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Ownership concentration and corporate performance of listed companies in China

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Abstract

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Five key words	Ownership concentration, Corporate performance, Corporate governance, The largest shareholder, The listed company
Purpose	The purpose of this study is to investigate the relationship between ownership concentration and corporate performance in Chinese listed companies. Enriching the theory of corporate governance.
Methodology	Quantitative method. We have used panel data and compiled our results in STATA.
Theoretical perspectives	Principal-agent problem; Information asymmetry theory
Empirical foundation	The empirical foundation consists of data collected from 1468 listed companies at the Shanghai and Shenzhen Stock Exchanges in China, spanning 2018 to 2022.
Conclusions	We observed a statistically significant positive relationship between ownership concentration and corporate performance, as measured by the return on assets (ROA).

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1. Introduction

1.1 Background

China has been reforming and opening up for more than 40 years, and along with the further opening up of the economy and the inflow of foreign capital, China's capital market has undergone significant changes. The dual impact of foreign companies bringing advanced management concepts and the pursuit of profit maximization (Zeitun & Tian, 2007; Berk and DeMarzo, 2019) has forced China's capital market to develop in the direction of better systems and information transparency so that companies can maximize profits in a competitive market environment. In the face of foreign competition, the most significant impact is on our listed companies, which have to face the challenges of international and domestic enterprises and keep growing themselves, benefiting from the favorable conditions created by the growth of the capital market while simultaneously encountering significant hurdles during the period of economic transformation. Many companies in China have gone through a long and tortuous process of transforming from state-owned enterprises to listed companies (Kang & Kim, 2012). Internal management problems and external pressures have tested them and have grown from solid performance to shrinkage or even been eliminated from the market. After years of economic reform, adopting the shareholding system and the remarkable progress witnessed in the Shanghai and Shenzhen stock markets have injected new vitality into listed companies. However, many listed companies in China still have unreasonable equity structures and incomplete share reforms. This matter has been a significant subject of inquiry in studies on corporate governance and contributes to the ineffective governance observed in listed companies and therefore has become a focus of attention for scholars in China.

The equity structure consists of "quantity" and "quality." Ownership concentration represents the "quantity" aspect of the ownership structure, while its "quality" refers to the nature of equity (Ma, 2000). Therefore, scholars exploring the influence of equity structure on firm performance typically adopt two approaches. On the one hand, they investigate how ownership concentration affects corporate performance. On the other hand, they explore the impact of equity nature on corporate performance. In some countries where external supervision mechanisms are well-established, and capital markets are more developed, companies tend to have a similar equity nature. However, there can be significant differences

in their ownership concentration. As a result, research on corporate governance often focuses on the exploration of ownership concentration. The most critical problem in China's listed companies at present is the unsound governance mechanism and inefficient corporate governance, and a significant reason for this problem is the unreasonable concentration of ownership. Therefore, studying the effects of ownership concentration on corporate performance is of strong relevance to currently listed companies in China.

Ownership concentration is a significant metric for evaluating the extent to which ownership within a company is concentrated or dispersed. It holds considerable significance in safeguarding the interests of investors and maintaining a harmonious equilibrium among diverse stakeholders involved in the company. An appropriate level of ownership concentration facilitates the establishment of effective corporate governance models. It ensures a balanced alignment of shareholders' interests, fostering sustainable, stable, and robust growth for the company. Consequently, conducting a comprehensive examination of the impact of ownership concentration on corporate performance holds significant implications for optimizing the equity structure of listed companies and enhancing their overall performance. With this objective in mind, this study adopts a micro-level perspective to investigate the relationship between ownership concentration and corporate performance among listed companies in China, aiming to provide meaningful insights and recommendations for optimizing ownership concentration in the Chinese context.

1.2 Motivation

Over the past few decades, China has witnessed continuous development in its market economy, increasing the quantity and scale of publicly traded firms. However, these companies still encounter various challenges in terms of their economic performance. Two primary factors contribute to these challenges. Firstly, since the early 1980s, China has undergone a substantial shift from a planned economy to a market economy, transforming the overall economic environment. The instability of the external macro environment has created a chain of instabilities within the domestic business environment, hindering the growth of enterprises. Secondly, research on corporate equity structure in China started relatively late, specifically in the 1990s, lagging behind other countries. The theoretical understanding of corporate equity structure was limited and lacked practical guidance, further impeding the progress of corporate equity structure. Additionally, around 2005, China introduced the

reform of shareholding separation, aiming to facilitate the circulation of state-owned shares in the stock market and gradually reduce the dominance of state-owned enterprises. The changes in internal and external business environments, coupled with the reform of the state-owned enterprise system, have impacted companies' operational performance. Consequently, it becomes crucial to focus on examining the internal equity structure of companies and investigate the influence of equity structure on firm performance. By selecting the most suitable equity structure for each company, we can foster the growth of their operational performance.

Besides, in countries with highly decentralized shareholdings, such as the United Kingdom and the United States, agency conflicts between managers and shareholders are the main source of corporate governance problems. In contrast, in countries with highly concentrated shareholdings, such as China, conflicts of interest between majority and minority shareholders are the core of corporate governance problems (Lee & Kuo, 2014). For this reason, an urgent issue in China is rationalizing the equity structure while reducing agency costs and improving corporate performance. The issue of equity structure has always been a hot topic of exploration for relevant theoretical scholars (Demsetz & Villalonga, 2001; Bano et al., 2018; Setiawan, Handiliastawan & Jafar, 2020), many of whom delve into the relationship between equity structure and firm performance. However, the academic community still needs to form a systematic consensus on the relationship between ownership concentration and corporate performance. Due to the complexity of equity structure itself, its broad scope, and the different paths of economic development among countries, equity structure exhibits distinct characteristics. As a result, numerous scholars have arrived at markedly different conclusions through empirical research, including theories suggesting that ownership concentration is irrelevant to firm performance (Xiao et al. 2012), positive relationship (Xu et al. 2006), negative relationship (He and Lao 2010), or exhibits a nonlinear relationship (Du and Liu 2002). Therefore, more investigation into how ownership concentration affects corporate performance is essential.

1.3 Purpose and Research Question

This study aims to empirically explore the relationship between ownership concentration and the corporate performance of Chinese-listed companies. This paper adds to the existing literature by examining the ownership structures and corporate governance effectiveness in

China's listed companies using unbalanced panel data on 1468 publicly traded firms from the Shanghai and Shenzhen Stock Exchanges in China throughout 2018–2022. To address the purpose of the study, this paper will address the following question:

What is the relationship between ownership concentration and corporate performance of listed companies in Shanghai and Shenzhen stock exchanges in China?

1.4 The main findings

The study's key finding indicates a positive relationship between ownership concentration and corporate performance in the context of China's A-share listed corporations. Specifically, a sample of 1,468 companies registered on the Shanghai and Shenzhen stock exchanges served as the basis for the investigation. By conducting an empirical analysis and drawing insights from relevant literature, it becomes evident that as ownership concentration increases, corporate performance improves. This finding implies that when ownership is concentrated among fewer shareholders, it allows for more effective shareholder control and monitoring of management actions. This, in turn, facilitates the implementation of efficient governance mechanisms.

1.5 Contribution

The relationship between ownership concentration and corporate performance is thoroughly and methodically examined in this research, selecting 1,468 eligible listed companies in Shanghai and Shenzhen for regression. By examining the impact of ownership concentration on corporate performance, this paper aims to provide valuable empirical evidence on corporate governance, address some of the research gaps in this area, and provide insights into the mechanisms underpinning internal corporate governance. These empirical results contribute to the literature on corporate governance in China and offer valuable insights for academics and practitioners. The positive relationship between ownership concentration and corporate performance underscores the significance of designing corporate governance structures that encourage concentrated ownership. Policymakers, shareholders, and corporate leaders can leverage these findings to develop governance policies and practices that foster ownership concentration, ultimately leading to improved performance and value creation for companies operating within the Chinese stock exchanges.

1.6 Outline

The remaining sections of the paper are structured as follows. The past empirical findings on the impact of ownership concentration on corporate performance, theoretical foundation, and hypothesis are presented in Section 2. The data and variables utilized in this research are described in Section 3. The approach and estimating procedures used to examine the data are introduced in Section 4. The empirical findings and analyses of how ownership concentration and company performance are related are presented in Section 5. The Robustness test's procedures and outcomes are described in Section 6. The paper's main arguments, research limitations, and suggestions for further study are summarized in Section 7's conclusion.

2. Literature review and hypothesis development

In this section of the paper, we provide a comprehensive review of empirical and theoretical advancements that are pertinent to our research inquiries. The presented theories aim to anticipate and elucidate the relationship between ownership concentration and corporate performance. Section 2.1 describes the empirical literature on ownership concentration and corporate performance, Section 2.2 describes the theoretical literature on ownership concentration and corporate performance, and presents the three hypotheses of this study in 2.2.6.

2.1 Empirical literature

Extensive research has been conducted by scholars to explore the relationship between ownership concentration and corporate performance. As early as the 1930s, foreign academics began investigating the connection between ownership concentration and corporate governance performance. On the other hand, domestic scholars began their investigations on this relationship relatively later, starting in the mid to late 1990s. The following section outlines the research findings of both domestic and international scholars concerning the relationship between ownership concentration and corporate governance performance.

