LUISS

Department
of Business and Management

Course of Corporate Governance

The Research on the Influence of the Controlling Shareholders' Equity Pledge in Listed Companies on Earnings Management Behavior

Giovanni Fiori

SUPERVISOR

Simone Scettri

CO-SUPERVISOR

ID No. 735101

CANDIDATE

Academic Year 2020/2021

Table of contents

Abstract

Equity pledge is one of the most important financing channels for controlling shareholders in China. It has the advantages of low financing costs, convenient procedures, and not influencing the controlling position. Since 2013, equity pledge behavior has shown a surging development, but it itself implies huge risks, which can easily lead to a series of financial crises in listed companies due to excessive earnings management. Therefore, the research questions in this paper are: (1) whether the controlling shareholders will conduct more accrual and real earnings management activities after the equity pledge financing; (2) from the perspective of different equity structures, whether these factors will have the moderating effect on the relationship between controlling shareholders' equity pledge and earnings management. The research contents of this paper are arranged as follows:

Firstly, this paper sorts out relevant literature and theoretical basis. This paper refers to relevant theories of equity pledge, information asymmetry theory, principal-agent theory and incomplete contract theory, consults relevant domestic and foreign literature on controlling shareholders' equity pledge, earnings management and equity structure, summarizes the characteristics and deficiencies of the existing literature, and finally finds new research direction in this paper.

Secondly, this paper analyzes the status quo of equity pledge of listed companies in China. Statistics shows that from 2008 to 2018, the number of Chinese A-share listed companies that pledged equity continued to increase, and the total market value of pledged stocks also increased significantly. Through theoretical analysis, this paper puts forward the research assumptions.

Thirdly, this paper uses the data from CSMAR database and WIND database to conduct an empirical analysis of the relationship between the controlling shareholders' equity pledge of A-share listed companies from 2008 to 2018 and accrual earnings management or real earnings management. The research indicates that the controlling shareholders' equity pledge will increase the degree of accrual and real earnings management. As the proportion of controlling shareholders' equity pledge increases, the degree of accrual and real earnings management will continue to increase. Furthermore, the equity structure will play a role in moderating the positive relationship between controlling shareholders' equity pledge and corporate earnings management. The higher the degree of equity balance is, the weaker the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings management will be. The higher the degree of equity concentration is, the stronger the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings management will be. Compared with state-owned holding companies, whether the controlling shareholders' equity is pledged and the equity pledge ratio in a private company has a more positive effect on accrual and real earnings management.

Finally, this paper puts forward relevant recommendations and future research prospects.

Keywords: controlling shareholder, equity pledge, equity structure, real earnings management, accrual earnings management

1 Introduction

1.1 Research background and research significance

1.1.1 Research background

Equity pledge is one of the most important financing channels for controlling shareholders in China. Compared with other financing methods, equity pledge has the advantage of low financing costs, convenient procedures, and does not affect the controlling position for shareholders, which makes controlling shareholders more inclined to alleviate financial pressure through equity pledge. Since the securities company launched the stock pledge repurchase business in 2013, the business has developed rapidly in a few years, and the transaction volume has shown a significant increase. However, it is alarming that although equity pledge has solved the financing needs of listed companies, it also implies huge risks. For the controlling shareholder of equity pledge, after the pledge if the stock price continues to fall and reaches the warning line, the shareholder will face the risk of the pledged shares being closed-out or even the control right being changed. For listed companies, a series of problems arise while the number of pledged stocks continues to increase. Due to the great uncertainty in the value of the pledged equity, once the stock price hits the warning line, the pledgee will require the controlling shareholder to make up the collateral. If the close-out line is reached and the controlling shareholder is unable to add more collaterals, the pledgee has the right to sell the pledged object in the secondary market to protect the its rights. This will form a negative feedback effect, further trigger stock price fluctuations, and may even make listed companies suffer financial crises and changes in control rights. LeTV's controlling shareholder Jia Yueting made the company's operating environment deteriorate due to large-scale equity pledges, which had extremely adverse effects on the company's operations and management. Therefore, whether the controlling shareholder wants to avoid losing control or to maintain the company's refinancing ability, the controlling shareholder will adopt a series of measures to maintain the value of the pledge. Admittedly, the accounting earnings plays an important role in influencing stock prices. Therefore, the main research question of this paper is whether the controlling shareholder will conduct more accrual and real earnings management activities in order to stabilize the stock price after the equity pledge financing. In addition, the internal and external governance environment has a significant effect on the self-interested behavior of controlling shareholders and the earnings management activities of enterprises. Accordingly, from the perspective of different equity structures, what changes will happen to the relationship between controlling shareholders' equity pledge and accrual earnings management or real earnings management? This is the second issue to be solved in this paper.

1.1.2 Research significance

(1) Theoretical significance

In terms of the economic consequences of the equity pledge, although some scholars have explored the impact of equity pledges on earnings management, most of them are limited to the study of accrual earnings management. There are only a few empirical studies that incorporate real earnings management into empirical research. With the improvement of accounting standards and stringent legal supervision, real earnings manipulation has gradually attracted the attention of more listed companies due to its hidden features. An increasingly number of companies have shifted from accrual earnings manipulation to real earnings manipulation for profit adjustment. Therefore, it is particularly important to study the influence of equity pledge behavior on both accrual earnings management and real earnings management at the same time. In addition, it is found that currently most scholars directly study the influence of equity pledge on earnings management, but have not considered that the nature of the enterprise itself will have an impact on earnings management. For companies with different equity structures, the influence of the controlling shareholders' equity pledge on earnings management is likely to be different. Therefore, this paper will focus on how the accrual and real earnings management behavior of listed companies will be affected respectively when the controlling shareholders' equity is pledged, broadening the research of earnings management. Furthermore, this paper will explore the moderating effect of different equity structures on the relationship between the controlling shareholders' equity pledge and earnings management.

(2) Practical significance

This paper studies the influence of controlling shareholders' equity pledge activities on the company's earnings management, providing corresponding guidance and suggestions for the regulatory authorities and listed companies. Firstly, it provides relevant guidance for the securities regulatory authorities about the supervision of equity pledges in the securities market. Equity pledges can solve financing constraints, but frequent and large equity pledges will probably harm business performance and the interests of small and medium shareholders, and hinder the healthy development of the capital securities market. Therefore, the regulatory authorities should pay more attention to the behavior of the controlling shareholders' equity pledge, and formulate more stringent laws and regulations related to the equity pledge financing. The purpose is to prevent controlling shareholders from appropriating the interests of small and medium shareholders to satisfy their own personal interests. The second point is to guide listed companies on how to manage corporate earnings reasonably in order to maintain the stability of the stock price and meanwhile promote the healthy and orderly development of the company. Furthermore, the companies can learn from the paper about how to prevent the instability of stock prices that will cause the transfer of corporate control and damage the rights and interests of small and medium shareholders. Therefore, this paper will further proceed with the perspective of equity structures, systematically analyzing the relationship between controlling shareholders' equity pledge and earnings management.

1.2 Research contents and research methods

1.2.1 Research contents

The first chapter summarizes the research background of the thesis in general, clarifies the theoretical and practical significance, elaborates the research content and research methods, and finds out the innovations of the thesis.

The second chapter is to organize related theories and literature. It mainly refers to relevant theories of equity pledge, information asymmetry theory, principal-agent theory and incomplete contract theory and consults relevant domestic and foreign literature of controlling shareholders' equity pledge, earnings management and equity structure. Finally, a suitable direction is found for the research.

The third chapter focuses on the theoretical analysis and research hypotheses. This part first analyzes the status quo of equity pledge in Chinese listed companies. After that it explores the effect of equity pledge on earnings management, and the moderating effect of equity structure on them, and then puts forward the research hypotheses of this paper through theoretical analysis.

The fourth chapter is the benchmark test. It first establishes regression models and performs regressions based on the research hypotheses mentioned above. After the main regression is completed, it needs to be verified whether the research result meets the research hypotheses or not.

The fifth chapter further tests the moderating effect and carries out the robustness check. It first introduces equity structures--equity balance, equity concentration and ownership property--as moderating variables, and then systematically studies how different equity structures can moderate the relationship between the controlling shareholders' equity pledge and earnings management. Finally, the robustness test is carried out to consolidate the main conclusions of the thesis.

The sixth chapter is the research conclusion and recommendations. It analyzes and summarizes the theoretical analysis and empirical results, and then puts forward relevant policy recommendations and possible guidelines for future research.

1.2.2 Research methods

This paper first summarizes the research theories and literature, based on this puts forward the research hypotheses, constructs multiple regression models, and finally conducts empirical analysis. The methods used in the study of the relationship between the controlling shareholders' equity pledge and earnings management are as follows:

(1) Literature analysis method.

This paper summarizes the characteristics and deficiencies of the existing literature by consulting domestic and foreign related documents on major shareholders' equity pledge, earnings management and equity structure. Furthermore, on the basis of relevant theories of equity pledge, information asymmetry theory, principal-agent theory and incomplete contract theory, it analyzes the correlation between controlling shareholders' equity pledge and earnings management, and then puts forward the research hypotheses.

(2) Empirical analysis method.

This paper uses the data of Chinese A-share listed companies from 2008 to 2018. First, it analyzes the influence of controlling shareholders' equity pledge on accrual and real earnings management. Second, it divides equity structures into equity balance, equity concentration, and ownership property and explores whether these three factors promote or inhibit the influence of the controlling shareholders' equity pledge on accrual and real earnings management. Combining descriptive statistics, two-way fixed effect models, and robustness tests, the results of the empirical research are finally analyzed and summarized.

1.3 Research innovations

First, this paper introduces the controlling shareholders' equity pledge into the study of earnings management motivation. Academia has been rich in research on corporate earnings manipulation motives, but only a few scholars specifically studied corporate earnings management motives from the perspective of equity pledges, and the researches mainly focus on accrual earnings management. Therefore, this paper enriches the relevant research on corporate earnings management motivation.

Second, in the research on the influence of equity pledge on earnings management, most scholars ignored the important factor of equity structure. Therefore, the existing literature rarely probes into whether the relationship between controlling shareholders' equity pledge and earnings management is affected by equity structures. Based on theoretical analysis, this paper establishes an empirical model to test the linkage relationship between the company's equity pledge and earnings management, and introduces the equity structure to study its moderating effect on the relationship between the controlling shareholders' equity pledge and earnings management.

2 Theoretical basis and literature review

2.1 Theoretical basis

2.1.1 Related theories of equity pledge

Equity pledge means that pledgers pledge their equity in order to secure financing from banks and other financial institutions, while banks and other institutions that accept the pledge are called pledgees. Equity pledge originated from European countries and America. In the 1970s and 1980s, equity pledge was effectively used in management buyouts and reverse takeovers.

Financing is the biggest reason for shareholders to pledge equity. When the controlling shareholder is facing a shortage of funds, the most convenient way of financing is to use the stock market for trading, but this will cause the controlling shareholder to lose the dominant power and the stock price of the listed company will drop sharply. At the same time, due to the impact of the financial crisis, banks' bad debts have surged. In order to reduce risks, banks have strengthened loan approval process, which will inevitably increase the difficulty of debt financing. However, equity pledges will not lead to these problems. First of all, according to the relevant provisions and judicial interpretations of the "Guarantee Law" and the "Property Law", the pledge of equity only restricts the right of the pledger to transfer stocks and the pledgee only obtains a limited right of compensation, which will not affect the management and other rights of shareholders. Secondly, compared with other forms of collaterals, the equity of listed companies is transparent and easy to obtain. In addition, the equity pledge is characteristic of convenient repurchase procedures, flexible deadlines, quick availability of funds, and fewer restrictions on the use of funds.

Every coin has two sides. When we find many advantages of equity pledge and enjoy the convenience brought by these advantages, we should also foresee its dangers. Otherwise, it will be unfavorable to maintain the stability of the capital market, and the legitimate rights and interests of small and medium shareholders cannot be effectively protected. From the perspective of the pledgee, before the pledge activity the pledgee needs to have an accurate estimate and judgment on the value of the pledged company's equity and the subsequent change in the price of the equity. Once the pledgee makes a judgment error, such as reaching a deal with the pledger when the stock price is inflated, the pledgee will bear the risk of stock price slumps. When the stock price remains at a high position, the claims of pledgees can be fully protected. However, when the stock price drops to a low level, even if the pledgee has the priority to obtain compensation, the full repayment may not be available. The reason is that the price of the pledged goods is not adequate to cover the claims, and the pledger cannot supplement the pledge because probably he transfers the property in advance. At this time, if the pledgee continues to hold the claims, he will not only face complicated procedures, but also fail to obtain a complete repayment in the end. Therefore, the equity pledge brings certain risks to the pledgee. From the perspective of the pledger, the more fluctuated the stock price is, the greater the probability of the drop in the company's stock price will be. When the stock price is lower than the "close-out line", the pledgee will consider closing the position to make up for the loss because he enjoys the priority right of compensation. At this time, the shareholder, as the pledger, will inevitably face the risk of losing control of the company. From the perspective of small and medium shareholders of the enterprise, equity pledge may lead to the risk of hollowing out the enterprise. When the pledger pledges the equity held in his hands to obtain financing, it creates the separation of cash flow rights and control rights. Under such circumstances, shareholders who have not lost their management rights and decision-making rights will further carry out hollowing activities, which will infringe on the interests of small and medium shareholders. When the stock price drops to the value of funds that they obtained through the pledge, they will choose to transfer the equity. Consequently, the risk will be successfully passed on to the financial institution and other shareholders. At the same time, controlling shareholders can also use the funds obtained through equity pledge to purchase the company's equity, thus increasing their control rights at a small cost. This behavior also seriously damages the interests of small and medium shareholders and the company.

2.1.2 Information asymmetry theory

The information asymmetry theory belongs to the field of microeconomics. Kenneth J. Arrow first discovered and proposed this theory in 1963. Subsequently, through the investigation of the second-hand car market in 1970, George A. Akerlof made a more systematic summary of the information asymmetry theory, and published the relevant representative work "The Market for Lemons".

The information asymmetry theory refers to the fact that in daily transactions, the information related to the transactions is not equal between both parties. The information-superior party will hide part of the true information in order to obtain excess returns, thus damaging the information-inferior party's interests. Similarly, in market transactions, there is a buyer's market and a seller's market. Normally the seller's market will use information advantages to seek personal gains while the buyer's market will take measures to make up for the loss caused by the lack of information. According to the time factor, information asymmetry can be divided into information asymmetry beforehand and information asymmetry afterwards. Information asymmetry beforehand causes adverse selection, and information asymmetry afterwards causes moral hazard. Adverse selection means that under the premise of information asymmetry, the information-superior will modify the real information or will not disclose the real information to harm the interests of other stakeholders and obtain excess benefits. For the controlling shareholder and managers of a company, they have a grasp of the current development status and future development plan of the company. In order to attract external investors, they often manipulate external information to make the company seem to have higher investment value. Moral hazard occurs after the relevant contract is signed, which means the superior party of the information will harm the interests of the other party. If there are loopholes in the terms of the contract when the contract is signed, one party may make use of the loopholes to make choices that are beneficial to itself. In the capital market, external creditors and small and medium shareholders have limited access to corporate internal information. Based on the information disclosed by corporate financial reports, the controlling shareholder has the scope to harm the contractual counterparty's interests and seek personal gains.

