory equipment. The total enterprise R&D investment is then compared to the enterprise's operating income, and the R&D investment's proportion relative to the operating income is calculated using Equation (5):

$$R\&D\ IR = \frac{R\&D\ investment_{total}}{\mathrm{EOI}} \tag{5}$$

In Equation (5), *R&D IR* and $R\&D\ investment_{total}$ mean the proportion and total amount of enterprise R&D investment; EOI represents the enterprise's operating income. This ratio reflects the company's commitment to R&D innovation, measured as a proportion relative to its operating income. Enterprise innovation investment encompass multiple indicators, including capital investment, the count of new products or services, the quantity of patent applications, progress in innovative projects, the proportion of R&D expenditure to sales, and the number of R&D personnel. The proportion of R&D expenditure to sales defined as Equation (6):

$$R\&D\ ER = \frac{R\&D\ E}{\mathrm{SR}} \tag{6}$$

In Equation (6), *R&D ER* indicates the proportion of R&D expenditure, SR represents sales, and *R&D E* denotes R&D expenditure.

3.6. Introduction of control variables

In this study, to ensure the validity and robustness of the research results, control variables are meticulously selected considering the complexity and multidimensionality of corporate innovation investment. Firstly, in accordance with He et al. (2023), research suggests that R&D investments typically do not yield immediate returns but instead require time to demonstrate positive impacts on a company's profitability and market value. In the short term, R&D investment may adversely affect a company's short-term solvency, but in the long term, it positively influences the company's growth and profitability. The study highlights that R&D investment enhances current profitability with effects that manifest over time [36]. Enterprise growth potential (EGP) is incorporated as a control variable, where its growth rate signifies the company's market competitiveness and future development prospects. Enterprises with high growth potential are more inclined to undertake substantial R&D investments to bolster their market position and technological edge. Therefore, controlling for Enterprise Growth Potential enables a clearer observation of the independent impact of R&D investment on corporate financial performance. Secondly, Enterprise management level (EML) serves as a control variable reflecting internal management efficiency and decision-making quality. As indicated by Bao et al. (2020), higher EML enhances the company's market responsiveness and decision-making quality by better identifying customer needs and market dynamics [37]. This underscores that higher management levels facilitate effective acquisition of market information, thereby guiding innovation investments more strategically. Managers at higher levels are adept at leveraging market intelligence for strategic decisions, including those concerning innovation investments. Enhanced EML signifies greater market sensitivity and learning capabilities among corporate managers, enabling them to promptly adapt innovation strategies to evolving market conditions. Lastly, monetary fund proportion (MFP) is included as a control variable, reflecting the liquidity and financial flexibility of the enterprise. According to Cheng et al. (2023), mismatches in funds or uneven distribution can heighten financial pressures on enterprises, influencing their decisions regarding innovation investments [38]. This aligns with MFP's impact on corporate innovation investments, illustrating how financial stability and flexibility can shape corporate strategies in innovation investment decisions. When a company possesses a low MFP, it often faces heightened financial pressures, which can lead to reduced investments in innovation. Additionally, return on equity (RE) serves as a control variable reflecting the enterprise's profitability and financial performance. According to Zhang et al. (2023), drawing from resource dependency theory, a high RE not only indicates strong current financial performance but also supports necessary financial backing for the enterprise's innovation investments, thereby enhancing its long-term competitiveness and financial performance [39]. Time since listing (T) is included as a control variable, reflecting the company's experience and maturity within the capital market. Shao et al. (2023) suggest that the time since listing represents a critical milestone in a company's lifecycle [40]. Pre-listing, companies

often face greater financial constraints and may rely more heavily on external financing and government subsidies for innovation investments. Post-listing, companies typically gain increased access to financing, potentially bolstering the capital market's support for their innovation endeavors. Moreover, listed companies generally exhibit higher transparency and stronger governance structures compared to their non-listed counterparts. Consequently, after receiving government subsidies, listed firms may more effectively allocate these funds towards innovation investments. Lastly, firm value (V), assessed via Tobin's Q, reflects the market's assessment of the company's overall value and future growth potential. According to Hao et al. (2022), green innovation significantly enhances firm value [41]. Specifically, each 1 % increase in the proportion of green patent applications correlates with a 0.023 increase in Tobin's Q. Moreover, investments in innovation, particularly in green technologies, not only elevate a company's market standing (as reflected in Tobin's Q) but also augment its profitability. By incorporating these control variables, this study aims to mitigate the influence of other factors on corporate innovation investments, thereby facilitating a more precise assessment of the impact of accounting conservatism. The selection of these controls enhances the internal validity of the research, ensuring the robustness and applicability of its findings.