2.1.1 Foreign Literature Review

Some scholars believe that concentrated ownership has been identified as a viable mechanism to restrain the moral hazard of management. To a certain extent, it helps to align the interests

of operators with those of shareholders, thus avoiding the phenomenon of "free-riding" and achieving the goal of improving corporate performance. For example, Berle and Means (1932) suggested that there is an agency problem between shareholders and agents when shareholder ownership is dispersed. Professionalized managers, needing adequate supervision by the owners, undermine the interests of the shareholders and deviate from the goals of the owners of the corporate property. Thus, the more diversified the ownership, the worse the firm performance may be. Jensen and Meckling (1976) formalized the principal-agent theory of manager-shareholder conflicts of interest. The distinction was made between all shareholders, who have voting rights in managing the corporate business, and outside shareholders, who have no voting rights. Later, Jensen and Meckling (1976) studied the relationship between the shareholding of inside shareholders and corporate performance and concluded that it was positive.

However, concentrated ownership can also have some drawbacks. A larger shareholding empowers it to prey on minority shareholders, which leads to lower performance, as some scholars argue that ownership concentration is negatively related to corporate performance. Johnson, La Porta, Silanes, and Shleifer (2000) defined various legal or illegal actions involving the transfer of company assets and profits to controlling shareholders, resulting in infringing the interests of small and medium-sized shareholders, as tunneling. They investigated the ownership structure of publicly traded corporations in 279 developed economies worldwide. They found that as the separation between controlling ownership and cash flow rights increases, controlling shareholders can exercise substantial control over the target company with fewer cash flows. This creates a solid incentive to infringe upon the rights of minority shareholders by transferring benefits and depleting corporate assets, resulting in the appropriation of wealth from minority shareholders, compromising operational efficiency, and dampening potential investors' investment motivation.

Some scholars have also concluded that there is a non-linear relationship between ownership concentration and corporate performance. McConnel and Servaes (1990) examined a sample of 1173 in 1976 and 1093 in 1986 from the New York Stock Exchange and the American Stock Exchange and found a nonlinear relationship between firm value and equity structure. Tobin's Q increases as the controlling percentage increases when the percentage of internal controlling shareholders' equity is less than 40%; Tobin's Q starts to decrease when the controlling percentage reaches 40%-50%, and they also find that Tobin's Q is significant and

positively related to the percentage of institutional investors' shareholding. However, there is no significant relationship between Tobin's Q and the percentage of major shareholders' shareholding.

2.1.2 Domestic Literature Review

The findings of empirical studies by domestic scholars on the relationship between ownership concentration and corporate performance are also inconsistent. Du and Liu (2002) selected 96 companies that issued only A-shares in 1998 and found a significant inverted U-shaped relationship between the shareholder ownership ratio and the return on total assets, which represents the firm performance, and further found that the corporate performance was best and the corporate governance was most efficient when the aggregate shareholdings of the top five shareholders were controlled between 53% and 55%. The study by Guo (2002) also found a significant inverted U-shaped relationship between ownership concentration and corporate performance, and earnings per share and return on net assets are highest for a moderately concentrated equity structure.

In addition to the non-linear relationship, other scholars have discovered a positive relationship between ownership concentration and corporate performance. In a study by Xu, Xin, and Chen (2008), a comparison was made between the academic community that has yet to form pre and post-shareholding reform periods of listed companies. The researchers concluded that the nature of shareholders impacts the relationship between ownership concentration and corporate performance in China. Specifically, they found that an increase in the value of ownership concentration is connected to better corporate performance, particularly in state-controlled enterprises. However, He and Lao (2010) draw the opposite conclusion. They used the empirical data of listed companies on the main board of China in 2008 to investigate the ownership concentration of listed companies. The study finds that corporate performance has increased, although the ownership concentration of listed companies has decreased after the equity reform. Therefore, there was a negative relationship between ownership concentration and the corporate performance of listed companies on the main board of China in 2008.

2.1.3 Comment

From the literature review above, there is a considerable amount of research on the relationship between ownership concentration and corporate performance domestically and internationally. However, empirical research findings have yet to form a unified viewpoint. The variation in empirical findings is influenced by factors impacting corporate performance, the diverse economic contexts across nations, the sample selection process, and the measurement methodologies of variable indicators. For example, foreign scholars mostly rely on Tobin's Q to measure the performance of listed companies, as it is considered a reliable indicator in the context of Western capital markets, providing a more accurate reflection of corporate performance. However, domestic scholars have yet to reach a consensus on measuring the performance of listed companies. Some directly refer to foreign research and use Tobin's Q. However, using Tobin's Q relies on the premise of an efficient (strong or semi-strong) market, while China's market could be more efficient. This shows that the lack of uniformity in measurement indicators directly affects the inconsistent outcomes of research studies on the relationship between ownership concentration and corporate performance. Due to the inconsistency in measurement indicators, which directly affects the research results on the relationship between ownership concentration and firm performance, this paper will select appropriate indicators based on China's capital market to ensure the accuracy of the findings.

2.2 Theoretical literature

2.2.1 Principal-agent problem

The principal-agent problem, also referred to as the agency problem, is a well-known issue in the field of economics and management. It occurs when one party, referred to as the principal, engages a different party, the agent, to carry out work on their behalf. This situation results in the separation of ownership and control, leading to potential conflicts of interest between the principal and the agent. This issue is especially important in corporate governance, where principals hire agents to operate the firm on their behalf (Shleifer and Vishny, 1986). In this paper, we provide a detailed literature review of the principal-agent problem, its causes, and its solutions.

The agent problem was first identified by Berle and Means (1932). They argued that the separation of ownership and control in modern corporations led to a divergence of interests between shareholders (principals) and managers (agents). This divergence of interests arises due to shareholders' and managers' different objectives and risk preferences of shareholders and managers. For example, shareholders aim to maximize profits, while managers may prioritize their salaries, job security, and job satisfaction. This misalignment of interests creates a potential conflict between the principal and the agent, leading to the principal-agent problem.

Furthermore, the presence of free riders among shareholders adds complexity to the agent problem. The free-rider theory describes the behavior of shareholders who benefit from the actions of other shareholders without contributing to the costs associated with these actions. Hart (1983) argued that free riders could lead to suboptimal corporate governance by reducing the incentives for other shareholders to engage in monitoring activities. Additionally, Shleifer and Vishny (1986) proposed that free-riding can lead to underinvestment in valuable corporate projects, as shareholders are unwilling to contribute to the costs of these projects if they believe that other shareholders will bear the costs. Addressing the behavior of free riders is crucial for promoting better corporate governance and investment decisions.

In order to realize the principal's economic interests, it is the core issue of principal-agent theory to do its best to take reasonable measures to control and supervise the agent. Fama and Jensen (1983) further develop this view by arguing that the alignment of shareholder and management interests is a key factor in improving corporate performance. The alignment effect theory emphasizes the importance of aligning the interests of shareholders, including different types of shareholders, in order to promote better corporate governance and performance (Yoshikawa, Phan and David, 2005). Overall, the theory emphasizes the significance of ensuring that the interests of all parties involved are aligned to promote better outcomes for the firm.

2.2.1.1 Concentrated Ownership

Jensen and Meckling (1976) emphasize the significance of ownership structures as a means to address the challenges arising from the separation of ownership and control. Similarly, Berle and Means (1932) suggest that centralized ownership acts as a constraint on managers.

Extensive research has shown that this mechanism is closely linked to the performance of corporates (Hermalin and Weisbach, 1998).

When the shareholding is highly fragmented, the majority of shareholders hold a similar proportion of shares. When the cost of supervision is greater than the benefit of supervision, each shareholder lacks the motivation to supervise the management of the company, and they all hope that the management will be supervised and restrained by other shareholders. As a result, there is a lack of oversight of the leadership of the corporation, which may cause issues with insider control. There is "adverse selection" and "moral hazard" on the side of the operator because in the absence of efficient oversight, management may act against the interests of shareholders to further their own goals. Because of this, a highly distributed shareholding makes it difficult for internal supervision systems to work as they should and discourages individual shareholders from participating in corporate governance, which hinders the company's ability to keep improving its performance.

Concentrated ownership is a useful strategy for reducing the agent problem because a small number of powerful shareholders have the incentive and ability to actively supervise management (Pagano and Roell,1998; Shleifer and Vishny, 1986). According to agency theory, lower agency costs result from more concentrated ownership since controlling shareholders are more motivated and capable of managing agents well. These significant shareholders, with substantial stakes in the company, are motivated to actively engage in firm decision-making and ensure effective control through residual control rights in contract design (Shleifer and Vishny, 1997). Additionally, apart from the regulatory role facilitated by ownership concentration, major shareholders also have the opportunity to acquire underperforming companies, thereby alleviating agency conflicts stemming from dispersed equity ownership. As a result, the robust oversight generated by the significant allocation of decision-making power incentivizes large shareholders to enhance firm value, benefiting both themselves and minority shareholders.