Information asymmetry theory is widely used in capital markets, especially in securities trading and credit trading. The controlling shareholders' equity pledge is a typical transaction in the capital market. Although the controlling shareholder signs a pledge agreement with financial institutions, the controlling shareholder of a company understands the company's development and its own debt solvency better than financial institutions, which leads to the information asymmetry between the controlling shareholder and financial institutions. The management of a listed company has all the information related to the company's operating conditions, as well as other information on how to affect the stock price. External investors cannot fully and correctly judge the current operating status of the company and the future value of the company through public information. Furthermore, in the era of information explosion, the authenticity of relevant information requires further investigation. Therefore, in the case of information asymmetry, it will induce the listed companies to conduct earnings management. The controlling shareholder will also take advantage of his absolute power to seek for relevant information that other external stakeholders cannot obtain, collude with the company's management, and manage corporate earnings to achieve the purpose of manipulating stock prices, thus influencing the correct judgment of external investors on the company's value.

2.1.3 Principal-agent theory

In the 1930s, Bele and Means discovered that business owners had difficulties in handling business operations at the same time. Based on this finding, they proposed the concept of "principal-agent" and advocated the separation of management rights and ownership, which means the corporation had better transfer the management rights and retain the ownership. The early theory of neoclassical economics believes that there is no conflict between the principal and the agent, and the information channels of everyone in the enterprise are the same. In this case, the interests of all the parties in the enterprise are also the same. However, such an absolutely idealized situation will not exist in reality. With the continuous development of social productivity, the division of labor in society becomes more and more detailed, and therefore the role of professional managers occurs. Due to the limited energy of the enterprise owner, he will select competent and experienced managers to help him to operate the business, thus transferring the business right to maximize personal value and corporate wealth. The formation of this contractual relationship resulted in the separation of ownership and management rights, which was the original form of "principal-agent".

It is obvious that there is a serious disparity between the contractual parties in terms of interest relations and information resources. Corporate owners and agents have different demands. Owners care about the value of the company and the company's performance while the agents focus more on personal interests. The agents manage the company pursuing minimum efforts and maximum personal returns, together with incomplete contracts and imperfect supervision. Consequently, it will worsen the conflicts between the principal and the agent, which adversely affect the overall interests of the company. For companies with a relatively dispersed shareholding structure, most of the shareholders are just investors, so they have no motivation to manage the daily operations of the company. The power of daily business activities basically belongs to professional agents, but the agents will only make investments that are beneficial to them, which may do damage to the enterprise. This is the first type of agency problem.

With the development of the capital market, the second type of agency problem has become more and more serious, which is the agency conflict between large shareholders and small and medium shareholders. Large shareholders often hold the control of the company, which means large shareholders make use of their controls to influence the management to operate the company in accordance their wishes. In order to secure their jobs, the management is willing to take the intentions of the large shareholders into consideration when making business decisions. Theoretically speaking, the more concentrated equity the major shareholders have, the more consistent the interests of the company are. However, in reality, major shareholders tend to have more complex intentions. Large shareholders have the motivation to appropriate the interests of small and medium shareholders. Especially when the company encounters a financial crisis, large shareholders often make operating decisions at the cost of the interests of small and medium shareholders to satisfy their own demands.

The controlling shareholders' equity pledge is likely to cause the second type of agency problem. Large shareholders obtain funds from the pledgee. After the pledge of equity, the separation of control rights and cash flow rights increases the motivation of large shareholders to encroach on the rights and interests of small and medium shareholders. During the pledge period, if the stock price falls and touches the close-out line, the pledged equity will be disposed of by the pledgee, which will lead to the slump in the stock price and damage the interests of other small and medium shareholders. In addition, earnings information is the basis for external pledgees and investors to judge the financial status of the enterprise. Therefore, large shareholders have sufficient motivation to utilize information asymmetry to control corporate earnings during the equity pledge process, thus increasing the agency problem between them and small and medium shareholders.

2.1.4 Incomplete contract theory

The GHM model mentioned in two articles written by Sanford Grossman and Oliver Hart in 1986 and Oliver Hart and John Moore in 1990 is the basis for incomplete contract theory. Incomplete contract theory indicates that, it is impossible to control all risks in transactions by system and supervision, so the contract signed is an incomplete contract.

Hart explained the incompleteness of the contract from three aspects. First, in a complex and unpredictable world, it is difficult for people to think too far, and it is impossible to fully predict the various situations that may occur in the future and make plans respectively. Second, even if every single plan can be made, it is difficult for the contractual parties to reach an agreement on these plans. Third, even if the parties can reach an agreement on these plans, it is doubtful that when there are disputes between them, whether the external authority can clarify the true meaning of the contract terms and enforce them.

From the description of the incomplete contract theory, it is obvious that the equity pledge contract signed by the controlling shareholder and the financial institution is an incomplete contract. Financial institutions cannot accurately predict the changes in the company's stock price in the future through the materials submitted by the company. There is a risk that the stock price will fall. Although some risks have been avoided by setting the warning line and the close-out line, the bank will still face heavy capital losses if the listed company does not perform well, and the controlling shareholder cannot afford the loan personally. At the same time, it can be concluded that the relevant contract between the controlling shareholder and the small and medium shareholders is also not completed. Small and medium shareholders cannot reasonably predict the selfish behaviors of controlling shareholders after the equity pledge, which creates opportunities for controlling shareholders to influence corporate stock prices by manipulating earnings.

During the equity pledge period, the company's earnings information reflects the company's operating conditions. Since other stakeholders are in an inferior position in terms of information, it is difficult to judge whether there is the earnings manipulation. Therefore, the controlling shareholder will take advantage of the contract incompleteness to collude with the professional managers of the company. They conspire to manipulate the company's earnings, so that the market value of the company can remain unchanged or even increase during the pledge process.

2.2 Literature review of domestic and foreign research related to the selected topic

2.2.1 Research on equity pledge

In the Anglo-American capital market, the equity of listed companies is highly dispersed, and controlling shareholders rarely hold high-proportion shares. Therefore, the pledge of controlling shareholders' equity is not common in Western countries. The western academia does not pay much attention to it and related academic research is not sufficient (Wang et al., 2013). The existing research on equity pledge of foreign countries mainly focuses on emerging economies, especially the research on Taiwan's capital market. Domestic scholars' research on equity pledge mainly focuses on the field of law. In recent years, more and more domestic scholars in the field of management have begun to study controlling shareholders' equity pledge, mainly focusing on the motivation and economic consequences of the pledge.

(1) The motivations of controlling shareholders' equity pledge

The controlling shareholders' equity pledge mainly includes the three motivations. The first one is to meet the financing needs. Wang and Song (2015) believe that compared with other financing methods such as stock issuance, allotment, and bond issuance, equity pledge is less subject to policy regulatory restrictions and the approval process is more convenient. When listed companies have financing needs and do not have real estate and other mortgages, the financing goal can be quickly achieved through equity pledge. For the pledgee, equity pledge is a form of guarantee. The subject matter of the guarantee is the stock of a listed company, which has good transparency and liquidity, so it is convenient for timely monitoring and position closing. Wang et al. (2013) study the equity financing samples of A-share listed companies from 2009 to 2012 and find that, compared with state-owned enterprises, private enterprises are more inclined to adopt equity pledge measures to obtain funds to ease the financial pressure because of other financing constraints. The second one is to "empty" the company. The research of Joh (2003) and Friedman (2003) indicates that the majority shareholders have a strong motivation to transfer resources from companies with low cash flow rights to companies with high cash flow rights through financing methods such as equity pledges, in order to realize the "empty" of the company. Based on the equity pledge theoretical model of Friedman (2003), Peng et al. (2011) point out that the controlling shareholder has the motivation to empty the company. The better the financial status of the listed company is, the more opportunities the controlling shareholder has to obtain benefits from the company through equity pledge. The third one is to maintain or increase control. Kao et al (2004) use Taiwanese companies as a research sample, and conclude that the funds obtained by controlling shareholders through equity pledge are not intended for the development of listed companies, but for purchasing shares of listed companies to maintain or increase equity. This motivation is particularly obvious when the listed companies are facing a hostile takeover. Similarly, Cheng and Zhang (2018) claim that controlling shareholders are more inclined to increase their holdings of the stocks after equity pledges.

(2) The economic consequences of controlling shareholders' equity pledge

The research on the economic consequences of controlling shareholders' equity pledge mostly focuses on the influence of equity pledge on company value, operating performance, earnings management, dividend policy, and auditor's risk response. From the perspective of company value and operating performance, a large number of scholars believe that equity pledge will cause the separation of control rights and cash flow rights, which will cause agency problems between controlling shareholders and small and medium shareholders, and then adversely affect the value and operating performance of listed companies. Chen (2001) conducts research on the data of listed companies in Taiwan, and finds that the controlling shareholders' equity pledge behavior will affect the company's investment efficiency, increase the company's risk, and reduce the company's value. From the perspective of earnings management, Chen and Lu (2017) study Chinese listed companies in the growth enterprise market (GEM) and find that compared with GEM listed companies where the controlling shareholders do not pledge equity, the GEM listed companies with the controlling shareholders' equity pledge have stronger upward earnings management motives, and are inclined to conduct real earnings management. From the perspective of dividend policy, Liao et al. (2014) study the samples of listed companies that had pledged equity from 2007 to 2012 and conclude that the proportion of pledged shares of controlling shareholders is negatively correlated with the distribution of cash dividends. The reason may be that the equity pledge has led to an increase in the degree of separation between the controlling shareholders' control rights and cash flow rights. Therefore, the controlling shareholder is unable to obtain dividends related to cash flow rights, and then he is less inclined to issue cash dividends. From the perspective of auditors' risk response, Zhang et al. (2017) and Zhang (2016) take Chinese A-share listed companies from 2007 to 2014 as a research sample. The empirical results indicate that compared with listed companies without equity pledge by controlling shareholders, listed companies with equity pledge face higher audit fees, and the equity pledge ratio is positively correlated with audit fees.

2.2.2 Research on earnings management

Listed companies generally have the motivation of whitewashing financial statements through earnings management for special purposes (Wang, 2005). Earnings management not only misleads the market's judgment on the company's value, but also affects research and analysis based on the financial data disclosed by listed companies. The academia has been paying close attention to the earnings management behavior of enterprises, and many scholars have put forward their own views from the perspective of the motivation and method selection of earnings management.

(1) The motivation of earnings management

Regarding the motivations of earnings management, the first one is the capital market motivation, which mainly includes IPO motivation, additional issuance and allotment motivation, avoiding loss and delisting motivation. Lin et al. (2000) use companies listed on the Shanghai and Shenzhen Stock Exchanges between 1992 and 1995 as a sample to analyze their financial surplus before and after the IPO and find that the financial profits of these companies are in the highest level one or two years before the IPO and then the financial profits will experience a significant decline after the IPO year. Yang (2013) conducts a research on the earnings management of 281 sample companies listed on the Growth Enterprise Market from 2009 to 2010 during the IPO process, and find that companies will adopt a variety of earnings management methods during the IPO phase. Teoh et al. (1998) compare the data of two years before and after the additional issuance of US companies and conclude that the companies that have higher net income before the issuance will experience negative abnormal accrual profits after the issuance. Lu (2003) investigates the impact of the allotment policy on companies' accrual profits, and the result is that companies will adjust accrual profits based on the allotment policy, confirming that the earnings management behavior of listed companies in China is induced by the policy. According to the relevant provisions of China's Securities Management Law, if a listed company continues to lose money for a long period and cannot make profits within the specified time limit, the listed company may be specially dealt with or even terminate its listing. Therefore, companies with serious losses and on the verge of bankruptcy have a strong incentive to use earnings manipulation methods to recover losses and avoid delisting penalties (Cai et al., 2012). Lu (1999) takes 22 loss-making listed companies on the Shanghai Stock Exchange as a sample and finds that in order to avoid losses, the company will adjust its earnings upwards in the year before the first loss. In order to avoid continuous losses, the company will adjust the surplus downward in the first loss year.

The second one is contract motivation, which can be divided into management salary motivation and debt contract motivation. Listed companies formulate equity incentives or performance index policies to stimulate the enthusiasm of executives. When management predicts the poor performance of the company, in order to achieve performance targets and maintain remuneration, they have greater incentives to carry out earnings management (Healy, 1985; Flora Guidry, Andrew J Leone, Steve Rock, 1999; Liu et al., 2003). Li et al. (2007) collect data samples from Shanghai and Shenzhen listed companies and do the regression with modified cross-sectional Jones model, finding a significantly positive correlation between management compensation and earnings management. In addition, many scholars at home and abroad have put forward their own views on the motivation of debt contracts. The obligatory relationship between the company and its creditors is maintained through debt contracts. On the one hand, debt contracts improve the company's governance level, and on the other hand induce management's earnings management behavior. Roychowdhury (2006) and Li (2011) indicate that companies with higher debt levels have stronger motivations for real earnings management. In order to avoid violating the debt contract, companies will conduct more real earnings management to reduce the cost of debt. Research by Qin and Fang (2019) argue that companies tend to implement negative earnings management after debt default exposures to reduce reputation loss and legal risks caused by default exposures, thereby controlling the costs and risks of debt defaults.

Finally, there is the political cost motivation. One reason for the political cost motive is that companies expect to reduce taxes and avoid political supervision through earnings management. Johnes (1991) carries out a survey on the US government and finds that in the industries where companies applying for import tax reduction and exemption, managers would reduce their surplus through downward earnings management behavior, so that they can obtain the opportunity of import tax reduction or exemption. Chinese scholar Li et al. (2011) further establish a surplus model of tax avoidance motivation. The result shows that the company's real earnings management will increase with the increase in the tax rate, while the accrual earnings management will increase with the drop in the tax rate. The political supervision has a huge impact on the corporate earnings management. For monopolistic companies with outstanding performance, in order to avoid anti-monopoly, anti-dumping and other political sanctions, companies often have the motivation to adopt downward earnings management and reduce financial earnings level. Cahan (1992) claims that when companies receive anti-monopoly reviews from regulatory agencies, they will adopt downward earnings management behaviors and lower their financial profits to avoid anti-monopoly sanctions.

(2) Choice of Earnings Management Methods

Academia generally divides corporate earnings management methods into accrual earnings management and real earnings management. In the early stage of research on earnings management at home and abroad, the main focus is on accrual earnings (Fields et al., 2001). However, since Schipper (1989) and Roychowdhury (2003) included real earnings management in corporate earnings management research, the scope of research on corporate earnings management has extended from accrual earnings management to real earnings management. Cohen and Zarowin (2010) discover that the two earnings management methods have a mutual substitution relationship, which means the one earnings management method increases, the other one decreases. Hashemi et al. (2011) argue that there is a complementary relationship between the two earnings management methods, which means listed companies may use accrual earnings management and real earnings management at the same time for the purpose of earnings manipulation. Facing the choice of earnings management methods, most scholars believe that company managers will choose between the two earnings management methods (Cohen et al., 2008; Badertscher, 2011). When managers choose between the two earnings management methods, they generally consider the following two aspects: one is the motivation to implement earnings management, and the other is the risks and costs of implementing earnings management.

Listed companies will choose earnings manipulation methods according to their motives for earnings management. Zhang et al. (2018) find that listed companies tend to adopt accrual earnings management to meet short-term report whitewashing purposes. Lu (1999) proposes that China's loss-making listed companies mainly conduct accrual earnings management. Xie et al. (2018) believe that among the companies implementing performance-based equity incentive plans, the companies with performance just meeting with exercise conditions have a higher level of real earnings management, and such companies are more inclined to implement negative accrual earnings management.

