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Multiple Large Shareholders, Investment Efficiency and Corporate Tax Avoidance: Evidence from China

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Abstract:

This study assesses the relationship between the ownership structure and corporate tax avoidance based on annual financial data of Chinese A-share listed firms during 2010–2020. Firstly, the empirical results demonstrate that when a listed firm has multiple large shareholders (MLS), these shareholders are likely to weaken internal monitoring and collude with each other, which will lower its corporate governance level and increase its corporate tax avoidance (CTA) level. The empirical conclusion remains valid after multiple robustness tests. Secondly, the empirical result of the baseline model is significantly influenced by the nature of ownership, the quality of external audit, the tracking of securities analysts and the firm's location. Finally, the result of our mediating effect analysis shows that the presence of MLS reduces the company investment efficiency, which provokes firms to make aggressive financial choices to obtain resources to ensure their future development.

Keywords: corporate tax avoidance, multiple large shareholders, corporate governance, mediating effect analysis

JEL Codes: B23, C51

1. Introduction

Tax revenue is not only an essential source of income for a country but also the material basis for the country to function. However, for firms, tax is the profits compulsorily taken away by the state. To keep resources within the firm as much as possible, firms tend to implement corporate tax avoidance (CTA) activities. As shown in previous studies (Goh et al., 2016),

CTA can increase a firm's cash flow, reduce its financial burden and ultimately increase corporate value. Graham and Tucker (2006) carried out a study from the perspective of cash flow, which showed that CTA can form a non-debt tax shield, decrease a firm's financing demand, and eventually ease the corporate financing constraints. However, some studies hold different opinions on the economic consequences of CTA. According to Chen and Chu (2005), the conclusion that CTA can increase the corporate value is mainly because of neglecting the common principal-agent problem faced by listed firms. CTA involves many non-transparent and relatively complicated transactions, which intensifies the information asymmetry between investors and listed firms, increases business risks, and ultimately reduces the corporate value (Desai and Dhammika, 2009).

In addition to the economic consequences of CTA, researchers have studied the influences of external and internal factors on CTA. Slemrod et al. (2001) found that there is a significant correlation between the level of CTA and the enforcement degree of tax collection and management. Specifically, a decline in tax collection and management enforcement increases the level of CTA. Hanlon and Slemrod (2009) investigated the costs of CTA. When the potential benefits of CTA are less than the direct and indirect costs of CTA, firms will abandon taking tax-related risks. Moreover, the executive compensation is significantly correlated with the level of CTA. Gaertner (2014) demonstrated that when the compensation of a CEO relates to the firm's after-tax profit, she/he prefers to conduct CTA activities to maximize her/his own benefits. Hsieh et al. (2018) further demonstrated that the personal traits of a CEO are significantly correlated with the level of CTA. More precisely, if a firm's CEO is overconfident, its CTA level rises. In addition, Francis et al. (2014) showed that the CTA level of firms with female CEOs is relatively low due to women's risk aversion.

The ownership structure is an important component of corporate governance and can also affect corporate decisions, including CTA. Previous literature has pointed out that firms with more concentrated ownership and control have lower CTA levels compared to firms with less concentrated ownership and control. The reason is that shareholders who hold a higher proportion of equity are more risk averse, and CTA is also seen as a risky investment (Badertscher et al., 2013). Khan et al. (2017) examined the impact of institutional investor shareholding on corporate tax avoidance by using index restructuring to set exogenous shocks. The research has shown certain benefits of CTA (achieving profit growth, meeting analysts' expectations) and pointed out that there is a significant positive correlation between institutional investor shareholding and CTA. There are also studies linking dual-class ownership structures with CTA. The research points out that dual-class ownership structures strengthen the position of the corporate management, leading to a reduction in the constraints and restrictions imposed by

the shareholder on it. This will lead to a decrease in the decision-making efficiency of corporate management and aggravation of principal-agent issues, as evidenced by a decrease in CTA levels (McMullin and Schonberger, 2020).

The rapid economic development in China has drastically increased the number of listed firms over the past 20 years. However, behind the rapid growth of listed firms in China, there are frequent violations caused by inadequate monitoring of listed firms and stock price collapses triggered by poor corporate governance of listed firms. For example, in 2019, Chinese tax authorities punished the MYS Environmental Protection and Technology Company for evading taxes by concealing sales, rental incomes and contract stamp tax. In 2022, Chinese tax authorities punished Suning Universal Company for its subsidiary evading tax by concealing operating income. Such examples are numerous. The China Securities Regulatory Commission announced 59 and 75 cases of financial fraud in Chinese listed firms, respectively, in 2020 and 2021. In 2020, the total number of listed firms in China was 4140, while in 2021 it was 4682. We can see that the increase rate of financial fraud in listed firms is significantly higher than the increase rate of the total number of listed firms. As a reference, the total number of listed firms on the US securities and capital market in 2020 was 5110, while in 2021 it was 6111. At the same time, the number of financial frauds among listed firms in the United States in 2020 was 8, and the number in 2021 was 4 (Wharton Research Data Services). This indicates that there is still room for improvement in the regulation of China's securities capital market. Thus, the compliance and corporate governance of Chinese listed firms need more attention.