However, it is important to note that a high concentration of ownership can also have drawbacks and contribute to increased agency problems. Managers may become defensive, further exacerbating the principal-agent conflict. Moreover, in the context of highly concentrated ownership, agency problems between majority and minority shareholders may intensify. This occurs when major shareholders, wielding their significant voting power,

prioritize their interests, which may not align with the interests of minority shareholders (Ntim, 2013). They may also manipulate managers to serve their agendas, disregarding the well-being of other stakeholders (Bebchuk and Roe, 1999). The theory of major shareholders, as proposed by Shleifer and Vishny (1986), emphasizes that a small group of major shareholders controls the company's direction and may prioritize their interests, resulting in imperfect and inefficient corporate governance structures. The limitations of shareholder voting rights further contribute to this effect, with Bebchuk (2007) suggesting that shareholders holding company shares may lack sufficient control rights to influence decision-making. A balance must be struck and appropriate governance implemented to ensure that centralized ownership structures promote transparency, accountability, and alignment of interests among different shareholder groups.

2.2.2 Information asymmetry theory

Information asymmetry refers to the uneven distribution of information between buyers and sellers in a market, where one party possesses more accurate information while the other party is relatively uninformed or has limited access to information. It is undeniable that those with greater information hold a distinct advantage, leaving those with lesser information in a more passive position during market transactions.

The theory of information asymmetry can be applied to the realm of corporate governance as well. The information asymmetry theory is highlighted at the level of corporate governance, i.e., the asymmetry in the flow of information between the shareholders of a listed corporate and the management, the first controlling shareholder or the majority of major shareholders and the small and medium-sized shareholders. On the other hand, the majority shareholder of a company tends to obtain more relevant information and perhaps considers maximizing its interests and infringes on the interests of the small and medium shareholders in the process of corporate management and a game of information timeliness between the actual controlling shareholder of a listed company or the majority of the large shareholder and the small and medium shareholders occurs.

2.2.3 Hypothesis

Ownership concentration and corporate performance have been extensively studied by scholars both internationally and domestically. Domestic and foreign literature provide

inconsistent findings, with some studies indicating a positive relationship between ownership concentration and performance while others suggest a negative or non-linear relationship.

Modern corporate theory suggests that, under relatively concentrated shareholding conditions, direct control of the enterprise by the majority shareholder is pivotal for effective corporate governance. A high concentration of ownership aligns the interests of owners and the company, motivating owners with significant shareholdings to actively monitor and influence management decisions, even at the cost of high monitoring and incentive expenses. This dynamic helps mitigate agency problems and ensures that managers act in the best interests of the owners. Moreover, large shareholders can mitigate the free-riding behavior of minority shareholders to some extent by exercising control rights and implementing monitoring mechanisms (Shleifer and Vishny, 1997; Pagano and Roell, 1998). However, some studies also propose that highly concentrated ownership intensifies new agency issues between large and small shareholders. La Porta et al. (1999) contend that these agency problems might be more severe compared to those existing between management and shareholders. Given the inadequate protection provided by China's current laws and regulations, ownership concentration plays a crucial role in effectively supervising the behavior of company operators and mitigating agency costs. Despite the potential drawbacks, the advantages brought about by centralized ownership may far outweigh the disadvantages. We adopt the commonly used approach and examine the presence of a linear relationship. According to the above, this study anticipates a positive relationship between ownership concentration and corporate performance, as outlined below:

Hypothesis 1: There is a positive relationship between the percentage of shares held by the largest shareholder (TOP1) and corporate performance.

Hypothesis 2: H5 Index has a positive relationship with corporate performance.

Hypothesis 3: Z Index has a positive relationship with corporate performance.

By examining these hypotheses, we aim to shed light on the relationship between ownership concentration, as indicated by the TOP1 shareholding, H5 index, and Z index, and firm performance, contributing to the understanding of corporate governance dynamics and their impact on company outcomes.

3. Data and sample description

3.1 Data collection

For a total of 7096 data points, this study investigates data collected from 1468 Chinese-listed companies that were active between 2018 and 2022 on the Shanghai and Shenzhen Stock Exchanges. To minimize the impact of false disclosures and companies that have gone bankrupt on our results, we used various screening methods to select our sample. Specifically, we excluded unsuitable samples based on the following criteria: (i) removal of listed companies with incomplete information disclosure on variables such as ownership concentration, and (ii) removal of companies categorized as "ST," which indicates an abnormal financial position and more than two consecutive years of financial losses. (iii) Excluding the financial company, the financial company itself is quite special and differs from other companies in the preparation of financial statements, and the relevant accounting standards of financial companies are also different from other companies (Zhang,2018). Considering the above-mentioned differences in financial enterprises, this paper will exclude them. By implementing these criteria, we sought to ensure the reliability and accuracy of our findings by eliminating potential sources of bias.

To collect data, we relied on the CSMAR database, which compiles and organizes data from all publicly traded companies in the Chinese market since 1990, encompassing a variety of data such as stock prices, trading volumes, company financial data, corporate governance information, macroeconomic data, industry data, news and information (ls.csmar.com, n.d.). The CSMAR database has become a vital resource for research on the Chinese stock market and is widely utilized in academic research, financial business, risk management, and other fields. Specifically, the database provides us with the following data: ownership concentration data, industry, yearly data, leverage ratio, firm age, growth rate, and total company assets. We analyzed these data using Stata software.

3.2 Description of Variables

The many types of variables that were utilized in this study will be described in this part. These consist of the variables being measured, or dependent variables, and explain variables or independent variables. In addition, we will discuss controlling variables, which are the variables that are held constant to prevent them from influencing the relationship between

ownership concentration and corporate performance. Finally, we will introduce dummy variables, which are used to represent categorical variables in quantitative analysis. To summarize these definitions, please refer to Appendix 1.

3.2.1 Dependent variables

Corporate performance is the research's dependent variable. Corporate performance refers to the measurement of how well a company is achieving its goals and objectives. It reflects its ability to generate profits, maintain growth, and maximize shareholder value over time.

Corporate performance is typically evaluated using various financial and non-financial metrics, such as revenue, net income, return on investment, market share, and customer satisfaction. These metrics provide a holistic view of a company's performance and are used to assess its overall health and competitiveness in the market. The chosen measure of corporate performance in this paper is ROA. As it is unaffected by leverage, special items, or other discretionary considerations, ROA is the preferred metric for analyzing the connection between ownership concentration and performance (CORE, GUAY and RUSTICUS, 2006).

For measuring corporate performance, Tobin's Q is also employed. This metric takes into consideration the expectations of investors for future occurrences, as well as their assessment of the firm's existing business plans (Demsetz and Villalonga, 2001). It represents the proportion of an enterprise's market worth to the cost of replacing its assets. Tobin's Q, a performance indicator for the future, takes into account a company's potential for growth and investment value.

According to European academics, Tobin's Q can more accurately capture the value that corporate governance adds, so most use Tohin'S Q as an indicator of corporate performance (Hermalin and Weisbach, 1998). However, this approach is not applicable in China because the European stock market is more robust in terms of relevant laws and the share price of listed companies can adequately reflect the operating results and efficiency of the corporate. However, the Chinese securities market was born during the important period of shifting from a planned economy to a market economy and its characteristics inevitably bear the imprint of this phase. The usefulness of the Chinese stock market still needs to develop compared to the mature level of Western capital markets. Therefore, there are limitations in

adopting Tohin'S Q to measure corporate performance in China. The return on assets, as a comprehensive indicator to evaluate corporate performance, can better reflect the corporate performance under the current market conditions in China (Sadiki, Vwima and Lebailly, 2020).

Return on Assets

ROA is a financial measure that calculates a company's profitability by dividing its net income by its total assets. It shows how efficiently a company utilizes its assets to generate profits. A higher ROA suggests better performance, whereas a lower return on assets denotes that the corporation is less effective in using its assets to generate profits. While ROA has limitations in measuring a company's future growth opportunities, it can offer valuable insights into its financial health and profitability. In this study, ROA is a metric used to assess accounting performance, which has been extensively used by previous researchers (Muth and Donaldson, 1998; Vafeas, 1999; Balatbat et al., 2004; Haniffa and Hudaib, 2006; Brown and Caylor, 2008).

3.2.2 Independent variables

Concentration measures how concentrated or dispersed the corporation's shareholding is due to the different shareholding ratios of all shareholders. This paper chooses three indicators to measure ownership concentration, which can provide a more comprehensive understanding of the company's ownership distribution. The indicators used in this paper to measure ownership concentration are as follows:

3.2.2.1 TOP1

Ownership concentration in listed companies can be assessed through the highest shareholder percentage of shares (TOP1). Since ownership is highly concentrated in Chinese listed companies, utilizing this indicator to measure ownership concentration is justifiable.

3.2.2.2 Herfindahl 5

The Herfindahl Index is an indicator of the degree of concentration of shareholding, expressed as the squared sum of the top major shareholders' shareholdings. After squaring the shareholding ratio, the gap in the shareholding ratio can be further amplified. The more concentrated the shareholding of a company, the larger the Herfindahl index; the more dispersed the shareholding, the smaller the Herfindahl index. As one of the measures of

ownership concentration in this study, the sum of the squares of the first-to-fifth shareholders' percentage ownership stakes (H5) is used.