In addition, Wang and Song (2015) argue that the risks and costs of earnings management will also affect the way managers choose to manipulate earnings. The risks and costs of implementing earnings management are mainly affected by the internal and external governance environment of listed companies. The tightening of the governance environment is an important reason why the company's earnings management changes from accrual earnings management to real earnings management. For example, Cohen et al. (2014) find that after the introduction of the Sarbanes-Oxley Act, the company's accrual earnings management dropped significantly, while the real earnings management level increased dramatically. With the improvement of accounting standards and the tightening of the regulatory environment, listed companies that manipulate earnings through accrual earnings management are more likely to be investigated by regulatory agencies, and therefore the risks and costs are greater. Liu et al. (2011) conduct an empirical test on the A-share market data and find that companies have begun to adopt more real earnings management to manipulate profits because it is difficult to implement accrual earnings management after the issue of new standards. Ye and Liu (2018) claim that analyst attention can play a role in preventing companies from conducting accrual earnings management. Therefore, listed companies tend to choose more real earnings management.

It is concluded from the above existing studies that although accrual earnings management is easy to implement, the behavior is easily detected by external investors and auditors. When the external governance environment becomes stricter, the risk and cost of the implementation of accrual earnings management are increasingly high. Therefore, the listed companies become reluctant to choose the accrual earnings management to manipulate accounting earnings. As the real earnings management is implemented through real trading activities, it is difficult for external investors and audit institutions to distinguish it from operating activities that do not have any manipulation purpose. Therefore, an increasingly number of listed companies begin to switch from accrual to real earnings management.

2.2.3 Research on the influence of equity pledge on earnings management

The literature review above regarding the motivations of the earnings management are all inferred from the perspective of listed companies' own interests. However, these research results are only part of the possible motivations for earnings management, and to a certain extent they restrict the interpretation power of the relevant literature on the corporate earnings management behavior. Therefore, recent literature has started to focus on the special phenomenon of controlling shareholders' equity pledge, looking for other possible earnings management motives.

Wang and Song (2015) indicate that after major shareholders pledge their equity, the earnings management behavior of listed companies change from "accrual earnings management'" to more concealed "real earnings management". Huang and Han (2014) find that the relationship between equity pledge and earnings management is affected by the ownership property. Major shareholders' equity pledges in state-owned holding companies face low risk of control transfer. Therefore, compared with private listed companies, state-owned holding companies have weaker earnings management motivations. Xie et al. (2017) argue that listed companies tend to use more hidden accounting policies such as capitalizing development expenditures under the background of major shareholders' equity pledges. In further research, they find that improving the quality of external audits can reduce this hidden earnings management behavior.

2.2.4 Research on the influence of equity structure on the equity pledge and earnings management

(1) The influence of the equity balance

Bennedsen and Wolfenzon (2001) believe that the private interests of major shareholders will be balanced by several powerful shareholders, so that the major shareholders will not hollow out the company. Bloch and Hege (2001) argue that when multiple large shareholders compete with each other in an enterprise, the decision is approved at the general meeting of shareholders. This reduces the selfish behavior with the unanimous approval of the majority of the shareholders. Zhu et al. (2010) use the 2003-2006 data of A-share listed companies as a sample. It concludes that there is an inverse relationship between earnings management and the degree of equity balance. Appropriate degree of equity balance is beneficial to restricting the opportunistic behavior of major shareholders. Lin and Xu (2012) find that the earnings management behavior such as reducing costs is significantly diminished through the enhancement of equity balance, which proves the effectiveness of equity balance on restricting earnings management. Chen and Lu (2017) argue that a certain amount of equity diversification can limit the motivation of major shareholders' embezzlement, and the positive relationship between controlling shareholders' equity pledge and real earnings management is weakened by the impact of equity balance. Wang (2016) selects 1039 companies with major shareholders' equity pledges as samples and finds that when the degree of the company's equity balance is low, the degree of equity balance has a positive relationship with major shareholders' equity pledge. However, when the degree of equity balance is high, the degree of equity balance has a negative relationship with the major shareholders' equity pledge, and this negative relationship requires the degree of equity balance with more than 60%.

(2) The influence of the equity concentration

Johnson (2000) first proposes the term "tunnel". He believes that the concentration of large shareholders' equity would lead to the encroachment of the interests of small and medium shareholders. Jiang et al. (2010) use Chinese listed companies from 1996 to 2006 as a sample, and find that major shareholders make use of inter-company related loans to harm the company interests. When the control right of major shareholders is significantly higher than the cash flow right, the major shareholders' motivation to damage stakeholders' interests is more serious (Shleifer and Vishny, 1997). Huang (2014) claims that the equity pledge by major shareholders damages the interests of the pledgee. Through empirical research, he finds that the amount of equity pledge by major shareholders is positively correlated with equity concentration. Through an empirical study of Chilean listed companies, Yang (2010) carries out an empirical study on listed companies excluding financial companies, and argues that the shareholding ratio of the largest shareholder is negatively related to earnings quality. However, LefortF (2008) believes that excessive equity diversification will lead to a decline in the quality of corporate earnings. Antonio (2011) carries out the research from the internal equity structure of the enterprise, and concludes that certain equity concentration has a positive effect on earnings quality. This effect is produced through the positive effect on internal audit and the board of directors. Koh (2003) explores a positive correlation between equity concentration and earnings management. However, Gu and Ouyang (2008) use A-share listed companies in 2002 as a sample and find that earnings management will first decline and then rise as the proportion of the largest shareholder's shareholding increases. Guan and Li (2004) conduct an empirical study on the data of 421 companies listed on the Shanghai Stock Exchange for three consecutive years and find that there is a significant correlation between equity concentration and earnings management. The relationship between the two is in a U-shaped distribution, which means high-concentrated or low-concentrated equity will both lead to an increase in the degree of earnings management. Jian and Liu (2013) point out that the credibility of corporate earnings information has a significant relationship with controlling shareholders. The stronger the controlling shareholder's actual control is, the lower the earnings credibility of the company will be.

(3) The influence of the ownership property

Fisman (2001) believes that "political relations" can affect the allocation of social resources, and state-owned enterprises are more likely to enjoy loan policies from banks. Khwaja and Mian (2005) also argue that "political relations" affects the long-term financing of companies. Companies with "political relations" are more likely to obtain loans from banks even if such companies have a higher default rate. Huang and Han (2014) build an empirical model to study the relationship among earnings management, major shareholders' equity pledge and capital embezzlement. The study indicates that in state-owned listed companies, the major shareholders' equity pledge is not directly related to the embezzlement, and earnings management is not necessarily chosen after the equity pledge. On the contrary, in private companies, the pledge of major shareholders' equity may lead to the occurrence of corporate earnings management and capital embezzlement. Wang and Song (2015) believe that managers in state-owned enterprises have a limited tenure, and their promotion and salary are mainly related to enterprise performance. Therefore, managers have an incentive to manipulate enterprise performance. In addition, the authors further study the moderating effect of the ownership property on major shareholders' equity pledge and earnings management, and find that compared with private enterprises, state-owned enterprises receive smaller financing constraints, so the state-owned property weakens the influence of major shareholders' equity pledge on earnings management. Xie and Liao (2018) claim that the transfer of equity in state-owned enterprises will attract the attention of relevant state departments. Even if the stock price drops, the creditor believes that the enterprise will handle it through non-market methods. Therefore, compared with state-owned enterprises, the private company has a stronger positive correlation between pledge equity and earnings management.

2.2.5 Comments on previous literature

Based on previous research findings, the researches on equity pledge mainly focus on the agency problems brought about by equity pledge and the influence of equity pledge on company value and performance. The researches on the motivation of earnings management are generally based on the perspective of listed companies' own interests. It is obvious that these research results are only part of the possible motivations for earnings management, which restricts the research scope of earnings management behavior of enterprises. Although some scholars have started with the special phenomenon of controlling shareholders' equity pledge to find other possible earnings management motivations independent of the listed company itself, the research results generally measure the degree of accrual earnings management. Another way of earnings management, real earnings management is rarely incorporated into the research. In addition, for companies with different equity structures, there are obvious differences in the effect of controlling shareholders' equity pledge on earnings management. Evidently, the current literature on the impact of equity pledge on corporate earnings management rarely focuses on this research perspective. This paper will focus on related research and analysis in these two directions. It first explores the relationship between the equity pledge and accrual earnings management or real earnings management. On this basis, this paper will further introduce the equity structure expressed by equity balance, equity concentration, and the ownership property as moderating variables, and systematically analyzes how different equity structures play the moderating role in the relationship between equity pledge behavior and earnings management. This paper will enrich the literature on controlling shareholders' equity pledge, earnings management, and equity structure to a certain extent, and provide more sufficient empirical evidence for related research.

3 Status quo, theoretical analysis and related assumptions of the equity pledge in Chinese listed companies

3.1 Status quo of the equity pledge in Chinese listed companies

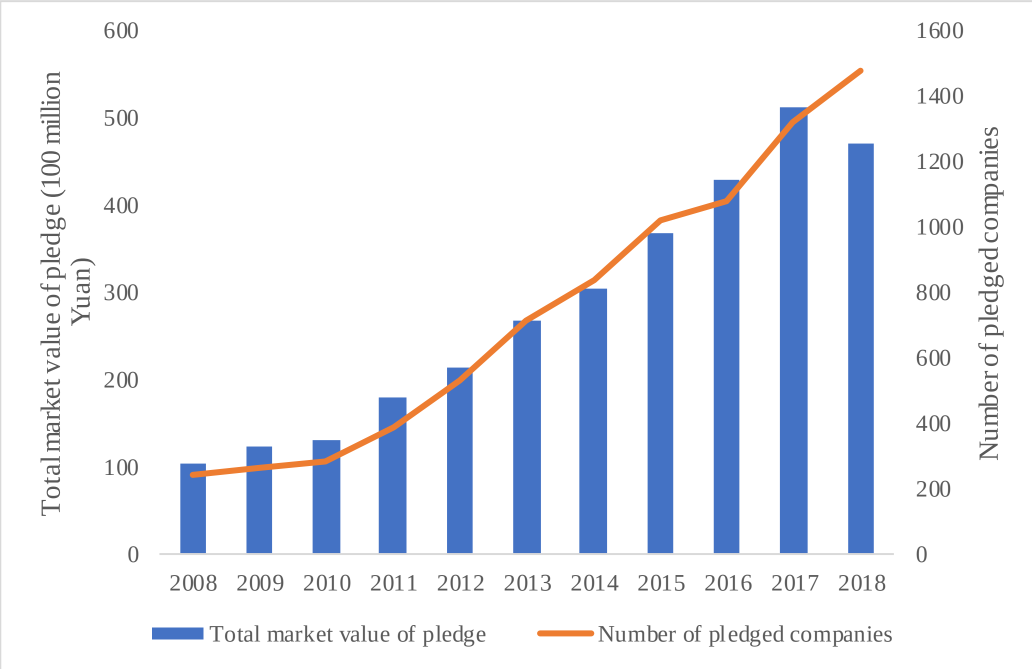

Figure 1: 2008-2018 Chinese A-share listed companies' equity pledge status

Data source: Compiled based on data from the CSMAR database

From Figure 1, it can be concluded that from 2008 to 2018, the number of companies that carried out equity pledges in the Chinese A-share market continued to increase, from 242 in 2008 to 1,477 in 2018. The year 2011 was an obvious turning point. The number of companies that pledged equity increased by 107, with a growth rate of 37.80%. The market value of pledged stocks also increased significantly, from 13.1 billion yuan in 2010 to 17.93 billion yuan in 2011, with a growth rate of 36.87%. In addition, another inflection point of the total market value of equity pledges appeared in 2018. The total market value of equity pledges dropped significantly compared to 2017, from 51.09 billion yuan in 2017 to 49.62 billion yuan in 2018, with a decrease of 8.16%. The possible reason is that in 2018, the number of blown-up stocks was increasing, so the capital market has become aware of the crisis of equity pledges. In general, whether from the number of companies that have pledged equity or the total market value of the equity pledge, there is an increasing trend in the development of equity pledges in Chinese A-share listed companies.

3.2 Theoretical analysis and related assumptions of the equity pledge and earnings management in Chinese listed companies

3.2.1 Theoretical analysis and related assumptions of the influence of equity pledge on earnings management

Although the equity pledge financing is a personal borrowing behavior, the controlling shareholders' equity pledge has a deep effect on the governance of listed companies. No matter where the funds from equity pledge are invested, the act of equity pledge itself reflects the financial distress of the controlling shareholder or the listed company, which is not necessarily good news for investors. Moreover, the media reports further expand this signal, making investors more sensitive and pay more attention to the performance of listed companies (Zheng et al., 2014). At the same time, the pledgee is also pleased to see the stability or rise of the stock price due to the difficulty of disposing of the pledged equity and recovering the claims. In other words, if the stock price falls below the close-out line, and the controlling shareholder cannot make up for the difference between the loan and the value of the pledge, the pledgee may not be able to realize the complete claims through the sale of the collateral. The reason is that once the market liquidity is insufficient, the collateral may be sold at a discount, and the amount of cash may not fully cover the main debt. Therefore, in order to avoid potential risks caused by equity pledge, the controlling shareholder has a strong motivation to manipulate earnings upwards during the equity pledge (Xie et al., 2016). Previous studies on equity pledge and earnings management mostly focused on the perspective of accrual earnings management. With the continuous development of the capital market, most accrual earnings management methods are easily identified by audit institutions and investors. The upwards accrual adjustment faces higher risks of regulatory review and class action, and are subject to the level of earnings management in previous periods (Gunny, 2010). The implementation and adjustment of real earnings management has high autonomy and therefore the controlling shareholder is inclined to implement real earnings management after the equity pledge. This paper believes that although accrual earnings management has shortcomings such as easily being discovered and lack of flexibility in adjustments, the controlling shareholder has not abandoned the accrual earnings management method after the equity pledge. Certain choice of accounting policies depends on the professional judgment of the management, such as the timing of the capitalization or expenditures. This type of accrual earnings management method does not require external announcements, so it is not easily identified by regulators and investors (Xie et al., 2017). Therefore, the controlling shareholders will also prefer this type of hidden accrual earnings management after the equity pledge. Based on above analysis, this paper proposes the following hypotheses:

H1a: Whether the controlling shareholders' equity is pledged is proportional to the accrual and real earnings management.

H1b: The controlling shareholders' equity pledge ratio is proportional to the accrual and real

earnings management.

3.2.2 Theoretical analysis and related assumptions of the influence of equity pledge on earnings management from the perspective of equity structure

The equity structure plays an extremely important role in the internal governance of the company. The company's equity structure directly affects the financing decisions of equity pledges and the equity structure also has an effect on the company's earnings manipulation. Equity balance, equity concentration and ownership property are the core of the research on equity structure. The effectiveness of the company's equity structure will promote the positive effect of controlling shareholders' equity pledge financing, and at the same time improve the company's earnings quality. This paper will explore the moderating effect of equity structure on the relationship between equity pledge and earnings management from three perspectives: the degree of equity balance, the degree of equity concentration and the ownership property.

（1）The moderating effect of equity balance on the relationship between controlling shareholders' equity pledge and earnings management

Effective equity balance plays a critical role in corporate governance. Compared with the negative effect of "one share dominance" on the company, the ownership structure of multiple shareholders is more beneficial to improving the corporate operation decisions and corporate value. On one hand, in order to protect their own interests and reduce risks, major shareholders will discuss on the equity pledge, and mobilize small and medium shareholders to actively participate in the company's operation and decision-making, so that the funds raised through equity pledge are beneficial to the development of the company. On the other hand, the mutual balance of multiple major shareholders can restrain the encroachment of small shareholders by major shareholders, and therefore improve the corporate governance structure. In addition, equity balance can form effective supervision of management, thereby curbing the opportunistic behavior of corporate managers, reducing the managers' motivation for earnings management and alleviating the agency problem between shareholders and management. Therefore, this paper proposes the following assumptions:

H2a: The degree of equity balance weakens the positive correlation between whether the controlling shareholders' equity is pledged and accrual or real earnings management.