The control variables in this study are outlined in Table 2.

4. Results analysis

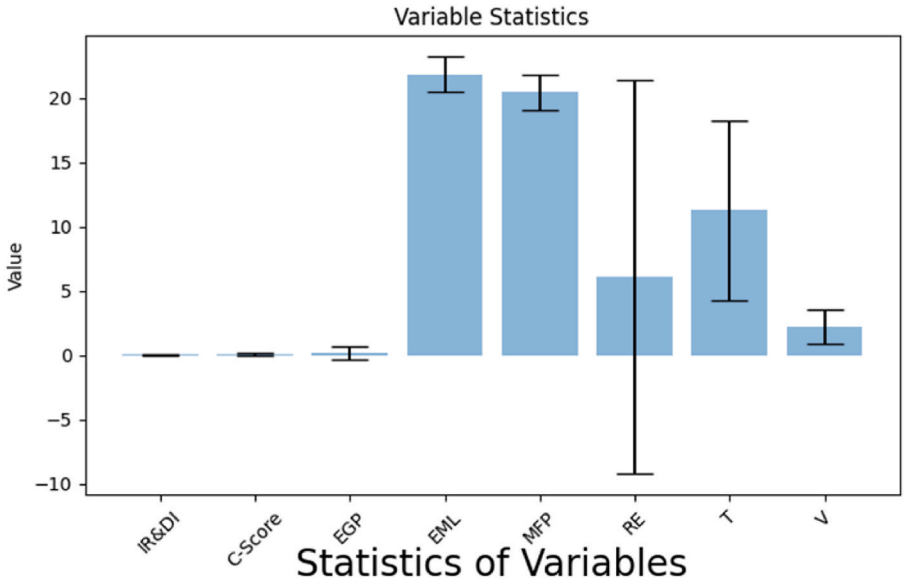
4.1. Descriptive statistical analysis

The descriptive statistics of variables are presented in Fig. 4. When analyzing the provided descriptive statistics, distinctive characteristics and numerical ranges are observed for each variable in the table. Innovation investment (IR&DI) exhibits a mean of 0.048 and a standard deviation of 0.053, indicating a relatively low level of innovation investment with minor variability. Its skewness is −0.61, suggesting a slight left-skewed distribution, and a kurtosis value of 2.34, approaching the normal distribution's kurtosis of 3, indicating a relatively balanced distribution shape. Accounting Conservatism (C-Score) shows a mean of 0.031 and a standard deviation of 0.084, reflecting a stable level of conservatism in financial reporting. The skewness of 0.45 indicates a slight right-skewed distribution, while a kurtosis of 3.21 suggests a sharper peak than the normal distribution. EGP has a mean of 0.199 and a standard deviation of 0.522, with a skewness of 0.89 and a kurtosis of 5.67, indicating an asymmetric distribution with a sharper and higher peak than the normal distribution. This suggests that extreme values of EGP are more prevalent, potentially exerting a significant impact on enterprise innovation investments. EML records a mean of 21.83 and a standard deviation of 1.401, with a skewness of −0.23 and a kurtosis of 2.91, showing a distribution close to symmetry but slightly flatter than the normal distribution. MFP reports a mean of 20.45 and a standard deviation of 1.367, with a skewness of 0.11, indicating an almost symmetric distribution, and a kurtosis of 1.68, slightly lower than the normal distribution's kurtosis, suggesting a relatively flat distribution shape. RE exhibits a mean of 6.061 and a standard deviation of 15.29, with a skewness of 1.98 and a kurtosis of 13.56, indicating a strongly right-skewed distribution with substantial variability in profitability among enterprises. Time since listing (T) has a mean of 11.24 and a standard deviation of 6.978, with a skewness of −1.04 and a kurtosis of 5.21, indicating a significantly left-skewed distribution with a flatter shape and fewer extreme values compared to the normal distribution. Enterprise value (V) shows a mean of 2.182 and a standard deviation of 1.342, with a skewness of 0.7 and a kurtosis of 3.45, revealing a slight right-skewed distribution and a shape somewhat higher than the normal distribution, indicating a relatively concentrated distribution of enterprise values with some higher-value enterprises. In summary, the data from the table illustrate the statistical characteristics of various variables related to enterprise innovation investment and accounting conservatism. These statistics provide crucial insights into the distribution shapes and potential data properties of each variable, which are essential for further analysis of the relationship between accounting conservatism and enterprise innovation investment.