3.2.2.3 Z index

The shareholding ratio between the company's top shareholder and its second-largest stakeholder is known as the Z index. A higher Z index indicates that the top shareholder possesses greater control, whereas the second-largest stakeholder has a relatively lower shareholding.

3.2.3 Control Variables

Finally, this study takes into account a variety of industry- and firm-specific control variables. These control variables comprise indicators of firm size, debt ratio, growth rate and firm age, along with dummy variables for industry and year.

3.2.3.1 Firm Size

Numerous studies have explored the connection between corporate size and performance. Although the impact of size on performance is well-established, findings across different studies are inconsistent, with some studies reporting positive effects while others indicate negative outcomes. For instance, research indicates that there is a link between firm profitability and size metrics. (Doğan, M., 2013), with larger firms achieving better economic performance compared to smaller ones (Kuncová, Hedija and Fiala, 2016). Additionally, a non-linear beneficial relationship between profitability and firm size has been established (Fiegenbaum and Karnani, 1991). While large companies may benefit from economies of scale, cost savings, and increased interest rates, they are also more susceptible to agency problems. Based on research exploring the relationship between ownership and performance, the commonly used proxy for firm size is total assets. In line with prior research in the corporate governance area (Agrawal and Knoeber, 1996; Anderson and Reeb, 2003), to calculate the size of the corporation, we utilize the logarithm of the book value of all assets.

3.2.3.2 Debt Ratio

There has been substantial research on the connection between leverage and company performance. Leverage has a complicated effect on corporate performance overall.

On the one hand, agency problems arise when high leverage causes a misalignment of interests between corporate executives and shareholders (Jensen and Meckling, 1976). For instance, executives may prioritize their own interests over the company's and make decisions that are not beneficial to the firm, such as taking on excessive debt to finance unrealistic investments or to enhance their reputation. These actions could expose the company to higher financial risks and negatively affect its performance. Moreover, a high debt ratio can compromise a firm's creditworthiness, leading banks and bond investors to question the company's ability to repay its debts. This can lead to a downgrade in the company's credit rating and hinder its access to new financing, thereby further weakening its capital structure and limiting investment and expansion plans, ultimately impacting its performance (Marlin et al., 1994). In addition, a high debt ratio may result in a lack of liquidity, making it challenging for a company to raise capital quickly to support operations in times of crisis, further negatively impacting performance.

On the flip side, debt can help curb cash flow waste by management and reduce their discretion, thus mitigating agency problems between shareholders and management as noted by Jensen (1986). Furthermore, the leverage ratio can also enhance the company's financial leverage effect, allowing for the expansion of asset scale through borrowing, which can result in higher rates of return.

3.2.3.3 Growth Rate

In this study, operational income growth is used as a proxy for a corporation's growth status, which affects its performance. Typically, good growth is positively associated with higher performance. When companies are able to sustain growth, increase market share and raise revenues, they tend to achieve higher profitability and market value, which is reflected in the corporate's performance indicators. Many scholars choose profit growth rates and revenue growth rates as indicators of company growth, but this paper takes into account that revenue growth rates are an important expression of a company's business results and reflect prominently the results of its management strategy. Therefore, this paper selects the value of this year's operating income ÷ the previous year's operating income - 1 as the relevant indicator to measure the operating income growth rate.

3.2.3.4 Firm Age

The age of the company was chosen as one of the control variables because, although there is no fixed answer, research suggests that firm age may have an effect on corporate performance. As a firm age, the management team and employees usually accumulate a wealth of experience and knowledge. This accumulation of experience can lead to better-informed decisions in the face of challenges and opportunities, thereby improving company performance. Long-standing businesses tend to build up a high level of brand recognition and credibility in the marketplace. Consumers tend to have a higher level of trust in established corporations, which helps to increase sales and market share, which in turn has a positive impact on corporate performance (Eisenberg et al., 1998). However, the impact of firm age on firm performance may also be subject to some limitations and negative effects: older firms may face the challenge of reduced innovation capacity. Innovation has a key role in sustaining growth and creating a competitive advantage, and long-established firms may face problems such as rigidity in innovative thinking, bureaucracy, and resistance to change, which may have a negative impact on corporate performance (Loderer and Waelchli, 2009); over time, industry and market environments may change. Older firms may have difficulty adapting to new market demands and competitive landscapes, which could result in a drop in firm performance.

3.2.3.5 Industry Dummy

Most studies investigating the association between ownership and performance commonly include industry indicator variables to control for industry-specific effects. (Welch, 2003; Altaf and Shah, 2018; Al Farooque et al., 2007; Kubo and Phan, 2019; Zhou, Yin and Dai, 2020). The purpose of utilizing an industry dummy is to consider the unique features of each industry and their impact on the anticipated corporate performance. Thomsen and Pedersen (2000) recommend that industry be considered when analyzing the relationship between ownership concentration and corporate performance. Differences between industries, such as competitive financial constraints, growth prospects, regulatory differences, and other factors, are expected to impact corporate performance. The nature of the industry often influences the frequency of owner distribution, and differences in competition and industry maturity can impact profitability, growth, and free cash flow. After excluding financial industry firms, the sample in this article includes five different industry sectors: utilities, real estate, general,

industrial, and commercial. By using industry dummy variables, it is possible to control for the unique characteristics of different industries.

3.2.3.6 Year Dummy

Most studies examining the relationship between ownership and performance typically incorporate industry year dummy variables (Guo, Liang and Xie, 2020; LI, SUN and ZOU, 2009; Kaserer and Moldenhauer, 2007). This paper uses year dummy variables for the period 2018-2022. The utilization of year dummy variables is a viable approach to account for the influence of temporal factors on the performance of corporations. Since economic and market conditions may change from year to year, using year dummy variables can help isolate the effect of such time factors and more accurately analyze the impact of ownership concentration on corporate performance (Fu, 2017).

3.3 Summary statistics

The assets histogram (Graph 1) shows that the distribution of assets is heavily skewed to the right rather than normally distributed. To improve the normal distribution, assets should be logarithmized. Graph 2 shows that after logarithmization, the normal distribution of the variables has improved significantly. Applying the logarithm to the data does not alter the inherent characteristics and relationships of the variables but instead reduces the scale of the variables. Besides, it narrowed the values on the horizontal and vertical axes. The natural logarithm allows us to compute elasticities, makes variables behave more normally (reducing skewness), and helps simplify some economic models to estimate them using linear models.

In order to provide consistent and reliable results from the regression, a critical assumption is normality. Outliers can pose a risk to the outcomes as they can distort and prejudice the data sample. The existence of outliers within the dataset may pose a challenge to our estimation outcomes as they have the potential to alter both estimation and inference (Bailey, 2019). An effective strategy for mitigating this concern involves implementing winsorization on variables that are presumed to contain outliers. This technique involves replacing extreme data points with less extreme ones to minimize their impact on the analysis. Consequently, we apply the winsorization technique to all variables, trimming the extreme values at the 1st and 99th percentiles.

3.3.1 Descriptive statistics

Table 3 presents descriptive statistics, including the mean, median, and standard deviation, as well as the maximum and minimum values, for the independent, dependent, and control variables in the study. From the specific data in the table, we can draw the following conclusions:

First, we can see that the average value of return on assets (ROA) is 0.3%, and its minimum and maximum values are -2.011 and 0.369, respectively. This significant polarization suggests notable variations in the performance of Shanghai and Shenzhen A-share listed companies, resulting in divergent ROA values across firms.

Second, the mean ownership concentration (TOP1) is 28.8%, and the difference with the median value of 27.1% is relatively small. This means that the equity structure of China's Shanghai and Shenzhen A-share listed companies is still relatively concentrated in general. Besides, the standard deviation is 12.8%, indicating that the sample's dispersion is comparatively minimal. The range of values observed for A-share listed companies in China is notable, with a minimum of 7.4% and a maximum of 65.2%. This suggests significant variability in the situation of these companies.

Third, Zhou (1999) used 0.25 as the threshold for the H-index and considered that if the H-index is greater than 0.25, it indicates an unequal distribution of shareholding proportions among the top n shareholders. The table shows that the average H5 value for the companies in the sample is 0.119. This value is notably lower than the threshold of 0.25, indicating that the distribution of rights among the top five shareholders is relatively balanced. Besides, the standard deviation is 0.088 means that the data within the sample is relatively stable. The minimum and maximum value of H5 is 0.011 and 0.431, indicating some companies in the sample with uneven shareholding distribution among the top five shareholders.

Fourth, the maximum value of the Z index of companies is 35.563, and the minimum value is 1.005. It indicates that certain companies have a significant disparity in shareholding between the largest and second-largest shareholders, with the former enjoying greater autonomy and control over the latter. On the contrary, in alternative corporations, the distribution of shares is comparatively equitable, with no real discrepancy in the percentage of shares held by the

primary and secondary significant shareholders. The mean value of the Z index is 4.752, the medium is 2.77, and the standard deviation is 5.502, which implies that the values have high volatility.

Finally, the analysis reveals that the debt-to-asset ratio (DAR) mean value of the control variables is 39.7%, which indicates from the numerical point of view that the debt-to-assets A-share listed companies in China are moderate. The minimum and maximum values of 6.8% and 90.6%, respectively, indicate that some listed companies are so abundant in their capital that they do not need external debt financing; on the other hand, some listed companies may rely too much on financial leverage and therefore result in more significant amounts of external financing.