H2b: The degree of equity balance weakens the positive correlation between the controlling shareholders' equity pledge ratio and accrual or real earnings management.

（2）The moderating effect of equity concentration on the relationship between controlling shareholders' equity pledge and earnings management

Shareholders with different shareholding ratios have different demands. The control right of a company is often grasped in the largest shareholder with a high shareholding ratio. The controlling shareholder tends to make use of equity pledges to transfer "static equity" to "dynamic capital" to maximize capital efficiency. After the equity pledge, the controlling shareholder will have greater incentives to collude with the management to manipulate earnings for their own interests. Accordingly, the following assumptions are made:

H3a: The degree of equity concentration enhances the positive correlation between whether the controlling shareholders' equity is pledged and accrual or real earnings management.

H3b: The degree of equity concentration enhances the positive correlation between the controlling shareholders' equity pledge ratio and accrual or real earnings management.

（3）The moderating effect of ownership property on the relationship between controlling shareholders' equity pledge and earnings management

On one hand, since state-owned enterprises are supported by the government and relative policies, lenders have low demand for earnings information. The availability of financing for state-owned companies is higher than that of private listed companies. In addition, state-owned companies also have advantages in financing costs, financing periods and other aspects. Because of the superiority of their own conditions, state-owned enterprises have less motivation for earnings management when they pledge equity. On the other hand, compared with private enterprises, controlling shareholders of state-owned enterprises face less risk of transfer of control rights after the equity pledge. The reason is that in order to prevent the loss of state-owned assets, state-owned shareholders will not be forced to close their positions when the stock price drops to the close-out line, and instead they are more inclined to take non-market measures to eliminate risks. Conversely, the controlling shareholders of private enterprises are confronted with the transfer of control rights, so they have a strong incentive to manage earnings after the equity pledge. Based on the above analysis, the following hypotheses are proposed:

H4a: Compared with state-owned enterprises, whether the controlling shareholders' equity is pledged in a private enterprise has a more significantly positive correlation with accrual and real earnings management.

H4b: Compared with state-owned enterprises, the controlling shareholders' equity pledge ratio in a

private enterprise has a more significantly positive correlation with accrual and real earnings management.

4 Empirical analysis of the influence of controlling shareholders' equity pledge in Chinese listed companies on earnings management

4.1 Data source and indicators analysis

4.1.1 Data source

The data in this paper is collected from the CSMAR database and the WIND database. The data of controlling shareholders' equity pledge come from the WIND database, and the data of earnings management and other data come from the CSMAR database. This paper uses the data of A-share listed companies for 11 consecutive years from 2008 to 2018. In order to improve the accuracy of the empirical process, the original sample data is screened. The ST and *ST companies and companies with omitting data are eliminated, and finally 16,335 companies are obtained as research subjects. All sample data are processed with STATA15.0 and EXCEL2016 software.

4.1.2 Variables explanation

(1) Explained variables

- Accrual Earnings Management (DA and DD)

This paper refers to the modified Jones model of Dechow et al. (1995) and the model proposed by Dechow et al. (2002) to obtain accrual earnings management indicators DA and DD. Accrual earnings management refers to the use of changes in accounting estimates and accounting policies to adjust the company's earnings after actual business or trading activities. The methods adopted are all within the scope permitted by accounting standards such as the changes in the inventory evaluation method, the adjustments in the scope of the consolidated statement, the changes in the depreciation method, the changes in the allowance for assets impairment. The above methods are usually selected at the end of each year. The reason is that at the end of the year, the manager will compare the expected surplus with the actual surplus, and find the gap between them. Next the manager will figure out the direction and method of the surplus adjustment, and then modify the corresponding accounting data. Accrual earnings management only changes accounting policies and accounting estimates, which will affect the distribution of the company's earnings. By contrast, the overall income and cash flow will not be changed, and basically the company's long-term decisions will not be altered. However, the benefits of accrual earnings manipulation fade over time. If more accrual earnings management is implemented in the early stage to increase profits, it will be difficult to use accrual earnings management to manipulate profits later. Therefore, accrual earnings management methods are suitable for short-term manipulation, such as controlling shareholders' equity pledge motives and obtaining IPO qualifications.

This paper first refers to the modified Jones model of Dechow et al. (1995), which uses the manipulable accrual profit DA to construct the accrual earnings management index:

$$\frac{TA_{it}}{A_{it-1}} = \beta_0 \frac{1}{A_{it-1}} + \beta_1 \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \beta_2 \frac{PPE_{it}}{A_{it-1}} + \varepsilon_{it} \ (1)$$

In formula (1), TA_{it} is the total accrual profits of the company i in year t, which is equal to the changes in accounts receivable plus the changes in inventory minus the changes in accounts payable minus the changes in taxes payable plus the changes in other current assets. A_{it-1} is total assets of company i at the end of year t-1. ΔREV_{it} is the change in the operating profits of the company i in year t, ΔREC_{it} is the change in the accounts receivable of the company i in year t, and PPE_{it} is total fixed assets of the company i in year t. According to the regression result of (1), the absolute value of the regression residual is used to measure the degree of earnings management, which is $DA_{it} = |\varepsilon_{it}|$.

To ensure the robustness of the empirical regression, this paper also uses the accrual earnings management indicator DD proposed by Dechow et al. (2002) to construct the model:

$$\frac{TA_{it}}{A_{it-1}} = \beta_0 \frac{1}{A_{it-1}} + \beta_1 \frac{\mathrm{CFO}_{it-1}}{A_{it-1}} + \beta_2 \frac{\mathrm{CFO}_{it}}{A_{it-1}} + \beta_3 \frac{\mathrm{CFO}_{it+1}}{A_{it-1}} + \varepsilon_{it} \ (2)$$

In formula (2), TA_{it} is the total accrual profit of the company i in year t, which is equal to the change in accounts receivable plus the change in inventory minus the change in accounts payable minus the change in taxes payable plus the change in other current assets. A_{it-1} is total assets of company i at the end of year t-1. CFO_{it} is the net cash flow from operating activities of company i in year t. According to the regression result of (2), the absolute value of the regression residual is used to measure the degree of earnings management, which is $DD_{it} = |\varepsilon_{it}|$.

- Real Earnings Management (RM)

This paper refers to the method of Roychowdhury (2006) to measure the company's real earnings management level. Firstly, model (3), model (4), and model (5) listed as follows are estimated by industry and by year. The residual items estimated in the model are the company's abnormal net operating cash flow (ACFO), abnormal production costs (APROD) and abnormal discretionary expenses (ADISEXP). The valuation models are as follows:

$$CFO_{it} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{S_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \varepsilon_{it} \text{ (3)}$$

$$PROD_{it} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{S_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{\Delta S_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \text{ (4)}$$

$$DISEXP_{it} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{S_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \text{ (5)}$$

S_{it} is the operating income of company i in year t. ΔS_{it} is the change in operating income of company i in year t, which is equal to the difference between operating income in year t and operating income in year t-1. A_{it-1} represents the total assets of company i at the end of year t-1. CFO_{it} represents the net operating cash flow of company i in year t. $PROD_{it}$ represents the production costs of company i in year t. $DISEXP_{it}$ represents the discretionary expenses of company i in year t. Since listed companies in China do not separately disclose R&D expenses and advertising expenses, and include these two items in sales expenses and administrative expenses instead, the sum of sales and administrative expenses can approximate discretionary expenses.

Nest, the indicator RM is respectively composed of abnormal net operating cash flow (ACFO), abnormal production costs (APROD) and abnormal discretionary expenses (ADISEXP). The specific RM index calculation formula is as follow:

$$RM = (-1) \times ACFO + (-1) \times ADISEXP + APROD \text{ (6)}$$

The larger the RM value is, the more preferable real earnings management is to the company. Although stock prices will be affected by various information, company earnings information has been one of the most important information for investors to evaluate stock prices for a long time. In order to manage the market value, stabilize or even increase the stock price, the controlling shareholder who has pledged equity will naturally pay more attention to the company's earnings, and when necessary, will directly prompt listed companies to manipulate earnings upward through earnings management. Unlike accrual earnings management, real earnings management is suitable for long-term manipulation. The enterprise establishes real operating activities to affect the profit level of the current period. It includes reducing production costs, manipulating cash flow from operating activities, and reducing discretionary expenses. First, enterprises can dilute the fixed costs of unit product through expanding production, which helps to reduce the average cost and increase the overall sales profit margin. Second, companies can increase short-term sales, expand sales discounts and accelerate revenue recognition to manipulate their corporate cash flow. Third, enterprises can reduce discretionary expenses such as research and development expenses, advertising expenses, and employee training expenses to reduce short-term expenses. Although the real earnings management is more concealed and difficult to be discovered by the regulatory authorities, it is detrimental to the value creation of the company, which does harm to other major shareholders who have not pledged equity.

(2) Explanatory variables

In terms of equity pledge, firstly construct the dummy variable PLD. When the controlling shareholder still has equity pledge at the end of the year, assign a value of 1, otherwise it will be 0. Secondly, construct the equity pledge ratio PLD_R, which is expressed by the proportion of the number of controlling shareholders' equity pledge to the company's share capital.

Equity pledge refers to the behavior of the pledger to obtain loans from financial institutions such as banks or provide guarantees through pledging their own equity. For pledgers (company's shareholders) of the equity pledge, they will obtain a certain amount of funds after the equity is pledged, but they will not lose the corresponding control of the pledged equity. If the pledger is the controlling shareholder, he only loses the dividend rights and the right of property claims, and his dominant position will not change. For pledgees (banks and other financial institutions), the pledge of the shareholders is equity, and the value of equity is closely related to the stock price of the listed company. Since the relevant information of stocks is open and transparent, financial institutions can monitor stock prices timely to evaluate the value of collateral. Once the stock price drops and approaches the warning line, the banks and other financial institutions can require the company's shareholders to supplement pledges to maintain the value of equity unchanged. When the stock price falls to the close-out line, banks and other financial institutions can auction the equity to repay debt. If there is surplus after the auction, the surplus will be returned to the pledger. If it is still insufficient to repay the entire debt, the pledgee has the right to demand that the pledger should pay the insufficient amount. Therefore, from the perspective of shareholders or banks and other financial institutions, the financing method of equity pledge can not only alleviate the financing constraints of the pledger, but also protect the interests of the pledgee. However, while equity pledge brings convenience, it may also lead to moral hazard and market risk. Moral hazard mainly refers to the fact that after the controlling shareholder has pledged his equity, he has an incentive to hollow out the listed company. The controlling shareholder exerts significant influence through the general meeting of shareholders so that he can appropriate the interests of other small and medium shareholders, and maximizes his own interests. Market risk means that the company's stock price will be affected by the market and other external environments. The behavior of controlling shareholder's equity pledge transmits a certain market signal that the controlling shareholder is facing financial difficulties, which indirectly affects the company's stock price.

(3) Other variables

The moderating variable is composed of the following indicators: the degree of equity balance (EB), expressed by the ratio of summarizing the second to fifth largest shareholders' shareholding ratio to the first largest shareholder's shareholding ratio; the degree of equity concentration (CRL), represented by the ratio of the number of shares held by the largest shareholder to the total number of shares; the ownership property (SOE), if the property of the company is a state-owned enterprise, assigns a value of 1, otherwise it is 0.
The controlled variables are composed of the following indicators: enterprise size (SIZE), represented by the natural logarithm of total assets at the end of the year; number of employees (LABOR), represented by the natural logarithm of the number of employees at the end of the year; debt-to-asset ratio (LEV), represented by the ratio of total debts to total assets at the end the year; return on equity (ROE), expressed by the ratio of net income to the total equity at the end of the year; the book-to-market value ratio (BTM), represented by the ratio of total assets at the end of the year to the sum of market value of equity and market value of net debt; independent director ratio (DURA), represented by the ratio of independent directors to the total number of board members; high-quality auditing (BIG4), if the auditor is a Big Four accounting firm, the value is 1, otherwise it is 0.

Table 1: Variables introduction

Types of variables	Name	Short name	Calculation method and description
Explained variables	Accrual earnings management	DA	Modified Jones model from Dechow et al. (1995): the absolute value of the regression residual
	Accrual earnings management	DD	Dechow et al. (2002): the absolute value of the regression residual
	Real earnings management	RM	Roychowdhury's approach (2006): abnormal production costs-abnormal operating cash flows-abnormal operating expenses
Explanatory variable	Equity pledge	PLD	If the controlling shareholder still has the pledged shares at the end of the year, the value is 1, otherwise it is 0.
	Equity pledge ratio	PLD_R	The amount of controlling shareholders' equity pledge / The company's total share capital
Moderating variable	The degree of equity balance	EB	Sum of the second to fifth largest shareholders' shareholding ratio / The first largest shareholder's shareholding ratio

	The degree of equity concentration	CRL	The number of shares held by the largest shareholder / The total number of shares
	The ownership property	SOE	State-owned enterprise assigns 1, otherwise 0
Controlled variable	The size of the enterprise	SIZE	Natural logarithm of total assets at the end of the year
	The number of employees	LABOR	Natural logarithm of the number of employees at the end of the year
	Debt-to-asset ratio	LEV	Total debts at the end of the year/ Total assets at the end of the year
	Return on equity	ROE	Net income/ Total equity at the end of the year
	Book-to-market ratio	BTM	Total assets at the end of the year / (market value of equity + market value of net debt)
	Independent director ratio	DURA	The ratio of independent directors to the total number of board members
	High-quality auditing	BIG4	If the auditor is a Big Four accounting firm, the value is 1, otherwise it is 0

4.1.3 Descriptive Statistics

Table 2 shows the descriptive statistics of the main variables. The mean value of real earnings management in the explained variables is -0.0074, and the mean value of the two measures of accrual earnings management is 0.32378 and 0.0702 respectively, indicating that Chinese listed companies have adopted a variety of earnings management methods. In terms of explanatory variables, from 2008 to 2018, the average number of companies that pledged equity accounted for 39.30%, indicating that equity pledges are common in Chinese A-share listed companies. For the equity pledge ratio PLD_R, this paper excludes the amount of PLD=0 in the empirical study, because companies that have not pledged equity are the majority, which can more accurately demonstrate the relationship between equity pledge ratio and earnings management. Among the moderating variables, the average value of the degree of equity balance is 1.1511, and the average value of the degree of equity concentration is 0.4803, indicating that the largest shareholder generally has strong control rights among Chinese listed companies.