The correlation analysis between accounting conservatism and innovation investment is illustrated in Fig. 5. The correlation coefficient between IR&DI and C-Score is −0.364, indicating a significant negative relationship. This suggests that higher levels of accounting conservatism correspond to lower levels of investment in innovation by enterprises, aligning with the research hypothesis. Additionally, EGP shows a weak positive correlation with innovation investment (0.063), though this correlation is relatively minor. EML exhibits the strongest correlation with innovation investment, with a coefficient of 0.72, indicating that higher management levels are associated with increased innovation investment. MFP shows a weak negative correlation (−0.049), suggesting that higher liquidity is associated with lower innovation investment. RE has a correlation coefficient of 0.125, and time since listing (T) has a coefficient of 0.192, both indicating positive correlations with innovation investment, although these correlations are not particularly strong. Finally, enterprise value (V) shows a stronger negative correlation of −0.218 with innovation investment, suggesting that higher enterprise value is associated with more cautious investment in innovation. In summary, these correlation coefficients provide

Table 2
Control variables.

Control variables	Variable measurement	Symbol
Enterprise growth potential	Annual growth rate of enterprise revenue	EGP
Enterprise management level	The natural logarithm of the enterprise's annual revenue	EML
The proportion of monetary funds	Net cash flow generated from operating activities/total liabilities	MFP
Return on equity	After tax net profit/net assets	RE
Time since listing	The duration of the establishment of the enterprise	T
Enterprise value	Tobin's Q	V
Year and Industry	–	Year & industry (Y&I)



	Variables	Mean	Standard deviation	Minimum value	Maximum value	Skewness	Kurtosis
0	IR&DI	0.048	0.053	0.0	1.52	-0.61	2.34
1	C-Score	0.031	0.084	-0.197	0.317	0.45	3.21
2	EGP	0.199	0.522	-0.577	3.396	0.89	5.67
3	EML	21.83	1.401	17.27	28.49	-0.23	2.91
4	MFP	20.45	1.367	15.53	25.64	0.11	1.68
5	RE	6.061	15.29	-97.93	32.47	1.98	13.56
6	T	11.24	6.978	1.0	26.0	-1.04	5.21
7	V	2.182	1.342	0.909	8.69	0.7	3.45

Fig. 4. Descriptive statistical results of variables.

insights into the relationships between various factors and innovation investment. They contribute to a nuanced understanding of how accounting conservatism and other variables influence innovation investment decisions within enterprises.

4.2. Multiple regression analysis of accounting conservatism and IR&DI

The regression analysis outcomes for the relationship between accounting conservatism and innovation investment are portrayed in Fig. 6. The regression coefficient for C-Score is −0.465, with a standard error (SE) of 2.93. This indicates that, holding other variables constant, a reduction of 0.465 units in innovation investment is associated with every one-unit decrease in C-Score. The regression coefficient for EGP is −0.043, with a SE of 2.55. These findings illustrate that a decline in EGP, while other variables remain constant, has a weak association with a decrease in innovation investment. The regression coefficient for EML is 0.758, with an SE of 20.36. These results signify that a rise in EML is positively correlated with an increase in innovation investment.

The correlation coefficient between IR&DI and C-Score is −0.364, indicating a significant negative relationship. This suggests that higher levels of accounting conservatism correspond to lower levels of investment in innovation by enterprises, aligning with the research hypothesis. Additionally, EGP shows a weak positive correlation with innovation investment (0.063), though this correlation is relatively minor. EML exhibits the strongest correlation with innovation investment, with a coefficient of 0.72, indicating that higher management levels are associated with increased innovation investment. MFP shows a weak negative correlation (−0.049), suggesting that higher liquidity is associated with lower innovation investment. RE has a correlation coefficient of 0.125, and time since listing (T) has a coefficient of 0.192, both indicating positive correlations with innovation investment, although these correlations are not particularly strong. Finally, enterprise value (V) shows a stronger negative correlation of −0.218 with innovation investment, suggesting that higher enterprise value is associated with more cautious investment in innovation. In summary, these correlation coefficients provide insights into the relationships between various factors and innovation investment. They contribute to a nuanced understanding of how accounting conservatism and other variables influence innovation investment decisions within enterprises.