The Logassets size of China's listed companies exhibits a mean value of 15.044, with the minimum and maximum values being 13.136 and 18.032, respectively. This observation suggests an apparent discrepancy exists in the larger size of listed companies. The average growth rate of operating income (GROWTH) is 0.271, indicating that listed companies in Shanghai and Shenzhen stock markets generally exhibit growth potential. The range of growth rates among the listed companies is evidenced by the minimum and maximum values of -0.749 and 3.458, respectively. The sample exhibits a range of company ages, with the minimum age being 8 and the maximum age being 56. The findings indicate the range of company ages within the sample. It suggests that the companies included in the study have varying experience levels, with some being relatively young (minimum value of 8) and others being more established (maximum value of 56). The sample's firm age exhibits a mean value of 21.92 and a standard deviation of 4.97, suggesting significant variability or dispersion. The values of firm age are spread out from the mean, suggesting a wide range of ages among the sampled firms.

3.3.2 Correlation analysis

Table 4 shows the correlation analysis results on the chosen variables selected in this paper for sample listed companies. The table provides insight into the association between the dependent and independent variables. Firstly, the findings indicate a significant positive association between the degree of ownership concentration and corporate performance. The study found a positive and statistically significant relationship between Top1, H5, and Z

ownership concentration variables and corporate performance, as measured by ROA. Specifically, the correlation coefficients for Top1, H5, and Z were 0.132, 0.135, and 0.033, respectively. These results suggest that a higher concentration of ownership value within a company is associated with more excellent corporate performance. Secondly, their correlation coefficients are high for the three explanatory variables, Top1, H5, and Z index, because they all indicate the degree of ownership concentration. However, since they are regressed separately in different models, the high correlation between them can be ignored. Utilizing highly correlated indicators across various models can potentially augment the explanatory capacity of ownership concentration on firm performance, providing more comprehensive and consistent information.

Among the control variables, there is a negative numerical correlation between the debt-to-asset ratio (DAR) and corporate performance, with specific correlation coefficients of -0.354, indicating that a high debt ratio may increase financial risk, affecting the firm's operating performance. Besides, there is a highly statistically significant positive correlation between company size (Logassets) and corporate performance, with a correlation coefficient of 0.075, indicating that company size beyond a specific range in the context of the study of ownership concentration will have a positive impact on the performance of the listed company.

The operating income growth rate (GROWTH) positively correlates with corporate performance, with correlation coefficients of 0.058. This indicates that better growth performance of the company is beneficial for a significant improvement in corporate performance. However, Growth is negatively correlated with the indicators of ownership concentration (Top1, H5, and Z). This suggests that there is a negative correlation between ownership concentration and revenue growth rate. The company's potential for substantial revenue growth may be restricted by an increased level of ownership concentration. Besides, Growth is significantly correlated with the company size (Logassets); the correlation coefficient is -0.048, which indicates that larger companies may face challenges in sustaining high growth rates as their operations become more complex and their size limits their ability to achieve rapid revenue growth.

Firm age is negatively correlated with almost all other variables, and the correlation coefficient is also tiny. The observed negative correlation could potentially be explained by

the fact that young firms tend to exhibit greater dynamism and adaptability in their responses to market fluctuations. In comparison, older companies may face challenges regarding innovation and flexibility in China's evolving and developing market.

4. Methodology

4.1 Econometric Methodology

4.1.1 Panel OLS regression

This paper utilizes both panel OLS regression and FE regression to examine the relationship between ownership concentration and firm performance. OLS regression is a popular technique for examining the link between ownership and performance. Particularly, panel OLS regression is a frequently used statistical method for assessing panel data made up of both time-series and cross-sectional data.

Panel data offers more information and more precise estimates by taking into account both temporal and cross-sectional variations. When it comes to corporate governance concerns like ownership concentration, panel data can provide insight into temporal differences that may influence the outcome variable. Panel OLS regression can be applied to analyze various factors affecting corporate governance. It enables researchers to estimate the impact of these factors on firm performance, thereby providing a better understanding of the effect of corporate governance and potential strategies for its improvement.

The OLS model in this research incorporates dummy variables for various years and industries. By incorporating these dummy variables, the differences among various companies, years, and industries can be controlled, leading to more accurate estimates of the influence of other independent variables on the dependent variable and enhanced control of heterogeneity. In conclusion, utilizing panel OLS regression to investigate ownership concentration is a reasonable approach as it can provide valuable information and precise estimates.

This paper builds the following model to test the relationship between ownership concentration and corporate performance of A-share traded companies in Shanghai and Shenzhen Securities Exchanges:

To examine the relationship between TOP1 and corporate performance, model (1) was established; in order to verify the assumptions proposed above 2, investigating the relationship between the H5 and corporate performance, model (2) is established; in order to verify the hypothesis 3 proposed above, to test the relationship between the z index and corporate performance, model (3) is established.

(1)

$$ROA_{it} = \beta_0 + \beta_1 TOP1_{it} + \beta_2 DAR_{it} + \beta_3 Log\ Assets_{it} + \beta_4 Growth_{it} + \beta_5 Firm\ age_{it} + \beta_6 YEAR_{it} + \beta_7 INDUS_{it} + \varepsilon_{it}$$

(2)

$$ROA_{it} = \beta_0 + \beta_1 H5_{it} + \beta_2 DAR_{it} + \beta_3 Log\ Assets_{it} + \beta_4 Growth_{it} + \beta_5 Firm\ age_{it} + \beta_6 YEAR_{it} + \beta_7 INDUS_{it} + \varepsilon_{it}$$

(3)

$$ROA_{it} = \beta_0 + \beta_1 Z_{it} + \beta_2 DAR_{it} + \beta_3 Log\ Assets_{it} + \beta_4 Growth_{it} + \beta_5 Firm\ age_{it} + \beta_6 YEAR_{it} + \beta_7 INDUS_{it} + \varepsilon_{it}$$

4.1.2 FE

According to Durbin (1954), the Hausman test is a statistical technique used to decide whether a FE model or a RE model is more suited in econometrics. The test findings, shown in Table 5, suggest that the FE model is preferred for the study and the RE model ought to be rejected.

Fixed effects models give researchers a mechanism to account for changes that industry and year dummy variables might not be able to detect. Industry and year dummy variables should not be used in a fixed effects model's regression equation. This is because FE regressions take into account individual (or unit) fixed effects. This means that FE regression controls for the effect of individual characteristics on the dependent variable, thereby reducing the endogeneity problems caused by individual characteristics. The FE model includes a constant term ("α") to account for the data sample's individual characteristics. Individual fixed effects are already taken into account, and adding individual dummy variables to the regression equation may cause multicollinearity issues that jeopardize the reliability of the results.

In order to verify the rationality of Hypothesis 1 proposed above, that is, to test the relationship between the TOP1 and corporate performance, model (4) was established; in order to verify the assumptions proposed above 2. To test the relationship between the H5 and

company performance, and establish model (5); In order to test hypothesis 3 above, to test the relationship between Z index and corporate performance, model (6) was developed.

(4) $ROA_{it} = \alpha + \beta_1 TOP1_{it} + \beta_2 DAR_{it} + \beta_3 Log\ Assets_{it} + \beta_4 Growth_{it} + \beta_5 Firm\ age_{it} + \varepsilon_{it}$

(5) $ROA_{it} = \alpha + \beta_1 H5_{it} + \beta_2 DAR_{it} + \beta_3 Log\ Assets_{it} + \beta_4 Growth_{it} + \beta_5 Firm\ age_{it} + \varepsilon_{it}$

(6) $ROA_{it} = \alpha + \beta_1 Z_{it} + \beta_2 DAR_{it} + \beta_3 Log\ Assets_{it} + \beta_4 Growth_{it} + \beta_5 Firm\ age_{it} + \varepsilon_{it}$

4.2 Statistical Tests

4.2.1 Heteroskedasticity

The presence of heteroskedasticity can result in biased and inefficient estimations of the regression model's parameters, impacting the accuracy of statistical tests and confidence intervals as well. As a result, We will perform White tests to determine if heteroskedasticity is present, which occurs when there is a lack of constant variance between the error term and the explanatory variables, resulting in inaccurate OLS standard errors.

From Table 5, the Chi-square statistics for the three models are 988.59, 976.00, and 909.63, respectively, and the p-value (0.0000) of all three models is highly statistically significant. The null hypothesis of homoscedasticity is rejected, implying the presence of heteroscedasticity in the data. We cannot make reliable inferences based on our estimated standard errors.

Therefore, in the regression analysis, we intend to use robust standard errors to account for the heteroskedasticity by adjusting the standard errors of the coefficients (Du, 2015). To enhance the precision of our estimation, we utilize clustered robust standard errors in the regression equation. This approach is implemented to effectively address heteroskedasticity, thereby improving the accuracy of our analysis.

4.2.2 Multicollinearity

As Woolridge (2016) discussed, it can be challenging to precisely determine the acceptable degree of correlation between two explanatory variables. The VIF test for measuring multicollinearity may identify a correlation issue between two explanatory variables, but the

coefficients may not be informative for analysis. Consequently, establishing an arbitrary cut-off value for the VIF test may not be particularly helpful (Woolridge, 2016).