Table 2: Descriptive statistics

VARIABLES	Obs	Mean	Std. Dev.	Min	Max
DD	16,335	0.32378	0.7021	0.0002	1.4184
DA	16,335	0.0702	0.1221	0.0003	1.6819
RM	16,335	-0.0074	0.2754	-2.3091	7.122

PLD	16,335	0.3930	0.4884	0.0000	1.0000
PLD_R	6,372	0.0633	0.0639	0.0007	0.3156
SIZE	16,335	22.1795	1.3304	15.4177	28.5199
LABOR	16,335	7.6966	1.3377	1.9459	13.2227
LEV	16,335	0.4504	0.2055	0.0577	0.9052
ROE	16,335	0.0585	0.4765	-1.4823	4.2644
BTM	16,335	0.4908	0.4973	-0.7071	13.2228
DURA	16,335	0.3716	0.05471	0.333	0.8
BIG4	16,335	0.4272	0.4946	0	1
EB	16,335	1.1511	0.6521	0.219	2.8998
CRL	16,335	0.4803	0.1555	0.02672	0.8813
SOE	16,335	0.4247	0.4943	0	1

4.2 Model building

This paper uses a two-way fixed effect model to estimate the relationship between equity pledge and earnings management, so the following benchmark regression models are constructed:

$$y_{it} = \alpha_0 + \alpha PLD_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (7)$$

$$y_{it} = \alpha_0 + \alpha PLD\_R_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (8)$$

In the model (7) and (8), y represents earnings management, which is represented by accrual earnings management (DA) and real earnings management (RM). PLD represents a dummy variable for the company's equity pledge. When a company has equity pledge at the end of the year, the value of PLD is 1, otherwise it is 0. PLD_R represents the corporate equity pledge ratio, which is expressed as the ratio of the amount of the controlling shareholder's equity pledge to the company's total share capital. X is the controlled variable, which is represented by the company size, the number of employees, debt-to-assets ratio, return on equity, the book-to-market ratio, the ratio of independent directors and high-quality auditing. γ_t is the time fixed effect, δ_i is the firm fixed effect, and ε_{it} is the random disturbance term. In order to better fit the causal relationship between equity pledge and earnings management, this paper lags the core variables by one year for regression.

4.3 Empirical results

Table 3 shows the benchmark regression results of whether to pledge equity or not. Judging from the coefficients of whether to pledge equity presented in the table, whether other variables are controlled or not, whether to pledge equity is significantly proportional to the company's accrual earnings management and real earnings management. It shows that under the same conditions, compared with listed companies that do not take equity pledges by controlling shareholders, listed companies with controlling shareholders' equity pledge will have a relatively higher level of corporate earnings management. This conclusion proves the hypothesis of H1a. In terms of the controlled variables, the corporate size has a significantly positive relationship with accrual and real earnings management. The number of employees has a significantly negative relationship with accrual and real earnings management. The debt-to-asset ratio has a significantly positive relationship with accrual earnings management, and a significantly negative relationship with real earnings management. The return on equity has a significantly negative relationship with accrual earnings management, and a significantly positive relationship with real earnings management. The book-to-market value ratio has a significantly positive relationship with accrual earnings management. The high-quality audit has a significantly negative relationship with accrual earnings management, and a significantly positive relationship with real earnings management.

Table 3: Benchmark regression on whether to pledge equity

	(1)	(2)	(3)	(4)
VARIABLES	DA	DA	RM	RM
PLD	0.0182***	0.0140***	0.0193***	0.0146***
	(0.00262)	(0.00268)	(0.00472)	(0.00471)
SIZE		0.00735***		0.0371***
		(0.00150)		(0.00299)
LABOR		-0.0171***		-0.0411***
		(0.00142)		(0.00285)
LEV		0.0716**		-1.265***
		(0.0355)		(0.0792)
ROE		-0.00965***		0.0222*
		(0.00316)		(0.0115)
BTM		0.0691***		0.0204
		(0.00819)		(0.0133)
DURA		0.0221		-0.00116
		(0.0157)		(0.0355)
BIG4		-0.00949***		0.0112*
		(0.00248)		(0.00585)
Time fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes

adj. R^2	0.016	0.042	0.009	0.055
F	48.5443***	34.3040***	16.8166***	65.3229***
N	16,335	16,335	16,335	16,335

Note: The standard errors in parentheses are robust standard errors. ***, **, and * indicate the significance levels of 1%, 5%, and 10%, respectively.

Table 4 shows the benchmark regression results of equity pledge ratio. Judging from the coefficients of the equity pledge ratio presented in the table, whether other variables are controlled or not, the equity pledge ratio is proportional to the company's accrual earnings management and real earnings management. It shows that under the same conditions, the higher the proportion of pledged equity of the controlling shareholder is, the higher the corporate earnings management will be. This conclusion proves the hypothesis of H1b. In terms of the controlled variables, the corporate size has a significantly positive relationship with accrual and real earnings management. The number of employees has a significantly negative relationship with accrual and real earnings management. The debt-to-asset ratio has a significantly positive relationship with accrual earnings management, and a significantly negative relationship with real earnings management. The return on equity has a significantly negative relationship with accrual earnings management, and a significantly positive relationship with real earnings management. The book-to-market value ratio has a significantly positive relationship with accrual earnings management. The high-quality audit has a significantly negative relationship with accrual earnings management, and a significantly positive relationship with real earnings management.

Table 4: Benchmark regression on equity pledge ratio

	(1)	(2)	(3)	(4)
VARIABLES	DA	DA	RM	RM
PLD_R	0.142***	0.105***	0.148***	0.0954**
	(0.0385)	(0.0391)	(0.0478)	(0.0431)
SIZE		0.0167***		0.0415***
		(0.0031)		(0.0070)
LABOR		-0.0249***		-0.0553***
		(0.0026)		(0.0045)
LEV		0.0455		0.2785***
		(0.0373)		(0.0921)

ROE		-0.0021		-0.0697
		(0.0205)		(0.0448)
BTM		0.0264		-0.1222
		(0.0367)		(0.0897)
DURA		0.0108		0.0734
		(0.0288)		(0.0638)
BIG4		-0.0051		-0.0176**
		(0.0044)		(0.0082)
Time fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
adj. R^2	0.020	0.050	0.013	0.064
F	2.1627	18.9972***	0.7397	29.0360***
N	6372	6372	6372	6372

Note: The standard errors in parentheses are robust standard errors. ***, **, and * indicate the significance levels of 1%, 5%, and 10%, respectively.

5 Empirical analysis of the influence of controlling shareholders' equity pledge in Chinese listed companies on earnings management from the perspective of equity structure

5.1 Model building

This chapter examines the moderating effect of equity structure on the relationship between equity pledge and earnings management. Therefore, this paper constructs the following regression models:

$$y_{it} = \alpha_0 + \alpha_1 PLD_{it\text{-}1} + \alpha_2 M_{it\text{-}1} + \alpha_3 M_{it-1} \times PLD_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (9)$$

$$y_{it} = \alpha_0 + \alpha_1 PLD\_R_{it\text{-}1} + \alpha_2 M_{it\text{-}1} + \alpha_3 M_{it-1} \times PLD\_R_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (10)$$

In the model (9) and (10), y represents earnings management, which is represented by accrual earnings management (DA) and real earnings management (RM). PLD represents a dummy variable for the company's equity pledge. When a company has equity pledge at the end of the year, the value of PLD is 1, otherwise it is 0. PLD_R represents the corporate equity pledge ratio, which is expressed as the ratio of the amount of the controlling shareholder's equity pledge to the company's total share capital. M is the moderating variable, which is equal to EB, CRL, and SOE respectively. EB is the degree of equity balance, CRL is the degree of equity concentration, and SOE is the ownership property. X is the controlled variable, which is represented by the company size, the number of employees, debt-to-assets ratio, return on equity, the book-to-market ratio, the ratio of independent directors and high-quality auditing. γ_t is the time fixed effect, δ_i is the firm fixed effect, and ε_{it} is the random disturbance term. In order to better fit the causal relationship between equity pledge and earnings management, this paper lags the core variables by one year for regression.

5.2 Empirical results

5.2.1 The moderating effect on whether to pledge equity

When the explanatory variable is whether to pledge equity or not, the equity balance EB, equity concentration CRL, and ownership property SOE are added in sequence. The regression results show in Table 5 that the regression coefficient of the cross-term of EB and PLD is significantly negative, which indicates that the higher the company's degree of equity balance is, the weaker the positive effect of whether the controlling shareholders' equity is pledged on the degree of accrual and real earnings management will be. The regression coefficient of the cross-term of CRL and PLD is significantly positive, which indicates that the higher the company's degree of equity concentration is, the stronger the positive effect of whether the controlling shareholders' equity is pledged on the degree of accrual and real earnings management will be. The regression coefficient of the cross-term of SOE and PLD is significantly negative, which indicates that compared with state-owned holding companies, whether the controlling shareholders' equity is pledged in a private company has a more positive effect on accrual and real earnings management. The conclusions from Table 5 prove the hypotheses of H2a, H3a, and H4a.

Table 5: The moderating effect on whether to pledge equity

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	DA	DA	DA	RM	RM	RM
PLD	0.0266	-0.0129	0.0111***	0.0242	-0.0231*	0.2660***
	(0.0798)	(0.0852)	(0.0296)	(0.1220)	(0.0139)	(0.0564)
EB	0.0923			-0.0062		
	(0.0995)			(0.0157)		
PLD*EB	-0.0355*			-0.0365*		
	(0.0199)			(0.0211)		
CRL		-0.0534***			0.0525***	
		(0.0164)			(0.0156)	
PLD*CRL		0.0576***			0.0793**	
		(0.0020)			(0.0314)	

SOE			-0.0868***			0.0252***
			(0.0271)			(0.00541)
PLD*SOE			-0.0205*			-0.0140*
			(0.0121)			(0.0081)
SIZE	0.0073***	0.0072***	0.0086***	0.0266***	0.0284***	0.0233***
	(0.0015)	(0.0015)	(0.0016)	(0.0032)	(0.0032)	(0.0033)
LABOR	-0.0169***	-0.0168***	-0.0170***	-0.0430***	-0.0428***	-0.0428***
	(0.0014)	(0.0014)	(0.0014)	(0.0029)	(0.0029)	(0.0029)
LEV	0.0623***	0.0599***	0.0653***	0.2123***	0.2170***	0.2152***
	(0.0219)	(0.0218)	(0.0218)	(0.0510)	(0.0508)	(0.0505)
ROE	-0.0067*	-0.0068*	-0.0065*	-0.0303	-0.0302	-0.0306
	(0.0038)	(0.0038)	(0.0039)	(0.0263)	(0.0263)	(0.0261)
BTM	0.0013	0.0050	0.0013	-0.0326	-0.0439	-0.0418
	(0.0205)	(0.0205)	(0.0202)	(0.0488)	(0.0488)	(0.0484)
DURA	0.0164	0.0164	0.0155	0.0273	0.0291	0.0314
	(0.0161)	(0.0159)	(0.0162)	(0.0367)	(0.0367)	(0.0370)
BIG4	-0.0071***	-0.0071***	-0.0068***	-0.0233***	-0.0233***	-0.0237***
	(0.0023)	(0.0023)	(0.0023)	(0.0061)	(0.0061)	(0.0061)
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.043	0.044	0.043	0.055	0.056	0.057
F	33.8092***	31.7874***	29.8435***	55.5083***	61.0757***	58.5923***
N	16335	16335	16335	16335	16335	16335

Note: The standard errors in parentheses are robust standard errors. ***, **, and * indicate the significance levels of 1%, 5%, and 10%, respectively.

5.2.2 The moderating effect on equity pledge ratio

When the explanatory variable is equity pledge ratio, the equity balance EB, equity concentration CRL, and ownership property SOE are added in sequence. The regression results show in Table 6 that the regression coefficient of the cross-term of EB and PLD_R is significantly negative, which indicates that the higher the company's degree of equity balance is, the weaker the positive effect of the equity pledge ratio on the degree of accrual and real earnings management will be. The regression coefficient of the cross-term of

CRL and PLD_R is significantly positive, which indicates that the higher the company's degree of equity concentration is, the stronger the positive effect of the equity pledge ratio on the degree of accrual and real earnings management will be. The regression coefficient of the cross-term of SOE and PLD_R is significantly negative, which indicates that compared with state-owned holding companies, the equity pledge ratio in a private company has a more positive effect on accrual and real earnings management. The conclusions from Table 6 prove the hypotheses of H2b, H3b, and H4b.

Table 6: The moderating effect on equity pledge ratio

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	DA	DA	DA	RM	RM	RM
PLD_R	0.214	-0.126	0.186***	0.228	0.0538	0.1102*
	(0.763)	(0.845)	(0.0211)	(0.172)	(0.186)	(0.0569)
EB	0.0923			0.001		
	(0.0995)			(0.001)		
PLD_R*EB	-0.0112***			-0.0044***		
	(0.0022)			(0.0011)		
CRL		-0.0236***			-0.0028**	
		(0.0099)			(0.0014)	
PLD_R*CRL		0.0432***			0.0013***	
		(0.00101)			(0.0004)	
SOE			-0.0321***			0.0164***
			(0.0035)			(0.005)
PLD_R*SOE			-0.0369*			-0.133***
			(0.0208)			(0.0081)
SIZE	0.0157***	0.0150***	0.0173***	0.0428***	0.0429***	0.0411***
	(0.0027)	(0.0027)	(0.0032)	(0.0069)	(0.0068)	(0.0071)
LABOR	-0.0249***	-0.0247***	-0.0249***	-0.0553***	-0.0554***	-0.0554***
	(0.0026)	(0.0026)	(0.0026)	(0.0045)	(0.0045)	(0.0045)
LEV	0.0394	0.0324	0.0495	0.2848***	0.2899***	0.2816***
	(0.0378)	(0.0379)	(0.0373)	(0.0941)	(0.0939)	(0.0922)
ROE	-0.0028	-0.0032	-0.0019	-0.0695	-0.0690	-0.0695
	(0.0200)	(0.0197)	(0.0204)	(0.0446)	(0.0443)	(0.0447)

BTM	0.0337	0.0436	0.0249	-0.1322	-0.1376	-0.1261
	(0.0391)	(0.0397)	(0.0364)	(0.0919)	(0.0924)	(0.0896)
DURA	0.0086	0.0066	0.0037	0.0707	0.0735	0.0776
	(0.0288)	(0.0286)	(0.0302)	(0.0636)	(0.0638)	(0.0644)
BIG4	-0.0052	-0.0053	-0.0047	-0.0173**	-0.0173**	-0.0175**
	(0.0044)	(0.0044)	(0.0043)	(0.0083)	(0.0082)	(0.0082)
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.051	0.052	0.051	0.065	0.064	0.064
F	17.3224***	17.7146***	15.5230***	24.6271***	26.2194***	24.7651***
N	6372	6372	6372	6372	6372	6372

Note: The standard errors in parentheses are robust standard errors. ***, **, and * indicate the significance levels of 1%, 5%, and 10%, respectively.

5.3 Robustness test

This paper tests the robustness of the above conclusions by using the method of replacing the explained variables. Firstly, replace the accrual earnings management indicator DA with the DD, and re-regress the benchmark regression model. The regression results are shown in Table 7. When the explanatory variable is whether to pledge equity or not, judging from the coefficients of the equity pledge presented in the table, whether other variables are controlled or not, whether to pledge equity is significantly proportional to the company's accrual earnings management. It shows that under the same conditions, compared with listed companies that do not take equity pledges by controlling shareholders, listed companies with controlling shareholders' equity pledge will have a relatively higher level of accrual earnings management. When the explanatory variable is equity pledge ratio, judging from the coefficients of the equity pledge ratio presented in the table, whether other variables are controlled or not, equity pledge ratio is significantly proportional to the company's accrual earnings management. It shows that under the same conditions, the higher the proportion of pledged equity of the controlling shareholder is, the higher the accrual earnings management will be.

Table 7: Robustness test of benchmark regression

VARIABLES	(1) DD	(2) DD	(3) DD	(4) DD
PLD	0.159***	0.114**		
	(0.0574)	(0.0582)		
PLD_R			1.256***	1.996*
			(0.103)	(1.100)
SIZE		0.3917***		0.4142***
		(0.0584)		(0.0828)
LABOR		-0.4317***		-0.3929***
		(0.0624)		(0.0748)
LEV		0.7455		0.9903
		(0.5499)		(0.8483)
ROE		0.0478		0.1705
		(0.0396)		(0.1286)
BTM		-0.4243		-0.6422
		(0.5596)		(0.8270)
DURA		0.1410		-0.0504
		(0.4823)		(0.6168)
BIG4		-0.1008***		-0.0836
		(0.0379)		(0.0682)
Time fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
adj. R^2	0.042	0.056	0.069	0.088
F	7.7053*	7.7125***	1.7270	3.8095***
N	16335	16335	6372	6372

Note: The standard errors in parentheses are robust standard errors. ***, **, and * indicate the significance levels of 1%, 5%, and 10%, respectively.