The outcomes of the robustness tests concerning accounting conservatism and innovation investment are depicted in Fig. 7. The

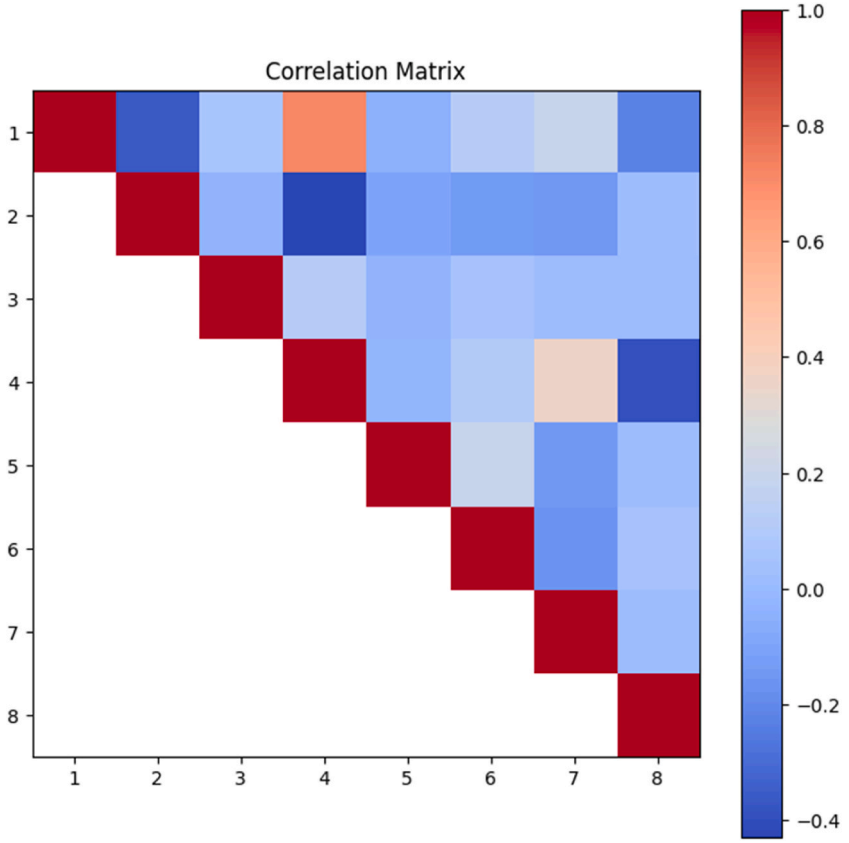


Fig. 5. Correlation analysis between accounting conservatism and innovation investment (1–8: innovation investment, C-Score, EGP, EML, MFP, RE, T, V).

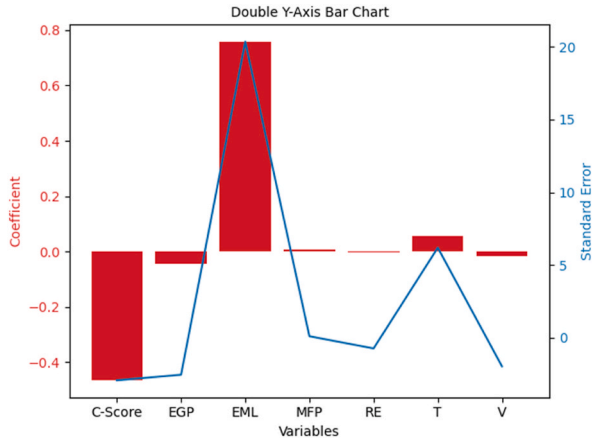


Fig. 6. Regression analysis results of accounting conservatism and innovation investment.

regression analysis reveals a statistically significant negative relationship between C-Score and IR&DI, with a regression coefficient of −2.649 and a standard error of −4.74. This finding corroborates the initial hypothesis of a negative correlation between these variables. For EGP, the regression coefficient is −0.166 with a standard error of −2.17, and for EML, the coefficient is −1.386 with a standard error of −6.39. Both results are statistically significant, but they contradict the results shown in Fig. 6, indicating potential issues with model specification or the presence of other unobserved factors influencing the outcomes. The regression coefficient for MFP is −0.801, with a standard error of −2.44. For RE, the coefficient is −0.002, with a standard error of −0.39. The coefficient for time since listing (T) is 0.311, with a standard error of 9.37. Lastly, the coefficient for enterprise value (V) is −0.052, with a standard

error of −1.3. All these results are statistically significant, yet the direction and strength of these correlations diverge from those depicted in Fig. 6. In summary, while the regression analysis supports the negative relationship between accounting conservatism and innovation investment, the inconsistencies in the direction and magnitude of other variables' effects suggest a need for further investigation into model specifications and potential unobserved factors.