Additionally, when high collinearity is detected, the statistical program STATA utilized in this study automatically eliminates the variables responsible for the collinearity issue. As such, we do not believe that these high correlation values will significantly impact our findings.

5. Multivariate analysis

5.1 Ownership Concentration and Corporate Performance

5.1.1 Hypothesis 1: TOP1

The regression analysis in this part concentrates on the relationship between the explanatory variable (TOP1) and the explained variable (ROA). The analysis includes additional control variables such as the debt-to-assets ratio (DAR), firm size (Logassets), the operating income growth rate (GROWTH), firm age, year dummy variable (YEAR), and industry dummy variable (INDUS). Models (1) and (4) are used to perform the regression analysis, exploring ownership concentration's effect on A-share listed companies' performance metrics in the Shanghai and Shenzhen stock markets.

Specifically, the aim is to examine the relationship between TOP1 and the numerical performance indicator of the company. We can evaluate the magnitude and direction of the association between ownership concentration and company performance using regression analysis while controlling for other relevant variables.

As shown in Table 7, Panels A and B, respectively, depict the outcomes of a typical panel regression without and with cluster-robust standard errors. The panel regression with fixed effects findings is shown in Panels C and D, as suggested by the Hausman test and the arguments proposed by Himmelberg et al. (1999). Panel C shows the results without cluster-robust standard errors, and panel D includes cluster-robust standard errors. The variable TOP1 from regression A has a positive coefficient of 0.239 and is statistically significant at the 1% level. It means that for every unit rise in the largest stakeholder of the company's shareholding ratio, the average return on assets (ROA) is expected to increase by 23.9 percentage points. Introducing cluster-robust standard errors in panel B does not affect

the magnitudes of the estimated coefficients, which remain significant at the 1% level. When fixed effects are incorporated into the panel regression, as shown in Panel C, the coefficient changes to 0.386 and the standard deviation increases to 0.076, but the statistical significance remains unchanged. Even with the inclusion of cluster-robust standard errors in panel D, only the standard deviation experiences an increase to 0.137.

The value of the R-squared for panels A and B is 0.198. The value of R-squared for panels C and D is 0.158. Although the R-squared values are not high, if the regression coefficients are statistically significant, even with low goodness of fit, it can still indicate the presence of a meaningful relationship between the variables. Both the Ordinary Least Squares (OLS) and Fixed Effects (FE) regression analyses show a positive relationship between TOP1 and corporate performance.

5.1.2 Hypothesis 2: H5

The regression equation's findings are shown in Table 8, where H5 (ownership concentration) is the independent variable and ROA (corporate performance) is the dependent variable. The outcomes of the standard panel regression without and with clustered robust standard errors are shown in Panels A and B, respectively. The results of the panel regressions with Fixed Effects, as proposed by the Hausman test, are shown in Panels C and D, respectively, without and with clustered robust standard errors.

According to Panel A's findings, ownership concentration, as determined by H5, is statistically significant at the 1% level and has a positive coefficient of 0.339. This shows that an average ROA rise of 33.9 percentage points is caused by a one-unit increase in H5. The value of the coefficient is the same in Panels A and B, but the standard deviations are 0.036 and 0.033, respectively. The introduction of clustered robust standard errors in Panel B does not affect the statistical significance, which remains at the 1% level. For Panels A and B, the model's explanatory power is measured by the adjusted R-squared value, which is 19.6%.

The results of the fixed effects panel regression without and with clustered robust standard errors, respectively, are shown in Panels C and D. Fixed factors are added to the panel regression in Panel C, and the coefficient remains positive at 0.596 with a standard deviation of 0.113. The statistical significance remains at the 1% level even after incorporating fixed effects. This degree of significance is maintained when clustered robust standard errors are

used in Panel D. The fixed effects model obtains an R-squared value of 15.8%, indicating that the model can account for about 15.8% of the variation in the dependent variable. The regression results show a positive relationship between H5 and firm performance using both Ordinary Least Squares model and Fixed Effects models.

5.1.3 Hypothesis 3: Z

Models (3) and (6) are used to perform the regression analysis, and the results are presented in Table 9. Specifically, it explores the relationship between the Z Index (Top1/Top2) and the performance indicators of the companies.

According to the results in Panel A, the Z index demonstrates a statistically significant relationship at the 1% significance level, with a positive coefficient of 0.002. This suggests that, on average, a 1 unit increase in the shareholding ratio of the company's first largest shareholder to that of the second largest shareholder is associated with a 0.2 percentage point increase in the return on assets (ROA). When incorporating clustered robust standard errors in Panel B, the estimated coefficient retains its magnitude and remains statistically significant at the 1% level. Moving to Panel C, introducing fixed effects in the panel regression results in unchanged coefficient estimates and standard deviations, with the significance level shifting to 5%. The previously mentioned patterns persist even after clustered robust standard errors are introduced in Panel D.

The R-squared value of Panel A and B is greater than Panel C and Panel D. The coefficient of variable Z in the model is relatively small but has a positive sign. With such a small magnitude, it suggests that the constraint imposed by the second-largest shareholder on the largest shareholder is weak. Additionally, an increase in the Z index indicates an expanding disparity between the primary and secondary shareholders, leading to a slight improvement in company performance.

5.1.4 Analysis and Summary of Experimental Results

Research hypotheses 1, 2, and 3 are supported by the regression results that look at the relationship between ownership concentration (measured by TOP1, H5, and Z) and company performance (ROA). This empirical evidence aligns with the hypothesis proposed by Shleifer and Vishny (1986) that a centralized ownership structure is likely to promote the alignment of

interests. It's because when the ownership of the company is highly concentrated, most of the company's management personnel implement management activities based on the interests of the controlling shareholders, so they maintain a high degree of consistent economic interests with the controlling shareholders. In this case, the enthusiasm of the controlling shareholders to supervise the company's management is also very high, because the company's operating conditions are directly related to their own interests.

In contexts where capital market mechanisms are underdeveloped and legal protection for investors is inadequate, centralized ownership structures with ownership concentration are commonly observed. On the other hand, countries with well-developed capital markets and robust legal protection, such as the UK and the US, tend to have decentralized shareholding structures. In China, with its relatively short-term development of the securities market and evolving regulatory environment, ownership concentration serves as a means to monitor company operators and reduce agency costs given the insufficient legal protection provided. While the US and the UK may have fragmented shareholding structures, their mature capital markets, including strong external takeover mechanisms and robust managerial markets, enable them to maintain good governance structures and achieve favorable corporate performance.

In the current stage of the Chinese capital market, ownership concentration contributes to mitigating agency costs and establishing a positive relationship with corporate performance, as controlling shareholders possess the incentive and ability to supervise agents. These findings are consistent with previous studies (e.g., Xu, 2008). In summary, the empirical findings of this study provide support for the notion that ownership concentration plays a crucial role in enhancing corporate performance, particularly in environments characterized by underdeveloped capital markets.

5.2 Control variables

Regarding the control variables, since their coefficients differ by less than 1% across each regression model and exhibit consistent significance levels, we will collectively discuss their impact on corporate performance in this context.

Firstly, the debt-to-asset ratio (DAR) of selected publicly traded firms demonstrates a significant negative relationship with corporate performance across all models. This indicates that a company's elevated financial leverage leads to increased financial expenses and heightened financial risk, adversely affecting corporate performance.

Secondly, the Logassets coefficient exhibits statistical significance at the 1% level, suggesting the presence of economies of scale in A-share listed firms in China. This means a positive relationship exists between the magnitude of a company and performance, implying that companies with greater size tend to exhibit superior performance.

Third, the operating income growth rate (GROWTH) exhibits a significant positive relationship with firm performance in the regression models. This is consistent with reality, as companies with better growth prospects and profitability tend to perform better.

Additionally, firm age shows a significant negative relationship with performance, with a small coefficient. This suggests that as the firm age increases, its performance decreases slightly. Considering China's unique institutional background and the relatively underdeveloped state of its capital market, with a late start in the securities market, the impact of firm age is relatively small.

5.3 Model limitations

Based on the above research and analysis, the hypotheses presented in this paper have been adequately tested, yielding valuable research findings. However, it is important to acknowledge certain limitations in our regression analysis that warrant discussion.

Firstly, there may be some issues with the indicators chosen for this study's performance evaluation of listed corporations. By relying solely on ROA as the variable in the empirical analysis, and exclusively employing ROE as the explanatory variable in the robustness test, the analysis may lack the breadth and depth required for a comprehensive assessment. Future studies could consider incorporating a broader range of performance indicators to enhance the robustness and representativeness of the analysis.

Furthermore, the regression model employed in this study only includes three independent variables, potentially overlooking additional factors that could influence the dependent

variable. The omission of such important variables may limit the explanatory power of the model, consequently impacting the scope and applicability of the empirical findings. Future studies should investigate the inclusion of additional pertinent factors to strengthen the model's explanatory power and further enrich it.