Secondly, to do the robustness check on the moderating effect, replace the accrual earnings management indicator DA with the DD and add equity balance EB, equity concentration CRL, and ownership property SOE in sequence. The regression results show in Table 8 that the regression coefficient of the cross-term of EB and PLD or PLD_R is significantly negative, which indicates that the higher the company's degree of equity balance is, the weaker the positive effect of whether to pledge equity and the equity pledge ratio on the degree of accrual earnings management will be. The regression coefficient of the cross-term of CRL and

PLD or PLD_R is significantly positive, which indicates that the higher the company's degree of equity concentration is, the stronger the positive effect of whether to pledge equity and the equity pledge ratio on the degree of accrual earnings management will be. The regression coefficient of the cross-term of SOE and PLD or PLD_R is significantly negative, which indicates that compared with state-owned holding companies, whether to pledge equity and the equity pledge ratio in a private company have a more positive effect on accrual earnings management.

Table 8: Robustness test of the moderating effect on DD

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	DD	DD	DD	DD	DD	DD
PLD	-0.177	-0.589***	0.0581			
	(0.148)	(0.186)	(0.0661)			
PLD_R				-0.095	-0.0832	0.0432
				(0.114)	(0.0963)	(0.0778)
EB	-0.0161			-0.0356		
	(0.0305)			(0.0396)		
PLD*EB	-0.0885*					
	(0.0462)					
PLD_R*EB				-0.0776***		
				(0.0069)		
CRL		-0.0221			-0.0115	
		(0.0285)			(0.0386)	
PLD*CRL		0.0150***				
		(0.0044)				
PLD_R*CRL					0.0174***	
					(0.0013)	
SOE			-0.0970			-0.0631
			(0.0827)			(0.0865)
PLD*SOE			-0.1080*			
			(0.0575)			
PLD_R*SOE						-0.116***
						(0.04301)
SIZE	0.3874***	0.3898***	0.3985***	0.3933***	0.3725***	0.4187***

	(0.0597)	(0.0602)	(0.0591)	(0.0804)	(0.0762)	(0.0839)
LABOR	-0.4305***	-0.4280***	-0.4321***	-0.3925***	-0.3898***	-0.3912***
	(0.0623)	(0.0620)	(0.0625)	(0.0747)	(0.0744)	(0.0739)
LEV	0.6914	0.6574	0.7363	0.8767	0.6677	0.8639
	(0.5528)	(0.5487)	(0.5472)	(0.8654)	(0.8579)	(0.8258)
ROE	0.0441	0.0436	0.0480	0.1599	0.1491	0.1620
	(0.0374)	(0.0363)	(0.0391)	(0.1235)	(0.1135)	(0.1255)
BTM	-0.3888	-0.3536	-0.3961	-0.4970	-0.2088	-0.5215
	(0.5596)	(0.5583)	(0.5614)	(0.8449)	(0.8495)	(0.8087)
DURA	0.0984	0.0958	0.1293	-0.0694	-0.0937	-0.0949
	(0.4793)	(0.4811)	(0.4837)	(0.6031)	(0.6116)	(0.6281)
BIG4	-0.1014***	-0.1021***	-0.0995***	-0.0859	-0.0863	-0.0897
	(0.0379)	(0.0379)	(0.0375)	(0.0682)	(0.0683)	(0.0676)
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.056	0.057	0.056	0.089	0.093	0.093
F	6.4374***	6.4071***	6.2002***	3.3585***	3.2050***	3.0936***
N	16335	16335	16335	6372	6372	6372

Note: The standard errors in parentheses are robust standard errors. ***, **, and * indicate the significance levels of 1%, 5%, and 10%, respectively.

6 Research conclusions and policy recommendations

6.1 Research conclusions

Based on the viewpoints of relevant literature, equity pledge theories, information asymmetry theory, principal-agent theory, and incomplete contract theory, this paper deeply explores the relationship between controlling shareholders' equity pledge and accrual earnings management or real earnings management in A-share listed companies. It also examines the moderating effect of equity structure on the relationship between equity pledge and corporate earnings management. This paper selects 16,335 listed companies from 2008 to 2018 as the research objects, builds a two-way fixed effect regression model for basic regression and robustness regression, uses STATA15.0 software to conduct empirical research, and draws the following conclusions:

The controlling shareholders' equity pledge will increase the degree of accrual earnings management and real earnings management. As the proportion of controlling shareholders' equity pledge increases, the degree of earnings management will continue to increase. After the equity pledge, when the value of the equity drops to the close-out line, the controlling shareholder may be unable to pay off the debt through its own funds. Instead, they have no alternative but to pay off the debts by selling the equity, which will inevitably cause the transfer of the controlling shareholders' control rights. Therefore, in order to avoid the risk of rights transfer, the controlling shareholder will have the strong earnings management motivation during the pledge period.

The ownership structure, including the degree of equity balance, the degree of equity concentration and the ownership property, will play a moderating role in the positive relationship between the controlling shareholders' equity pledge and corporate earnings management. In detail, (1) The degree of equity balance has a negative moderating effect on the equity pledge and earnings management. The higher the company's degree of equity balance is, the weaker the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings management will be. (2) The degree of equity concentration has a positive moderating effect on the equity pledge and earnings management. The higher the company's degree of equity concentration is, the stronger the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings management will be. (3) The corporate ownership property also has a significant moderating effect on the relationship between equity pledge and earnings management. Compared with state-owned holding companies, whether the controlling shareholders' equity is pledged and the equity pledge ratio in a private company have a more positive effect on accrual and real earnings management.

6.2 Recommendations

With the improvement of Chinese economy, equity pledge has become a new financing tool in the current capital market. However, Chinese capital market is imperfect compared to European and American countries, and the equity pledge policies lag behind the current equity pledge situation. Therefore, there are still many potential risks in equity pledge and how to prevent risks requires the joint efforts of company itself, stakeholders, and supervision.

6.2.1 Improve the internal governance mechanism of the enterprise

The internal governance mechanism is closely related to the quality of the accounting information disclosed by the enterprise. The perfect internal governance mechanism is the basis for the effective disclosure of accounting information and it also helps to restrain the controlling shareholders and the management from earnings management. The controlling shareholders' manipulation of corporate earnings is intended for the market value management, but it harms the rights of external stakeholders and the interests of the listed company itself. This is a self-interested act and also a "short-term" behavior. The main reason for the internal governance problems is the absolute control of the controlling shareholder. Therefore, it is necessary to improve the internal governance mechanism of the enterprise to reduce the risk of the controlling shareholders' equity pledge.

Improving the internal governance mechanism can start from the following aspects: The first is to optimize the company's equity structure. From the results of empirical research, it can be concluded that the higher the degree of equity balance is, the weaker the positive effect of the controlling shareholders' equity pledge on the degree of accrual and real earnings management will be. Therefore, increasing the shareholding ratio of other major shareholders will reduce the shareholding ratio of the controlling shareholder and then improve the internal equity balance of the enterprise. The second is to improve the supervision and management functions of the internal board of directors and the board of supervisors, conduct real-time supervision behaviors of the company's management, increase the number of meetings of the board of directors, and expand the functions of independent directors. These help to prevent management from abusing functions, and from conspiring with controlling shareholders to harm the value of the enterprise. The third is to improve the internal performance incentive system and the fault accountability system. The internal incentive system has shifted from the promotion and the increase in salary to a stock option mechanism. The standard for equity exercise should be closely linked to the management's long-term performance. The fault accountability system is mainly set for punishing the harmful behavior that the management does to damage the company.

6.2.2 Strengthen the risk prevention mechanism of the pledgee

When the controlling shareholders' equity is pledged, the financial institution is the funds provider and also the biggest stakeholder. Although the warning line and the close-out line are set when the equity pledge contract is signed, the financial institution is still in high risk because he can't fully grasp the true operation situation of the enterprise such as the future business performance and the price change. Controlling shareholders may create an illusion to convince financial institutions that the company has the high equity value but the real equity value is lower than the stock price, thus transferring the risk of future stock price decline to financial institutions. Therefore, as a pledgee, it is necessary for financial institutions to create an effective evaluation mechanism to comprehensively evaluate the actual risks of the pledgee. According to relevant factors such as the ownership property of the pledger, the pledge rate, and the credit status of the actual controller, the pledgee can classify the risks of equity pledges into three categories: high, medium, and low. Moreover, financial institutions must continue to pay attention to the stock price changes of high-risk companies, equity changes, and negative media reports on the company, and then urge the pledger to improve the performance ability of the contract. When the stock price of the pledged equity touches the close-out line, financial institutions should actively negotiate with the company. They should not use the equity as the first source of repayment, but take the shareholders' own cash instead, in order to prevent shareholders from “emptying” the company.

6.2.3 Improve the equity pledge system and disclosure system

As a financing guarantee method, equity pledge requires the improvement of the external equity pledge system and disclosure system. The well-established system helps to prevent the adverse effect of the controlling shareholders’ equity pledge on the capital market and listed companies. The “Measures of Transactions and Settlement for Equity Pledge Repurchase” implemented in March 2018 effectively curbed the phenomenon of excessively high pledge ratio. However, controlling shareholders can still avoid the excessively high pledge ratio through frequent pledges and releases. Therefore, in addition to controlling the pledge ratio, relevant regulatory authorities also need to introduce a series of policies to regulate the procedures of equity pledges, such as the number of pledges per year. For the pledge of controlling shareholders, more stringent restrictions should be imposed to prevent the controlling shareholders from infringing on the future value of the listed company. In addition, the identity and qualifications of the pledgee should also be restricted. Only financial institutions with corresponding qualifications can become the pledgee of equity pledges. Qualified financial institutions are those that can comprehensively evaluate the financial capabilities of the pledger, timely supervise the potential risks of the pledger, and the financial institution itself has strong financial ability.

The corporate earnings management behavior caused by the equity pledge, to a certain extent, is attributed to the imperfect company’s disclosure system. Although the regulatory authorities have set certain requirements for the disclosure of equity pledges, the information disclosed can only reflect the pledge time, pledge period, and general purposes of equity pledge. These information disclosures are not adequate to prevent controlling shareholders from manipulating earnings information. Relevant departments should require the controlling shareholder to disclose the specific use of the funds raised and the timely investment rate of return when the funds are reinvested, so as to reduce the information asymmetry of internal and external stakeholders. At the same time, it is necessary to clarify the standard of the disclosure content, so that the behavior before and after the equity pledge is comparable. In addition, the relevant regulators should strengthen the full-process supervision of information disclosure, and impose severe penalties on the violation of regulations during the pledge period.

6.3 Research prospects

This paper believes that further research can be conducted around the following areas in the future:

Firstly, the sample size of the research can be expanded. As the equity pledge business is becoming increasingly widespread, more companies and more annual data can be included to increase the accuracy of research in the future.

Secondly, other features of equity pledge can be included. For example, duration, interest rate and financing motives of the equity pledge can also be incorporated into the research on the influence of the controlling shareholders' equity pledge on the earnings management.

Thirdly, more proper indicators of earnings management can be found. Foreign statistical methods are still being used in Chinese academic field currently. Hopefully, more appropriate earnings management indicators that are in line with the domestic capital market environment can be found to improve the applicability and accuracy of the empirical results.

Bibliography

1. Badertscher B A. 2011. Overvaluation and the choice of alternative earnings management mechanisms[J]. The Accounting Review, 86(5): 1491-1518.
2. Bennedsen M, Wolfenzon D. 2001. The Balance of Power in Closely Held Corporations[J]. Social Science Electronic Publishing, 58(1):113-139.
3. Bin Liu, Xing Liu, Shixin Li, Shunwen He. 2003. An Empirical Test of the Interactive Effect between CEO Salary and Corporate Performance[J]. Accounting Research, 000(003):35-39.
4. Bin Wang, Anhui Cai, Yang Feng. 2013. Major Shareholder Equity Pledge, Control Transfer Risk and Company Performance [J]. System Engineering Theory and Practice, (07): 1762-1773.
5. Bin Wang, Chunxia Song. 2015. Major Shareholders' Equity Pledge, the Nature of Equity and Earnings Management Methods[J]. East China Economic Management, 000(008): 118-128.
6. Cahan S F. 1992. The effect of antitrust investigations on discretionary accruals: A refined test of the political-cost hypothesis[J]. Accounting review, 77-95.
7. Caiyue Ouyang, Yan Xie, Jiacai Xiong. 2018. Controlling Shareholder's Equity Pledge and Newly Issued Corporate Bond Pricing[J]. Journal of Shanxi University of Finance and Economics, 40(303): 26-38.
8. Changqing Li, Lianyun Guan. 2004. An Empirical Study on the Relationship between Ownership Structure and Earnings Management [J]. Business Research, (19): 48-53.
9. Chengang Ye, Meng Liu. 2018. Analyst Concern, Property Rights and Earnings Management Path[J]. Journal of Zhongnan University of Economics and Law, 228(03):34-43+160.
10. Chun Cai, Rong Zhu, Hui He, Xie Liufang. 2012. Choice of Earnings Management Methods, Behavioral Hiddenization and Improvement of Dying Companies: Based on the Empirical Evidence from A-Share Special Handling Companies[J]. Accounting Research, (9):31-39+96.
11. Claessens S, Djankov S, Fan J, Lang L. 2002. Disentangling the Incentive and Entrenchment Effects of Large Shareholdings[J]. Journal of Finance, (57).
12. Cohen D A, Dey A, Lys T Z. 2008. Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods[J]. The accounting review, 83(3): 757-787.
13. Cohen D A, Zarowin P. 2010. Accrual-based and real earnings management activities around seasoned equity offerings[J]. Ssrn Electronic Journal, 50(1):2-19.

14. Deping Chen, Xingting Lu. 2017. Research on the Relationship between Equity Pledge and Earnings Management——Based on the Empirical Test of Listed Companies on the Growth Enterprise Market[J]. Accounting Research, 000 (005): 39-44.
15. Deren Xie, Ke Liao, Dengjin Zheng. 2017. Controlling Shareholder's Equity Pledge and Implicit Choice of Accounting Policy for Development Expenditure[J]. Accounting Research, 000(003): 30-38+94.
16. Deren Xie, Ke Liao. 2018. Pledge of Controlling Shareholders' Equity and Real Earnings Management of Listed Companies[J]. Accounting Research, (08): 21-27.
17. Fama E F, Jensen M C. 1983. Agency problems and residual claims[J]. The journal of law and Economics, 26(2): 327-349.
18. Fang Lin, Hui Xu. 2012. Governance Effects of Equity Balances Based on Real Trading Earnings Management[J]. Journal of Shanxi University of Finance and Economics, 000(001): 83-93.
19. Fei Cheng, Qingjun Zhang. 2018. Controlling Shareholder's Equity Pledge, Stock Increase and Stock Price Fluctuation [J]. Southern Finance, (11): 49-58.
20. Fields T D, Lys T Z, Vincent L. 2001. Empirical research on accounting choice [J]. Ssrn Electronic Journal, 31(1-3):255-307.
21. Fisman R. 2001. Estimating the value of political connections[J]. American economic review, 91(4): 1095-1102.
22. Guidry F, Leone A J, Rock S. 1999. Earnings-based bonus plans and earnings management by business-unit managers[J]. Journal of accounting and economics, 26(1-3): 113-142.
23. Gunny K A. 2010. The Relation Between Earnings Management Using Real Activities Manipulation and Future Performance: Evidence from Meeting Earnings Benchmarks[J]. Contemporary Accounting Research, 27(3): 855–888.
24. Healy P M. 1985. The effect of bonus schemes on accounting decisions[J]. Journal of Accounting and Economics, (7):85-107.
25. Jiang G, Lee C M C, Yue H. 2010. Tunneling through intercorporate loans: The China experience[J]. Journal of Financial Economics, 98(1): 1-20.
26. Jianqiao Hong, Hao Xue. 2009. How do Equity Balances Affect the Reliability of Operating Accruals: A Related Party Transaction Perspective[J]. Management World, (01): 153-161.
27. Jianqiao Lu. 1999. An Empirical Study on Earnings Management of Loss-making Listed Companies in

China [J]. Accounting Research, 000(009): 25-35.