To further validate the stability of the impact of accounting conservatism on corporate innovation investment, this study employs several different model specifications for additional robustness checks. These checks include altering the measurement methods of variables, introducing additional control variables, and using different statistical methods to analyze the data. Firstly, to examine the robustness of the impact of accounting conservatism on corporate innovation investment, an adjusted C-Score model is adopted, which includes more indicators of the firm's financial condition, such as the current ratio and debt ratio. Secondly, the measurement of corporate innovation investment is adjusted from a simple ratio of R&D expenditure to sales revenue to a composite indicator that includes the number of patent applications and the success rate of new product development. Additional control variables are also introduced, such as market competition (measured by the market concentration index) and firm age, since market competition may influence a firm's innovation investment decisions, while firm age may affect a firm's risk tolerance and innovation capabilities. In addition to conventional hierarchical regression analysis, this study utilizes fixed effects and random effects models to account for potential unobserved heterogeneity, thereby enhancing the robustness of the estimation results. The results of robustness tests using different model specifications and statistical methods are presented in Table 3.

As depicted in Table 3, irrespective of adjustments in model specifications or the application of different statistical methods, the negative influence of the C-Score on corporate innovation investment persists as significant and stable. Particularly noteworthy is the slight increase in the regression coefficient after controlling for market competition and firm age, suggesting that incorporating these variables enhances the precision of capturing the impact of accounting conservatism. Furthermore, findings from both the fixed effects and random effects models indicate that accounting conservatism's dampening effect on corporate innovation investment remains robust even when accounting for potential unobserved heterogeneity. This underscores the reliability of the research hypothesis. In summary, accounting conservatism demonstrably exerts a substantial negative impact on corporate innovation investment activities. This discovery holds critical implications for comprehending the enduring consequences of accounting policy decisions on corporate advancement.

Based on the comprehensive analysis conducted, several conclusions can be drawn. Firstly, a consistent negative correlation between accounting conservatism and corporate innovation investment is evident across all analyses. This relationship underscores the inhibitory effect of accounting conservatism on firms' propensity to invest in innovation. In contrast, the management level of the firm emerges as a robust positive factor influencing innovation investment consistently across various analyses. This finding suggests that higher management capability facilitates greater investment in innovation, likely due to enhanced strategic decision-making and market responsiveness. However, the relationships involving enterprise growth potential, cash-to-total assets ratio, return on equity, time since listing, and enterprise value exhibit more nuanced patterns across different analyses. These variables show varying directions and strengths of association with innovation investment, which may be influenced by factors such as model specifications,

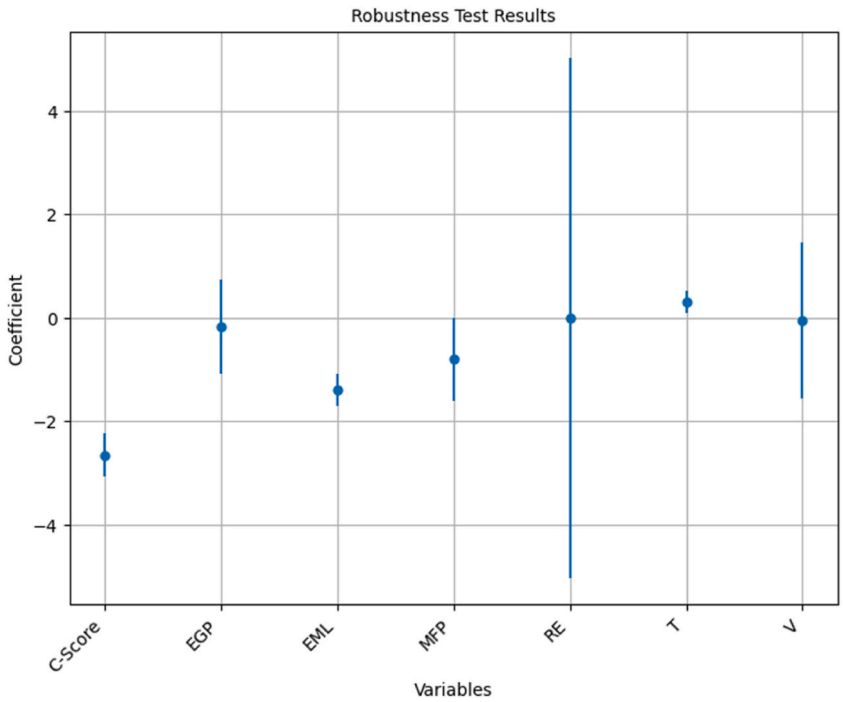


Fig. 7. Robustness test results for innovation investment and the accounting conservatism.