It's also important to note that this study only focuses on Chinese A-share listed companies that are traded on the Shanghai and Shenzhen stock markets. Therefore, the generalizability of the findings may be limited, particularly when considering unlisted companies, including small and medium-sized enterprises (SMEs) and private companies. As a result, caution should be exercised when extrapolating the empirical results to the broader context of non-listed companies, and further research is necessary to expand the applicability of the findings.

In summary, while this study has made meaningful contributions to the field, it is essential to recognize the limitations inherent in the regression analysis. Addressing these limitations through the inclusion of additional performance indicators, a broader set of independent variables, and the consideration of a more diverse sample would strengthen the empirical analysis and enhance the practical implications for policy and decision-making.

6. Robustness test

The purpose of the robustness test is to ascertain that the findings derived from the research are not spurious or influenced by outliers or other factors. By conducting the test, if changing the model does not cause a change in the results, confidence in the validity and reliability of the study results can be increased (Bailey, 2019).

The regression results are subject to randomness and errors. To verify the reliability of the empirical findings, this study conducted model tests by replacing the measure of corporate performance, return on asset (ROA), with return on equity (ROE), aiming to reduce the incidental nature of the results and examine the robustness of the equation. Return on equity is an important indicator reflecting a company's equity investment returns. These indicators concern investors and management, as a higher return on equity indicates stronger profitability of the firm's net assets.

The regression analysis of the above model was re-run with return on equity (ROE) as the explanatory variable, replacing the previous return on assets (ROA); explanatory variables were ownership concentration (Top1, H5, Z), and control variables were debt-to-asset ratio (DAR), firm size (Logassets), the growth rate of operating income (GROWTH), firm age, year dummy (YEAR) and industry dummy (INDUS). We employed a Panel OLS regressions controlled for clustered robust standard error for robustness testing with the dependent variable replaced by ROE. Table 10 displays the outcomes of the robustness assessments.

The significance of the variables did not change for all models, nor did the positivity or negativity of the variables. Ultimately, it was found that regardless of whether the dependent variable was ROA or ROE, the data showed results congruent with the above conclusions. Therefore, the previous research using return on assets (ROA) as the dependent variable in this paper has good robustness.

7. Conclusion

This paper studies the relationship between ownership concentration and corporate performance using a research sample of Chinese A-share listed companies in Shanghai and Shenzhen stock markets from 2018-2022. Through the study, we find that: on the one hand, it can be observed that the proportion of shares held by the largest shareholder (TOP1), the Herfindahl Index (H5), and the ratio of the shareholding of the company's first largest shareholder to that of the second largest shareholder (Z Index) are all positively correlated with corporate performance. This indicates a significant positive relationship between the ownership concentration and corporate performance. On the other hand, it is also found that company size (Logassets) and the growth rate of operating income (GROWTH) have a positive relationship with corporate performance. However, the debt-to-asset ratio (DAR) and firm age negatively affect company performance.

Based on the above conclusions, we can conclude that an increased level of ownership concentration positively impacts the overall performance of corporations. Increasing the ownership concentration enhances the incentive for shareholders to monitor management, reduces agency costs, and enhances corporate performance. The rise in shareholder ownership also encourages shareholders to actively participate in the company's routine operations and management, providing more support for its development and reducing

free-riding behavior by certain shareholders who neglect their interests. An increase in shareholder ownership tightens the integration of shareholders' interests with those of the company, reducing the waste of the company's public resources, minimizing the possibility of shareholders sacrificing the company's interests for their benefit, and reducing conflicts among shareholders, thereby generating a convergence of interests.

Section 2.1 highlights the incongruent findings from prior research and empirical examinations concerning the influence of ownership concentration on the performance of corporations. The phenomenon of ownership concentration has been noted to have a dual impact on the performance of corporations, with both favorable and unfavorable outcomes, and it can also exhibit a positive U-shaped or inverted U-shaped relationship with performance. Various factors, including variable selection, sample choice, and the overall capital market environment, contribute to these disparities. Different choices of variables can lead to divergent research outcomes. Therefore, the findings of this study can conclude that among the 1,468 selected A-share listed companies on the Shanghai and Shenzhen Stock Exchanges in China, the three selected indicators of ownership concentration, namely Top1, H5, and the Z-index, have a positive relationship with corporate performance. This study enriches and enhances the corporate governance theory by investigating the relationship between ownership concentration and corporate performance. This statement furnishes a theoretical framework for enhancing the operational efficiency of corporations in China.

The limitation of this paper is the omission of endogenous variables in the empirical analysis. As previously stated, the investigation conducted by Chinese scholars regarding ownership structure and corporate performance commenced at a later stage. Further research is required to address the endogeneity of equity ownership. Furthermore, domestic studies examining the endogeneity of ownership structure encounter challenges in selecting appropriate instrumental variables. The instrumental variables chosen must undergo rigorous testing to ensure their effectiveness. Identifying suitable instrumental variables for the relationship between ownership concentration and corporate performance is frequently challenging. Hence, the research paper is subject to certain constraints to a certain degree.

Regarding future research, firstly, the factors influencing corporate performance include internal and external factors. External factors influencing corporate performance mainly include the national economic system, legal environment, cultural atmosphere, and values.

Most authors have only considered internal factors such as ownership concentration, company size, and growth capability concerning corporate performance. Future research can include the analysis of external factors to examine their impact on corporate performance. Moreover, the intricate matter of potential endogeneity is of utmost significance and interest for future investigations. As previously stated, current scholarship addressing this matter could be enhanced. Professionals in the field should explore the topic of endogeneity.

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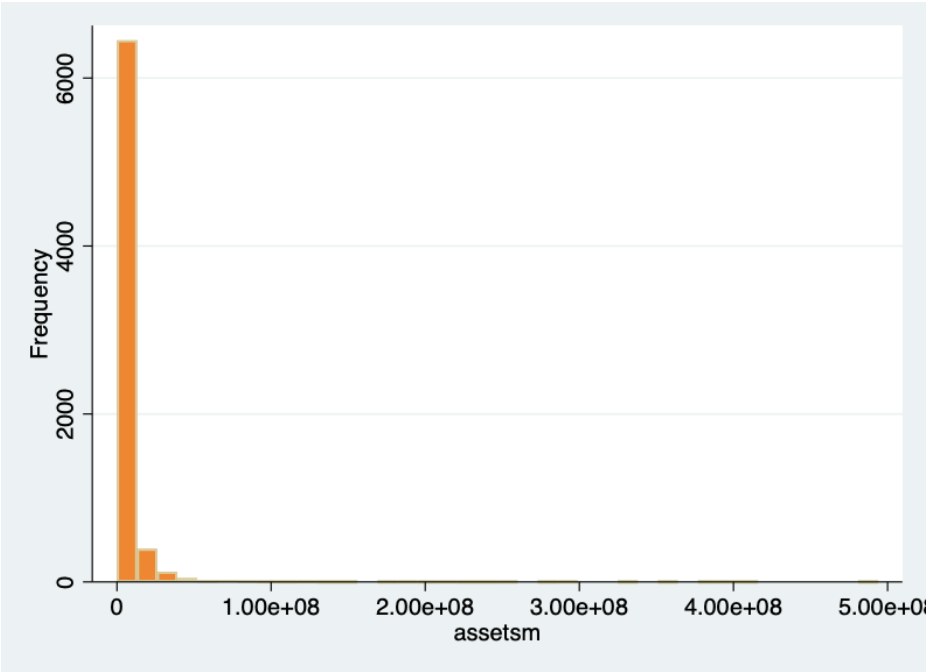
Tables and Graphs

Graph 1: Assets histogram



Graph 2 : Logassets histogram

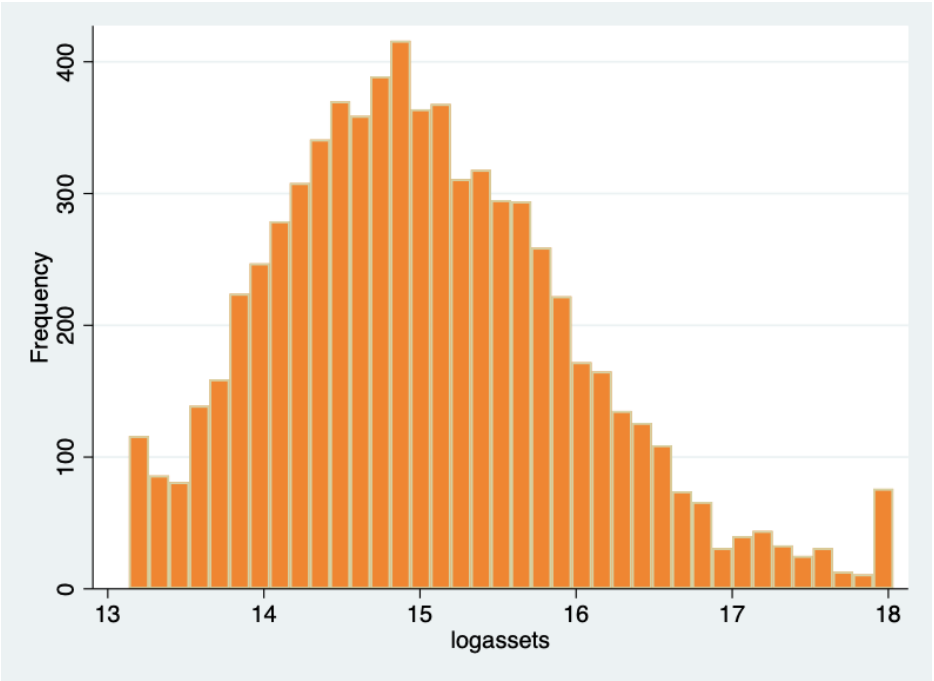


Table 3: Descriptive Statistics

	Mean	Median	SD	Min	Max	N
ROA	.003	.06	0.291	-2.011	.369	7096
Top1	.288	.271	0.128	.074	.652	7096
H5	.119	.096	0.088	.011	.431	7096
Z	4.752	2.77	5.502	1.005	35.563	7096
Dar	.397	.385	0.189	.068	.906	7096
Logassets	15.044	14.957	0.975	13.136	18.032	7096
Growth	.271	.118	0.609	-.749	3.458	7096
Firm age	21.92	22	4.970	8	56	7096