28. Jie Yang. 2013. Empirical Research on IPO Earnings Management of Listed Companies on Chinese Growth Enterprise Market. Finance and Economics, 000(007): 72-75,15.
29. Jiwei Yang. 2010. Equity Governance Structure and Earnings Quality: Empirical Evidence in the Post-share Split Era[J]. Economics and Management Research, (08): 14-21.
30. Johnson S, Porta R L, Lopez-De-Silanes F. 2000. Tunneling[J]. American Economic Review, 90(2):22-27.
31. Jones J J. 1991. Earnings management During Import Relief Investigation [J]. Journal of Accounting Research, 29(2):193-228.
32. Junrui Zhang, Sijia Yu, Zijian Cheng. 2017. Will the Pledge of Major Shareholders' Equity Affect the Auditor's Decision? ——Evidence Based on Audit Fees and Audit Opinions [J]. Audit Research, 000(003): 65-73.
33. Kaimin Liao, Yanhua Chen, Hongjiao Ding, et al. 2014. Research on the Influence of Controlling Shareholder's Equity Pledge on the Tendency of Cash Dividend Distribution[J]. China Management Information Technology, (16): 116-118.
34. Khwaja A I, Mian A. 2005. Do lenders favor politically connected firms? Rent provision in an emerging financial market[J]. The Quarterly Journal of Economics, 120(4): 1371-1411.
35. Koh P S. 2003. On the association between institutional ownership and aggressive corporate earnings management in Australia[J]. The British accounting review, 35(2): 105-128.
36. Lanfen Gao. 2002. The Effect of the Agency Problem of the Equity Pledge of Directors and Supervisors on Accounting Information and Company Performance [D]. National Cheng Kung University.
37. Lefort F, Urzúa F. 2008. Board independence, firm performance and ownership concentration: Evidence from Chile [J]. Journal of Business Research, 61(6):615-622.
38. Longping Zhang, Lin Pan, Caiyue Ouyang, etc. 2016. Does the Pledge of Controlling shareholders' Equity Affect the Auditor's Pricing Strategy? Empirical evidence from Chinese listed companies[J]. Auditing and Economic Research, 031(006):35-45.
39. Marra A, Mazzola P, Prencipe A. 2011. Board monitoring and earnings management pre-and post-IFRS[J]. The International Journal of Accounting, 46(2): 205-230.
40. Pourciau S. 1993. Earnings management and nonroutine executive changes [J]. Journal of Accounting &

Economics, 16(1-3):317-336.

41. Qiliang Liu, Jingying Liu, Lihua Tan, Yaman Zhang. 2011. IFRS Mandatory Convergence, Earnings Motivation and Accruals, and Real Earnings Manipulation[J]. Accounting Communications, 000(05):9-15.
42. Roychowdhury S. 2006. Earnings management through real activities manipulation[J]. Journal of Accounting & Economic, 42(3):335-370.
43. Shleifer A, Vishny R W. 1997. A Survey of Corporate Governance[J]. Journal of Finance, 52(2):737-783.
44. Shu Lin, Minghai Wei. 2000. Profit Management in the Process of China's A-Share Issuing Company's Initial Public Offering. China Accounting and Finance Research, 002(002): 87-103.
45. Sweeney A P. 1994. Debt-covenant violation and managers' accounting responses[J]. Journal of accounting and Economics, 17(3):281-308.
46. Teoh S H, Welch I, Wong T J. 1998. Earnings management and the long-run market performance of initial public offerings[J]. The journal of finance, 53(6): 1935-1974.
47. Tingting Zhang, Yanxi Li, Weiqiang Zeng. 2018. Research on the Differences in Earnings Management Behaviors of Listed Companies under Media Concerns——A New Way to Govern Earnings Management[J]. Management Review, 30(2): 25-41.
48. Weiying Zhang. 1999. Viewing China's State-owned Enterprise Reform from the Corporate Governance Structure. Enterprise Theory and China's Enterprise Reform. Beijing: Peking University Press.
49. Wenli Zhu, Xinxin Chen, Lina Kan. 2020. How does Equity Pledge Affect the Value of Listed Companies [J]. Finance and Accounting Monthly, 000(001): 48-55.
50. Xie Deren, Cui Chenyu, Xiaoyan Tang. 2018. Motivation to Achieve Performance and Real Earnings Management under Performance-Based Equity Incentives[J]. Nankai Management Review, 21(01):159-171.
51. Xingwen Zhu, Yigang Liao, Shengwen Xie. 2010. Senior Management Change, Equity Characteristics and Earnings Managemecnt: Empirical Evidence from Chinese Listed Companies[J]. Nankai Management Review, 13(002): 23-29.
52. Xinhong Wang, Yanyan Li. 2016. The Characteristics of Major Shareholders' Equity and Equity Pledge: Based on the Analysis of Small and Medium-sized Listed Companies[J]. Commercial Research, 000(006): 116-121.

53. Xuan Qin, Junxiong Fang. 2019. Research on Corporate Earnings Management Behavior Before and After Debt Default Exposure——An Empirical Test Based on the Perspective of Debt Risk Management[J]. China Economic Issues, (6): 119-134.
54. Yanxi Li, Shize Bao, Rui Gao. 2007. Salary Incentives, Board Supervision and Earnings Management of Listed Companies. Nankai Management Review, 10(006); 55-61.
55. Yifu Lin, Fang Cai, Zhou Li. 1997. The Connotation of Modern Enterprise System and the Reform Direction of State-owned Enterprises[J]. Economic Research, 000(017): 3-10.
56. Yufeng Jian, Changsheng Liu. 2013. Research on Equity Concentration, Equity Balances and Corporate Earnings Management——Based on the empirical data of A-share listed companies from 2009 to 2011[J]. Friends of Accounting, 000(004): 74-79.
57. Yujian Lu. 2003. Research on Earnings Management of Chinese A-Share Listed Companies Based on Allotment Rights[J]. Journal of Hebei University (Philosophy and Social Sciences Edition), 28(004):89-94.
58. Yun W P, Shin H H. 2004. Board Composition and Earning Management in Canada[J]. Journal of Corporate Finance, 10(3):431-457.
59. Zengfu Li, Qingyi Zeng, Xiahai Wei. 2011. Debt Contract, Nature of Controller and Earnings Management[J]. Economic Review, (6): 88-96.
60. Zengfu Li, Youhuan Zheng, Yujun Lian. 2011. Equity Refinancing, Earnings Management and the Performance Deterioration of Listed Companies: A Study Based on Accrual Item Manipulation and Real Activity Manipulation [J]. Chinese Management Science, 19(02): 49-56.
61. Zengfu Li, Zhiqiang Dong, Yujun Lian. 2011. Accrued Project Earnings Management or Real Activity Earnings Management?——Based on the Research of Income Tax Reform in China in 2007[J].Management World, 000(006):121-134.
62. Zhenwei Gu, Lingnan Ouyang, Mo Qin. 2008. An Empirical Study of "One Share Domination" and Earnings Management[J]. Journal of Chongqing University (Social Science Edition), (05): 54-59.
63. Zhizhong Huang, Xiangyun Han. 2014. Major Shareholder Equity Pledge, Capital Embezzlement and Earnings Management[J]. Contemporary Accounting Review, 000(002): 19-34.

Acknowledgements

First of all, I want to express my gratitudes to my Chinese and Italian supervisors during the process of thesis writing. Although I often bother Prof. Xu Haoping to consult the empirical analysis of the thesis, she always spares no efforts to help me analyze the problem and tells me the principle of all the steps. It is a pity that I cannot attend courses on Luiss campus because of the COVID-19, but the online courses of Prof. Giovanni Fiori leave a deep impression on me. His lessons are interesting and abundant, which makes me acquire a lot from the course of corporate governance. Despite of the inconvenience of email communication, my supervisor Prof. Giovanni Fiori and co-supervisor Prof. Simone Scettri can always give me a timely reply to the improvement of my thesis. Secondly, I want to thank my parents for their tolerance and support during my studies over the years. I am not particularly confident and prone to anxiety. When encountering setbacks and difficulties in studying, you are always the first to comfort me and encourage me, and always choose to believe in me. I am grateful to you for creating a good and comfortable learning environment for me. In the future, when I step into the society, I will remember your teachings to me and follow you as an example. In addition, I also want to appreciate my partners in the study group. We usually encounter with difficulties in learning online courses in Luiss, but we always help and encourage with each other and finally we all achieve satisfactory results in the exams. Finally, I would like to thank all the friends who assisted me during my study and life. It is your concern that makes me better and better.

Summary

1 Abstract

Equity pledge is one of the most important financing channels for controlling shareholders in China. It has the advantages of low financing costs, convenient procedures, and not influencing the controlling position. Since 2013, equity pledge behavior has shown a surging development, but it itself implies huge risks, which can easily lead to a series of financial crises in listed companies due to excessive earnings management. Therefore, the research questions in this paper are: (1) whether the controlling shareholders will conduct more accrual and real earnings management activities after the equity pledge financing; (2) from the perspective of different equity structures, whether these factors will have the moderating effect on the relationship between controlling shareholders' equity pledge and earnings management. The research contents of this paper are arranged as follows:

Firstly, this paper sorts out relevant literature and theoretical basis. This paper refers to relevant theories of equity pledge, information asymmetry theory, principal-agent theory and incomplete contract theory, consults relevant domestic and foreign literature on controlling shareholders' equity pledge, earnings management and equity structure, summarizes the characteristics and deficiencies of the existing literature, and finally finds new research direction in this paper.

Secondly, this paper analyzes the status quo of equity pledge of listed companies in China. Statistics shows that from 2008 to 2018, the number of Chinese A-share listed companies that pledged equity continued to increase, and the total market value of pledged stocks also increased significantly. Through theoretical analysis, this paper puts forward the research assumptions.

Thirdly, this paper uses the data from CSMAR database and WIND database to conduct an empirical analysis of the relationship between the controlling shareholders' equity pledge of A-share listed companies from 2008 to 2018 and accrual earnings management or real earnings management. The research indicates that the controlling shareholders' equity pledge will increase the degree of accrual and real earnings management. As the proportion of controlling shareholders' equity pledge increases, the degree of accrual and real earnings management will continue to increase. Furthermore, the equity structure will play a role in moderating the positive relationship between controlling shareholders' equity pledge and corporate earnings management. The higher the degree of equity balance is, the weaker the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings

management will be. The higher the degree of equity concentration is, the stronger the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings management will be. Compared with state-owned holding companies, whether the controlling shareholders' equity is pledged and the equity pledge ratio in a private company have a more positive effect on accrual and real earnings management.

Finally, this paper puts forward relevant recommendations and future research prospects.

Keywords: controlling shareholder, equity pledge, equity structure, real earnings management, accrual earnings management

2 Introduction

2.1 Research background

Equity pledge is one of the most important financing channels for controlling shareholders in China. Compared with other financing methods, equity pledge has the advantage of low financing costs, convenient procedures, and does not affect the controlling position for shareholders, which makes controlling shareholders more inclined to alleviate financial pressure through equity pledge. Since the securities company launched the stock pledge repurchase business in 2013, the business has developed rapidly in a few years, and the transaction volume has shown a significant increase. However, it is alarming that although equity pledge has solved the financing needs of listed companies, it also implies huge risks. For the controlling shareholder of equity pledge, after the pledge if the stock price continues to fall and reaches the warning line, the shareholder will face the risk of the pledged shares being closed-out or even the control right being changed. For listed companies, a series of problems arise while the number of pledged stocks continues to increase. Due to the great uncertainty in the value of the pledged equity, once the stock price hits the warning line, the pledgee will require the controlling shareholder to make up the collateral. If the close-out line is reached and the controlling shareholder is unable to add more collaterals, the pledgee has the right to sell the pledged object in the secondary market to protect the its rights. This will form a negative feedback effect, further trigger stock price fluctuations, and may even make listed companies suffer financial crises and changes in control rights. LeTV's controlling shareholder Jia Yueting made the company's operating environment deteriorate due to large-scale equity pledges, which had extremely adverse effects on the company's operations and management. Therefore, whether the controlling shareholder wants to avoid losing control or to maintain the company's refinancing ability, the controlling shareholder will adopt a series of measures to maintain the value of the pledge.

Admittedly, the accounting earnings plays an important role in influencing stock prices. Therefore, the main research question of this paper is whether the controlling shareholder will conduct more accrual and real earnings management activities in order to stabilize the stock price after the equity pledge financing. In addition, the internal and external governance environment has a significant effect on the self-interested behavior of controlling shareholders and the earnings management activities of enterprises. Accordingly, from the perspective of different equity structures, what changes will happen to the relationship between controlling shareholders' equity pledge and accrual earnings management or real earnings management? This is the second issue to be solved in this paper.

2.2 Research significance

(1) Theoretical significance

In terms of the economic consequences of the equity pledge, although some scholars have explored the impact of equity pledges on earnings management, most of them are limited to the study of accrual earnings management. There are only a few empirical studies that incorporate real earnings management into empirical research. With the improvement of accounting standards and stringent legal supervision, real earnings manipulation has gradually attracted the attention of more listed companies due to its hidden features. An increasingly number of companies have shifted from accrual earnings manipulation to real earnings manipulation for profit adjustment. Therefore, it is particularly important to study the influence of equity pledge behavior on both accrual earnings management and real earnings management at the same time. In addition, it is found that currently most scholars directly study the influence of equity pledge on earnings management, but have not considered that the nature of the enterprise itself will have an impact on earnings management. For companies with different equity structures, the influence of the controlling shareholders' equity pledge on earnings management is likely to be different. Therefore, this paper will focus on how the accrual and real earnings management behavior of listed companies will be affected respectively when the controlling shareholders' equity is pledged, broadening the research of earnings management. Furthermore, this paper will explore the moderating effect of different equity structures on the relationship between the controlling shareholders' equity pledge and earnings management.

(2) Practical significance

This paper studies the influence of controlling shareholders' equity pledge activities on the company's earnings management, providing corresponding guidance and suggestions for the regulatory authorities and listed companies. Firstly, it provides relevant guidance for the securities regulatory authorities about the supervision of equity pledges in the securities market. Equity pledges can solve financing constraints, but frequent and large equity pledges will probably harm business performance and the interests of small and medium shareholders, and hinder the healthy development of the capital securities market. Therefore, the regulatory authorities should pay more attention to the behavior of the controlling shareholders' equity pledge, and formulate more stringent laws and regulations related to the equity pledge financing. The purpose is to prevent controlling shareholders from appropriating the interests of small and medium shareholders to satisfy their own personal interests. The second point is to guide listed companies on how to manage corporate earnings reasonably in order to maintain the stability of the stock price and meanwhile promote the healthy and orderly development of the company. Furthermore, the companies can learn from the paper about how to prevent the instability of stock prices that will cause the transfer of corporate control and damage the rights and interests of small and medium shareholders. Therefore, this paper will further proceed with the perspective of equity structures, systematically analyzing the relationship between controlling shareholders' equity pledge and earnings management.