Table 3
Robustness test results for different model specifications and statistical methods.

Model type	C-Score regression coefficient	SE	Control variables included	Notes
Baseline model	−0.465	2.93	EGP, EML	Initial model
Adjusted model	−0.479	2.88	EGP, EML, market competition, time since listing (T)	Includes market competition and firm age
Fixed effects model	−0.462	2.95	All control variables	Controls for unobserved heterogeneity
Random effects model	−0.458	2.90	All control variables	Controls for unobserved heterogeneity

sample characteristics, or unobserved confounding variables. Overall, the findings of this study contribute a novel perspective on how accounting conservatism influences corporate innovation investment. By providing empirical support, this study offers valuable insights for investors and corporate managers in making informed financial decisions and devising effective innovation strategies.

4.3. Discussion

The findings of this study highlight a notable negative correlation between accounting conservatism and corporate innovation investment, which is consistent with the conclusions drawn by several scholars. For example, Nur et al. (2023) emphasized that accounting conservatism tends to prompt companies to adopt cautious operational strategies in uncertain environments, influencing long-term capital investments and expenditures on research and development [42]. Similarly, Zhang (2023) found that in settings characterized by high information asymmetry, firms may enhance accounting conservatism to mitigate uncertainty perceived by external investors, potentially constraining investments in innovative projects [43]. This study further explores the mechanism through which accounting conservatism impacts corporate innovation investment, focusing on the perspective of information asymmetry theory. The disparity in information between internal managers and external stakeholders may lead to an excessive emphasis on short-term losses in public disclosures due to heightened conservatism. Consequently, this orientation could detract from investments in research and technological innovation, dampening incentives for long-term innovation and development. This observation aligns with the findings of Ma et al. (2020), who suggested that while accounting conservatism addresses agency problems, it could also hinder corporate risk-taking, including initiatives in innovation that involve uncertainty and extended timeframes for returns [44]. Additionally, Biddle et al. (2022) bolster these findings by noting that overly conservative accounting practices in M&A can shield firms from risky transactions but may also result in missed growth prospects [45]. Collectively, these insights underscore that while accounting conservatism offers short-term benefits by mitigating the negative effects of information asymmetry, its long-term implications may curtail a firm's capacity for innovation, thereby impacting its sustained competitiveness. Consequently, firms are advised to strike a balance between immediate gains and long-term growth imperatives when crafting accounting policies, ensuring they support continuous technological advancement and organizational development.

The conclusion drawn from this study, grounded in empirical analysis of Chinese A-share listed companies, posits that accounting conservatism exerts a pervasive influence across global financial markets, potentially shaping corporate innovation investment universally. However, the manifestation and strength of this influence can vary due to differences in market environments, regulatory frameworks, cultural contexts, and accounting standards across countries and regions. Market environments exhibit significant variability that can alter the impact of accounting conservatism on innovation investment. For instance, in volatile emerging markets, firms may favor conservative accounting practices to navigate uncertainty, thereby influencing decisions related to innovation investment. Moreover, regulatory policies play a crucial role in shaping the application of accounting conservatism. Stringent regulatory frameworks impose stricter compliance requirements on firms, potentially fostering higher levels of accounting conservatism in financial reporting. Consequently, such conservatism could act as a significant deterrent to innovation investment within these regulatory contexts. These insights underscore the nuanced interplay between accounting conservatism and innovation investment, highlighting the importance of considering local market dynamics, regulatory landscapes, cultural nuances, and accounting practices when analyzing their relationship globally. Future research should continue to explore these dynamics across diverse settings to enhance our understanding of their implications for corporate strategies and economic development. Moreover, cultural variations can significantly influence firms' inclinations towards accounting conservatism and their attitudes regarding innovation. For instance, in cultures that endorse risk-taking and innovation, firms may actively pursue innovative investments despite high levels of accounting conservatism. Additionally, the technological characteristics and market dynamics of various industries can also shape how accounting conservatism interacts with innovation investment. In sectors characterized by rapid technological progress and fierce competition, companies may prioritize innovation to sustain their competitive edge, notwithstanding stringent requirements of accounting conservatism. In summary, while this study contributes valuable insights into the relationship between accounting conservatism and corporate innovation investment, the broader applicability of these findings requires further validation through future research, particularly across diverse countries, cultural contexts, and industry sectors. Comparative analyses across nations and industries could offer deeper insights into both the universal aspects and specific impacts of accounting conservatism on innovation investment. Such investigations would enrich our understanding of how accounting practices intersect with strategic decision-making in corporate environments worldwide.