Table 4: Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ROA	1.000							
(2) Top1	0.132***	1.000						
(3) H5	0.135***	0.956***	1.000					
(4) Z	0.033***	0.546***	0.469***	1.000				
(5) Dar	-0.354***	-0.046***	-0.058***	0.004	1.000			
(6) Logassets	0.075***	0.016	0.018	0.000	0.360***	1.000		
(7) Growth	0.058***	-0.041***	-0.040***	-0.014	-0.003	-0.048***	1.000	
(8) Firm age	-0.027**	-0.009	-0.009	0.008	-0.028**	-0.043***	-0.016	1.000

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

Table 5: The Hausman test

	Roa - Top1	Roa - H5	Roa - Z index
chi2	67.64	69.98	65.86
Prob > chi2	0.0000	0.0000	0.0000

Table 6: Test of Heteroskedasticity

	White test of heteroskedasticity	Chi2 statistic	df	p-value
Model 1	H0 : Homoskedasticity	988.59	26	0.0000
Model 2	H0 : Homoskedasticity	976.00	26	0.0000
Model 3	H0 : Homoskedasticity	890.98	26	0.0000

Table 7: Regression Result for ROA and TOP1

This regression table reports the results for the regression models with Panel OLS with industry and year dummies (A), Panel OLS with industry and year dummies controlled for clustered robust standard errors (B), Panel OLS with Fixed Effects (C), and Panel OLS with Fixed Effects controlled for clustered robust standard errors (D) with the objective of measuring the effect of the TOP1 on Corporate performance (ROA).

	A	B	C	D
	OLS	OLS	FE	FE
VARIABLES	ROA	ROA	ROA	ROA
TOP1	0.239***	0.239***	0.386***	0.386***
	(0.025)	(0.023)	(0.076)	(0.137)
Dar	-0.663***	-0.663***	-1.165***	-1.165***
	(0.018)	(0.038)	(0.038)	(0.085)
Logassets	0.068***	0.068***	0.126***	0.126***
	(0.003)	(0.005)	(0.011)	(0.020)
Growth	0.041***	0.041***	0.054***	0.054***
	(0.005)	(0.006)	(0.007)	(0.010)
Firm age	-0.001**	-0.001**		
	(0.001)	(0.001)		
Constant	-0.842***	-0.842***	-1.559***	-1.559***
	(0.058)	(0.073)	(0.161)	(0.308)
Observations	7,096	7,096	7,096	7,096
Industry controls	YES	YES	NO	NO
Year controls	YES	YES	NO	NO
Standard errors	Default	Clustered Robust	Default	Clustered Robust
R-squared	0.198	0.198	0.158	0.158
Adj. R Squared	0.197	0.197		
Number of firm	1,468	1,468	1,468	1,468

Standard errors in parentheses

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

Table 8: Regression Result for ROA and H5

This regression table reports the results for the regression models with Panel OLS with industry and year dummies (A), Panel OLS with industry and year dummies controlled for clustered robust standard errors (B), Panel OLS with Fixed Effects (C), and Panel OLS with Fixed Effects controlled for clustered robust standard errors (D) with the objective of measuring the effect of the H5 on Corporate performance (ROA).

	A	B	C	D
	OLS	OLS	FE	FE
VARIABLES	ROA	ROA	ROA	ROA
H5	0.339***	0.339***	0.596***	0.596***
	(0.036)	(0.033)	(0.113)	(0.195)
Dar	-0.660***	-0.660***	-1.166***	-1.166***
	(0.018)	(0.038)	(0.038)	(0.085)
Logassets	0.068***	0.068***	0.129***	0.129***
	(0.003)	(0.005)	(0.011)	(0.020)
Growth	0.041***	0.041***	0.053***	0.053***
	(0.005)	(0.006)	(0.007)	(0.010)
Firm age	-0.001**	-0.001**		
	(0.001)	(0.001)		
Constant	-0.812***	-0.812***	-1.564***	-1.564***
	(0.058)	(0.072)	(0.161)	(0.306)
Observations	7,096	7,096	7,096	7,096
Industry controls	YES	YES	NO	NO
Year controls	YES	YES	NO	NO
Standard errors	Default	Clustered Robust	Default	Clustered Robus
R-squared	0.197	0.197	0.158	0.158
Adj. R Squared	0.196	0.196		
Number of firm	1,468	1,468	1,468	1,468

Standard errors in parentheses

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

Table 9: Regression Results for ROA and Z

This regression table reports the results for the regression models with Panel OLS with industry and year dummies (A), Panel OLS with industry and year dummies controlled for clustered robust standard errors (B), Panel OLS with Fixed Effects (C), and Panel OLS with Fixed Effects controlled for clustered robust standard errors (D) with the objective of measuring the effect of the Z index on Corporate performance (ROA).

	A	B	C	D
	OLS	OLS	FE	FE
VARIABLES	ROA	ROA	ROA	ROA
Z	0.002***	0.002***	0.002**	0.002**
	(0.001)	(0.000)	(0.001)	(0.002)
Dar	-0.672***	-0.672***	-1.177***	-1.177***
	(0.018)	(0.039)	(0.038)	(0.086)
Logassets	0.070***	0.070***	0.118***	0.118***
	(0.003)	(0.005)	(0.011)	(0.019)
Growth	0.040***	0.040***	0.054***	0.054***
	(0.005)	(0.006)	(0.007)	(0.010)
Firm age	-0.002**	-0.002***		
	(0.001)	(0.001)		
Constant	-0.784***	-0.784***	-1.333***	-1.333***
	(0.058)	(0.072)	(0.155)	(0.267)
Observations	7,096	7,096	7,096	7096
Industry controls	YES	YES	NO	NO
Year controls	YES	YES	NO	NO
Standard errors	Default	Clustered Robust	Default	Clustered Robus
R-squared	0.188	0.188	0.154	0.154
Adj. R Squared	0.187	0.187		
Number of firm	1,468	1,468	1,468	1,468

Standard errors in parentheses

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

Table 10: Robustness test

This regression results table presents the regression results of the new dependent variable ROE replacing ROA. Panel A shows the regression results of ROE with Top 1, Panel B shows the results of ROE with H5, and Panel C shows the results of ROE with Z. All regressions are Panel OLS regressions with industry and year dummies controlled for clustered robust standard error. This regression merely substitutes the dependent variable while keeping other explanatory variables and control variables unchanged.

	(A)	(B)	(C)
	OLS	OLS	OLS
VARIABLES	ROE	ROE	ROE
TOP1	0.113***		
	(0.008)		
H5		0.167***	
		(0.011)	
Z			0.001***
			(0.000)
Dar	-0.203***	-0.202***	-0.208***
	(0.008)	(0.008)	(0.008)
Logassets	0.021***	0.021***	0.021***
	(0.001)	(0.001)	(0.001)
Growth	0.009***	0.009***	0.009***
	(0.002)	(0.002)	(0.002)
Firm age	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Constant	-0.238***	-0.225***	-0.209***
	(0.021)	(0.021)	(0.021)
Observations	7,096	7,096	7,096
Industry controls	YES	YES	YES
Year controls	YES	YES	YES
Standard errors	Clustered Robust	Clustered Robust	Clustered Robust
R-squared	0.190	0.190	0.169
Adj. R Squared	0.188	0.189	0.167

Robust standard errors in parentheses

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

Appendixes

Appendix 1: Definitions of variables

Type	Name	Symbol	Variable Specification
Dependent variable	Return On Assets	ROA	Net Income / Total Assets
Independent variables	Ownership concentration	TOP1	shareholding ratio of the largest shareholder
		Herfindahl 5	sum of the squares of the percentage shareholdings of the first to fifth shareholders
		Z index	the shareholding of the company's first largest shareholder / the shareholding of the company's second-largest shareholder
Control variables	Firm size	ASSETS	Total assets
	Debt ratio	DAR	Total book value of debt / total book value of assets
	Growth rate	GROWTH	(Current year amount of operating income - Prior year amount of operating income)/(Prior year amount of operating income)
	Firm age	FA	Number of years since origination
	Industry dummy	INDUS	Industry controls include: utilities, real estate, general, industrial, and commercial
	Year dummy	YEAR	A year dummy for each year 2018 - 2022