2.3 Research content

The first chapter summarizes the research background of the thesis in general, clarifies the theoretical and practical significance, elaborates the research content and research methods, and finds out the innovations of the thesis.

The second chapter is to organize related theories and literature. It mainly refers to relevant theories of equity pledge, information asymmetry theory, principal-agent theory and incomplete contract theory and consults relevant domestic and foreign literature of controlling shareholders' equity pledge, earnings management and equity structure. Finally, a suitable direction is found for the research.

The third chapter focuses on the theoretical analysis and research hypotheses. This part first analyzes the status quo of equity pledge in Chinese listed companies. After that it explores the effect of equity pledge on earnings management, and the moderating effect of equity structure on them, and then puts forward the research hypotheses of this paper through theoretical analysis.

The fourth chapter is the benchmark test. It first establishes regression models and performs regressions based on the research hypotheses mentioned above. After the main regression is completed, it needs to be verified whether the research result meets the research hypotheses or not.

The fifth chapter further tests the moderating effect and carries out the robustness check. It first introduces equity structures--equity balance, equity concentration and ownership property--as moderating variables, and then systematically studies how different equity structures can moderate the relationship between the controlling shareholders' equity pledge and earnings management. Finally, the robustness test is carried out to consolidate the main conclusions of the thesis.

The sixth chapter is the research conclusion and recommendations. It analyzes and summarizes the theoretical analysis and empirical results, and then puts forward relevant policy recommendations and possible guidelines for future research.

2.4 Research methods

This paper first summarizes the research theories and literature, based on this puts forward the research hypotheses, constructs multiple regression models, and finally conducts empirical analysis. The methods used in the study of the relationship between the controlling shareholders' equity pledge and earnings management are as follows:

(1) Literature analysis method.

This paper summarizes the characteristics and deficiencies of the existing literature by consulting domestic and foreign related documents on major shareholders' equity pledge, earnings management and equity structure. Furthermore, on the basis of relevant theories of equity pledge, information asymmetry theory, principal-agent theory and incomplete contract theory, it analyzes the correlation between controlling shareholders' equity pledge and earnings management, and then puts forward the research hypotheses.

(2) Empirical analysis method.

This paper uses the data of Chinese A-share listed companies from 2008 to 2018. First, it analyzes the influence of controlling shareholders' equity pledge on accrual and real earnings management. Second, it divides equity structures into equity balance, equity concentration, and ownership property and explores whether these three factors promote or inhibit the influence of the controlling shareholders' equity pledge on accrual and real earnings management. Combining descriptive statistics, two-way fixed effect models, and robustness tests, the results of the empirical research are finally analyzed and summarized.

2.5 Research innovations

First, this paper introduces the controlling shareholders' equity pledge into the study of earnings management motivation. Academia has been rich in research on corporate earnings manipulation motives, but only a few scholars specifically studied corporate earnings management motives from the perspective of equity pledges, and the researches mainly focus on accrual earnings management. Therefore, this paper enriches the relevant research on corporate earnings management motivation.

Second, in the research on the influence of equity pledge on earnings management, most scholars ignored the important factor of equity structure. Therefore, the existing literature rarely probes into whether the relationship between controlling shareholders' equity pledge and earnings management is affected by equity structures. Based on theoretical analysis, this paper establishes an empirical model to test the linkage relationship between the company's equity pledge and earnings management, and introduces the equity structure to study its moderating effect on the relationship between the controlling shareholders' equity pledge and earnings management.

3 Assumptions

According to the theoretical analysis, related assumptions are proposed:

H1a: Whether the controlling shareholders' equity is pledged is proportional to the accrual and real earnings management.

H1b: The controlling shareholders' equity pledge ratio is proportional to the accrual and real earnings management.

H2a: The degree of equity balance weakens the positive correlation between whether the controlling shareholders' equity is pledged and accrual or real earnings management.

H2b: The degree of equity balance weakens the positive correlation between the controlling shareholders' equity pledge ratio and accrual or real earnings management.

H3a: The degree of equity concentration enhances the positive correlation between whether the controlling shareholders' equity is pledged and accrual or real earnings management.

H3b: The degree of equity concentration enhances the positive correlation between the controlling shareholders' equity pledge ratio and accrual or real earnings management.

H4a: Compared with state-owned enterprises, whether the controlling shareholders' equity is pledged in a private enterprise has a more significantly positive correlation with accrual and real earnings management.

H4b: Compared with state-owned enterprises, the controlling shareholders' equity pledge ratio in a private enterprise has a more significantly positive correlation with accrual and real earnings management.

4 Empirical analysis

4.1 Variables introduction

Table 4-1 Variables introduction

Types of variables	Name	Short name	Calculation method and description
Explained variables	Accrual earnings management	DA	Modified Jones model from Dechow et al. (1995): the absolute value of the regression residual
	Accrual earnings management	DD	Dechow et al. (2002): the absolute value of the regression residual
	Real earnings management	RM	Roychowdhury's approach (2006): abnormal production costs-abnormal operating cash flows-abnormal operating expenses
Explanatory variable	Equity pledge	PLD	If the controlling shareholder still has the pledged shares at the end of the year, the value is 1, otherwise it is 0.
	Equity pledge ratio	PLD_R	The amount of controlling shareholders' equity pledge / The company's total share capital
Moderating variable	The degree of equity balance	EB	Sum of the second to fifth largest shareholders' shareholding ratio / The first largest shareholder's shareholding ratio
	The degree of equity concentration	CRL	The number of shares held by the largest shareholder / The total number of shares
	The ownership property	SOE	State-owned enterprise assigns 1, otherwise 0
Controlled variable	The size of the enterprise	SIZE	Natural logarithm of total assets at the end of the year
	The number of employees	LABOR	Natural logarithm of the number of employees at the end of the year
	Debt-to-asset ratio	LEV	Total debts at the end of the year/ Total assets at the end of the year
	Return on equity	ROE	Net income/ Total equity at the end of the year
	Book-to-market ratio	BTM	Total assets at the end of the year / (market value of equity + market value of net debt)
	Independent director ratio	DURA	The ratio of independent directors to the total number of board members
	High-quality auditing	BIG4	If the auditor is a Big Four accounting firm, the value is 1, otherwise it is 0

4.2 The formula of earnings management

- Accrual earnings management

This paper first refers to the modified Jones model of Dechow et al. (1995), which uses the manipulable accrual profit DA to construct the accrual earnings management index:

$$\frac{TA_{it}}{A_{it-1}} = \beta_0 \frac{1}{A_{it-1}} + \beta_1 \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \beta_2 \frac{PPE_{it}}{A_{it-1}} + \varepsilon_{it} \quad (1)$$

In formula (1)， TA_{it} is the total accrual profits of the company i in year t, which is equal to the changes in accounts receivable plus the changes in inventory minus the changes in accounts payable minus the changes in taxes payable plus the changes in other current assets. A_{it-1} is total assets of company i at the end of year t-1. ΔREV_{it} is the change in the operating profits of the company i in year t, $\Delta REC_{it}$is the change in the accounts receivable of the company i in year t, and PPE_{it} is total fixed assets of the company i in year t. According to the regression result of (1), the absolute value of the regression residual is used to measure the degree of earnings management, which is $DA_{it} = |\varepsilon_{it}|$.

To ensure the robustness of the empirical regression, this paper also uses the accrual earnings management indicator DD proposed by Dechow et al. (2002) to construct the model:

$$\frac{TA_{it}}{A_{it-1}} = \beta_0 \frac{1}{A_{it-1}} + \beta_1 \frac{\mathrm{CFO}_{it-1}}{A_{it-1}} + \beta_2 \frac{\mathrm{CFO}_{it}}{A_{it-1}} + \beta_3 \frac{\mathrm{CFO}_{it+1}}{A_{it-1}} + \varepsilon_{it} \quad (2)$$

In formula (2)， $TA_{it}$is the total accrual profit of the company i in year t, which is equal to the change in accounts receivable plus the change in inventory minus the change in accounts payable minus the change in taxes payable plus the change in other current assets. A_{it-1} is total assets of company i at the end of year t-1. CFO_{it} is the net cash flow from operating activities of company i in year t. According to the regression result of (2), the absolute value of the regression residual is used to measure the degree of earnings management, which is $DD_{it} = |\varepsilon_{it}|$.

- Real Earnings Management (RM)

This paper refers to the method of Roychowdhury (2006) to measure the company's real earnings management level. Firstly, model (3), model (4), and model (5) listed as follows are estimated by industry and by year. The residual items estimated in the model are the company's abnormal net operating cash flow (ACFO), abnormal production costs (APROD) and abnormal discretionary expenses (ADISEXP). The valuation models are as follows:

$$CFO_{it} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{it-1}}\right) + \beta_1 \left(\frac{S_{it}}{A_{it-1}}\right) + \beta_2 \left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \varepsilon_{it} \quad (3)$$

$$PROD_{it} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{it-1}}\right) + \beta_1 \left(\frac{S_{it}}{A_{it-1}}\right) + \beta_2 \left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \beta_3 \left(\frac{\Delta S_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \quad (4)$$

$$DISEXP_{it} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{S_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \quad (5)$$

S_{it} is the operating income of company i in year t. ΔS_{it} is the change in operating income of company i in year t, which is equal to the difference between operating income in year t and operating income in year t-1. A_{it-1} represents the total assets of company i at the end of year t-1. CFO_{it} represents the net operating cash flow of company i in year t. $PROD_{it}$ represents the production costs of company i in year t. $DISEXP_{it}$ represents the discretionary expenses of company i in year t. Since listed companies in China do not separately disclose R&D expenses and advertising expenses, and include these two items in sales expenses and administrative expenses instead, the sum of sales and administrative expenses can approximate discretionary expenses.

Nest, the indicator RM is respectively composed of abnormal net operating cash flow (ACFO), abnormal production costs (APROD) and abnormal discretionary expenses (ADISEXP). The specific RM index calculation formula is as follow:

$$RM = (-1) \times ACFO + (-1) \times ADISEXP + APROD \quad (6)$$

4.3 Benchmark regression

This paper uses a two-way fixed effect model to estimate the relationship between equity pledge and earnings management, so the following benchmark regression models are constructed:

$$y_{it} = \alpha_0 + \alpha PLD_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (7)$$

$$y_{it} = \alpha_0 + \alpha PLD\_R_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (8)$$

In the model (7) and (8), y represents earnings management, which is represented by accrual earnings management (DA) and real earnings management (RM). PLD represents a dummy variable for the company's equity pledge. When a company has equity pledge at the end of the year, the value of PLD is 1, otherwise it is 0. PLD_R represents the corporate equity pledge ratio, which is expressed as the ratio of the amount of the controlling shareholder's equity pledge to the company's total share capital. X is the controlled variable, which is represented by the company size, the number of employees, debt-to-assets ratio, return on equity, the book-to-market ratio, the ratio of independent directors and high-quality auditing. γ_t is the time fixed effect, δ_i is the firm fixed effect, and ε_{it} is the random disturbance term. In order to better fit the causal relationship between equity pledge and earnings management, this paper lags the core variables by one year for regression.

4.4 Further regression on moderating variables

Next, this paper examines the moderating effect of equity structure on the relationship between equity pledge and earnings management. Therefore, this paper constructs the following regression models:

$$y_{it} = \alpha_0 + \alpha_1 PLD_{it-1} + \alpha_2 M_{it-1} + \alpha_3 M_{it-1} \times PLD_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (9)$$

$$y_{it} = \alpha_0 + \alpha_1 PLD\_R_{it-1} + \alpha_2 M_{it-1} + \alpha_3 M_{it-1} \times PLD\_R_{it-1} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it} \quad (10)$$

In the model (9) and (10), y represents earnings management, which is represented by accrual earnings management (DA) and real earnings management (RM). PLD represents a dummy variable for the company's equity pledge. When a company has equity pledge at the end of the year, the value of PLD is 1, otherwise it is 0. PLD_R represents the corporate equity pledge ratio, which is expressed as the ratio of the amount of the controlling shareholder's equity pledge to the company's total share capital. M is the moderating variable, which is equal to EB, CRL, and SOE respectively. EB is the degree of equity balance, CRL is the degree of equity concentration, and SOE is the ownership property. X is the controlled variable, which is represented by the company size, the number of employees, debt-to-assets ratio, return on equity, the book-to-market ratio, the ratio of independent directors and high-quality auditing. γ_t is the time fixed effect, δ_i is the firm fixed effect, and ε_{it} is the random disturbance term. In order to better fit the causal relationship between equity pledge and earnings management, this paper lags the core variables by one year for regression.

5 Research conclusions

Based on the viewpoints of relevant literature, equity pledge theories, information asymmetry theory, principal-agent theory, and incomplete contract theory, this paper deeply explores the relationship between controlling shareholders' equity pledge and accrual earnings management or real earnings management in A-share listed companies. It also examines the moderating effect of equity structure on the relationship between equity pledge and corporate earnings management. This paper selects 16,335 listed companies from 2008 to 2018 as the research objects, builds a two-way fixed effect regression model for basic regression and robustness regression, uses STATA15.0 software to conduct empirical research, and draws the following conclusions:

The controlling shareholders' equity pledge will increase the degree of accrual earnings management and real earnings management. As the proportion of controlling shareholders' equity pledge increases, the degree of earnings management will continue to increase. After the equity pledge, when the value of the equity drops to the close-out line, the controlling shareholder may be unable to pay off the debt through its own funds. Instead, they have no alternative but to pay off the debts by selling the equity, which will inevitably cause the transfer of the controlling shareholders' control rights. Therefore, in order to avoid the risk of rights transfer, the controlling shareholder will have the strong earnings management motivation during the pledge period.

The ownership structure, including the degree of equity balance, the degree of equity concentration and the ownership property, will play a moderating role in the positive relationship between the controlling shareholders' equity pledge and corporate earnings management. In detail, (1) The degree of equity balance has a negative moderating effect on the equity pledge and earnings management. The higher the company's degree of equity balance is, the weaker the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings management will be. (2) The degree of equity concentration has a positive moderating effect on the equity pledge and earnings management. The higher the company's degree of equity concentration is, the stronger the positive effect of whether the controlling shareholders' equity is pledged and the equity pledge ratio on the degree of accrual and real earnings management will be. (3) The corporate ownership property also has a significant moderating effect on the relationship between equity pledge and earnings management. Compared with state-owned holding companies, whether the controlling shareholders' equity is pledged and the equity pledge ratio in a private company have a more positive effect on accrual and real earnings management.

6 Research prospects

This paper believes that further research can be conducted around the following areas in the future:

Firstly, the sample size of the research can be expanded. As the equity pledge business is becoming increasingly widespread, more companies and more annual data can be included to increase the accuracy of research in the future.

Secondly, other features of equity pledge can be included. For example, duration, interest rate and financing motives of the equity pledge can also be incorporated into the research on the influence of the controlling shareholders' equity pledge on the earnings management.

Thirdly, more proper indicators of earnings management can be found. Foreign statistical methods are still being used in Chinese academic field currently. Hopefully, more appropriate earnings management indicators that are in line with the domestic capital market environment can be found to improve the applicability and accuracy of the empirical results.