4.4. Policy recommendations

Drawing from the study's findings that accounting conservatism significantly impedes corporate innovation investment, the following policy recommendations are proposed to foster innovation development, particularly among high-tech enterprises.

(1) Adjustment of Accounting Policies: Enterprises should be encouraged to adopt more flexible accounting policies to mitigate the inhibitory impact of excessive conservatism on innovation investment. This could involve optimizing financial reporting requirements and reducing the undue emphasis on non-recurring losses. By alleviating the tendency for enterprises to adopt overly conservative approaches driven by precautionary financial risk considerations, innovation investment could be more effectively stimulated.
(2) Enhancement of Information Transparency: Enhancing the comprehensiveness and transparency of corporate information disclosure, especially regarding detailed reporting on R&D expenditures and innovation outcomes, is crucial. This initiative can help mitigate information asymmetry issues, enabling investors to make more accurate assessments of a company's innovation capabilities and market potential. This, in turn, can reduce unnecessary conservative behaviors arising from misperceptions.
(3) Innovation Incentive Mechanisms: Establishing dedicated innovation incentive policies, such as tax benefits and innovation funds, particularly targeting enterprises highly reliant on technological innovation, can effectively encourage increased R&D investments. These measures aim to maintain a vibrant level of innovation within enterprises, even when adopting more conservative accounting policies.
(4) Strengthening Internal Audit and Risk Management: Enhancing internal audit and risk management processes within enterprises is crucial to ensuring that decisions regarding innovation projects are grounded in thorough market research and scientific risk assessments. This approach helps mitigate conservative attitudes stemming from inadequate information at the decision-making level, thereby enhancing the company's resilience to external environmental changes.
(5) Training and Education: Reinforcing training for corporate executives and financial personnel is essential to deepen their understanding of accounting conservatism and its long-term impacts on enterprise development. By emphasizing education and training, enterprises can shift focus from short-term financial concerns to prioritizing long-term innovation investments and sustainable development goals.
(6) Regulation and Guidance: Regulatory bodies should formulate and implement clearer guiding principles, applying differentiated management of accounting conservatism tailored to high-tech enterprises. Establishing reasonable boundaries for accounting policies is crucial to prevent unintentional constraints on enterprise innovation activities.

Implementing these measures aims to effectively balance the relationship between accounting conservatism and enterprise innovation investment. This approach promotes the healthy development of enterprises, particularly technology-oriented firms, and contributes to overall socio-economic progress.

5. Conclusion

This study empirically analyzes the relationship between accounting conservatism and corporate innovation investment among Chinese A-share listed companies, employing the theory of information asymmetry as its theoretical framework. The study reveals a significant negative correlation between accounting conservatism and corporate innovation investment, which is validated through multilevel regression analyses. These findings not only advance the theoretical understanding of how accounting conservatism influences corporate decision-making but also provide practical insights for application in real-world scenarios. Firstly, this study elucidates the inhibitory impact of accounting conservatism on corporate innovation investment, offering a novel perspective for corporate managers when devising financial and innovation strategies. It underscores the importance of striking a balance between maintaining financial prudence and fostering innovation, cautioning against overly conservative accounting policies that can potentially stifle a firm's innovation potential. Secondly, the research findings suggest implications for policymakers, highlighting the necessity to consider the ramifications of accounting conservatism on corporate innovation behavior when formulating accounting standards and innovation-oriented policies. Policymakers are encouraged to promote the adoption of moderate accounting practices and institute corresponding incentives aimed at nurturing innovation within enterprises. Lastly, this study identifies avenues for future research, including deeper exploration into the underlying mechanisms governing the relationship between accounting conservatism and corporate innovation investment. Additionally, there is a call for investigations into how variations in market environments and regulatory frameworks influence this relationship across different contexts. In summary, this study contributes substantively to both theoretical developments and practical implications regarding the interplay of accounting conservatism and corporate innovation investment. Its findings underscore the importance of balanced financial strategies in fostering innovation-driven growth within firms, thereby advancing broader economic development objectives. For corporate managers, this study emphasizes the critical balance between short-term financial conservatism and long-term innovation capability. It stresses the importance of finding a middle ground where accounting conservatism supports financial prudence without impeding investment in innovation. Managers are advised to heighten their awareness of the implications of accounting policies to avoid unnecessarily curtailing the company's innovative potential through overly conservative approaches. Enhancing internal decision-making processes and transparency can facilitate better alignment of short-term financial objectives with long-term innovation strategies. For policymakers, this study underscores the significance of accounting conservatism's impact on corporate innovation activities in shaping accounting standards and innovation policies. Policymakers are encouraged to promote the adoption of moderate accounting practices to prevent undue suppression of

innovation potential arising from excessive conservatism. Moreover, policymakers can stimulate increased innovation investments by implementing measures such as R&D tax incentives and innovation fund support. Strengthening supervision and guidance over corporate innovation activities is also advised to ensure that companies can effectively engage in innovation and R&D endeavors while adhering to regulatory standards. These policy considerations aim to foster an environment conducive to sustained corporate innovation and economic growth.

This study contributes theoretically in several key areas based on existing literature. It empirically establishes a negative correlation between accounting conservatism and corporate innovation investment. While prior research has touched on this relationship, there has been a notable absence of detailed investigation specific to the Chinese market context. This study addresses this gap by offering fresh insights into how accounting conservatism shapes corporate innovation investment within this unique environment. Grounded in information asymmetry theory, the research delves into the mechanisms through which accounting conservatism influences corporate innovation behavior across diverse market conditions. By applying information asymmetry theory to the intersection of accounting practices and innovation, this study not only affirms the theory's relevance in novel contexts but also broadens its applicability. To comprehensively assess corporate innovation investment, this study employs a variety of metrics such as the ratio of R&D expenditure to total sales, the introduction of new products or services, and the number of patent applications. This methodological diversity enhances the accuracy and reliability of the findings, paving the way for multidimensional analyses of how accounting conservatism impacts corporate strategies. In ensuring the robustness of its conclusions, the study conducts sensitivity analyses using multiple model specifications, including adjusted C-Score models, fixed effects models, and random effects models. These approaches not only bolster the credibility of the research outcomes but also introduce new avenues for robustness testing in future investigations. The study underscores the profound implications of accounting policy decisions on long-term corporate development, particularly regarding innovation investment—a facet that has received relatively less attention in current literature. The findings contribute significantly to enhancing understanding among corporate entities and policymakers alike regarding the nexus between accounting policies and strategic decision-making. Furthermore, the study's conclusions inspire further inquiry into the nuanced ways accounting conservatism influences corporate innovation investment across varied national and market contexts, prompting future research to explore these dynamics more deeply. However, the study still has some limitations. Firstly, future research could expand the sample scope to encompass listed companies from diverse countries and markets, thereby validating the universality of the conclusions drawn in this study. Comparative analyses across different market environments would yield a more comprehensive understanding of the dynamics and conditional aspects of the relationship between accounting conservatism and innovation investment. Secondly, given the primary focus of this study on the link between accounting conservatism and innovation investment, future research could extend its inquiry to explore how accounting conservatism influences other forms of corporate investment, such as capital expenditures, and the interplay between these investment decisions and innovation investment. Moreover, despite incorporating various control variables, potential issues related to unobserved heterogeneity remain. Future studies could adopt methodologies such as natural experiments or instrumental variables to mitigate these concerns, thereby strengthening the causal inference of the research findings. Additionally, while this study predominantly examines the quantitative impact of accounting conservatism on innovation investment, future research could deepen its investigation into how accounting conservatism influences the quality of innovation investment. This includes exploring factors such as the technological sophistication of innovation projects and their success rates in the market. Lastly, this study employs cross-sectional data for analysis. Future research could leverage panel data methods to explore the dynamic processes involved in corporate innovation investment and to elucidate how accounting conservatism shapes the formation and sustained development of corporate innovation capabilities over time. Through these research avenues, future studies can advance our understanding of the intricate relationship between accounting conservatism and corporate innovation investment. This will enable researchers to provide more tailored management recommendations for businesses and evidence-based decision-making support for policymakers.

Data availability statements

The data used to support the results of this study is included in the article [and supporting information].

CRediT authorship contribution statement

Weiyu Zou: Writing – review & editing, Writing – original draft, Validation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Aniza Othman:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:Weiyu Zou reports financial support was provided by Philosophy and Social Science Research Project of Jiangsu Universities. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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