With the development of China's economy and the implementation of ownership structure reforms in listed firms, more and more scholars are paying attention to the relationship between ownership structure and corporate governance on the Chinese capital market, which has laid the foundation for our research. Firstly, scholars have studied the relationship between institutional investors shareholding and CTA of listed firms. Contrary to expectations, their empirical results showed that the increase in institutional ownership has promoted the CTA of the listed firms (Jiang et al., 2021). Secondly, previous studies have also studied the impact of relevant reforms on China's stock market on corporate governance. The research of Li et al. (2017) studied the relationship between split share structure reform and CTA. The split share structure reform aims to enhance the stock liquidity of Chinese listed firms, and its main content is to eliminate the circulation system differences between circulating and non-circulating stocks in Chinese listed firms through a series of measures. The empirical research indicates that after the split share structure reform, the CTA of state-owned firms has risen significantly. This is due to the increased liquidity of stocks, and shareholders of state-owned firms also hope to benefit from the rise in stock prices. Unlike the split share structure reform, the mixed ownership

reform has the opposite effect on CTA. The mixed ownership reform is an attempt to enhance the enthusiasm of state-owned enterprises in production and operation by introducing private capital into state-owned enterprises. According to the research of Wang et al. (2021), the mixed ownership reform reduces the CTA level of listed firms. The reason is that the reform has affected the corporate financial constraints and analysts' forecasts. Lastly, some studies have pointed out that a decentralized ownership structure promotes mutual monitoring among shareholders, which inhibits the radical financial behaviour of listed firms, such as CTA (Ouyang et al., 2020). However, some studies believe that the relationship between ownership structure and corporate radical financial behaviour is nonlinear, which indicates the heterogeneity of the impact of ownership structure on corporate business behaviour (Richardson et al., 2016).

As can be seen, the research into the ownership structure of Chinese listed firms in the existing literature is mostly from the perspective of the ownership structure reforms and no consensus has been reached on the impact of MLS[1] on corporate governance. Therefore, this study explores the roles of multiple large shareholders (MLS) in the corporate governance of Chinese listed firms, focusing on the relationship between CTA and the ownership structure of Chinese listed firms. The results of the baseline model show that the level of CTA of listed firms tends to increase when there are MLS. This finding remains valid after several robustness tests. The results of further research indicate that the result of the baseline model is significantly influenced by the nature of ownership, quality of external audit, the tracking of securities analysts and the firm's location. The mediating effect analysis suggests that company investment efficiency is the mediating variable of the relationship between MLS and CTA.

The contribution of this research is as follows. Firstly, this study provides different research perspectives on ownership structure. Previous research has analysed the relationship between ownership structure and CTA from the perspectives of principal-agent issues (McGuire et al., 2014) or corporate risk preferences (Badertscher et al., 2013), with less research into this issue from the perspective of the direct economic consequence of shareholder behaviour patterns. This article establishes a theoretical analysis framework and conducts empirical testing based on two possible behaviour patterns of MLS. Secondly, this article provides further evidence for the economic consequences of MLS. The existing research literature points out that MLS may bring more related party transaction and resource transfer behaviour (Cai et al., 2016; Dyck and Zingales, 2004), which will have a negative impact on the corporate operations. The conclusion

1 MLS is an abbreviation for multiple large shareholders. According to relevant Chinese laws (*Company Law of the People's Republic of China*), the presence of two or more shareholders holding more than 10% of the shares is generally defined as multiple large shareholders. This paper will further discuss this in the variable definition and robustness test.

of this paper further illustrates that the existence of MLS will damage company investment efficiency, which not only confirms the existing research conclusions but also provides evidence for subsequent research. Thirdly, this article expands the research into CTA. In previous studies on ownership structure and CTA, researchers have focused on examining the impact of CTA as an economic behaviour on corporate operating indicators (Khan et al., 2017) or shareholder wealth (Ouyang et al., 2020), lacking an in-depth analysis for motivations of CTA. This research points out that the decline in investment efficiency caused by the existence of MLS leads to an increase in CTA. This confirms that CTA is an internal financing approach rather than a profit-seeking approach in this situation, which is consistent with previous research (Edwards et al., 2016; Lanis and Richardson, 2012). Finally, this article also explores the relevant self-selection bias in detail and examines the impact of a series of external governance factors on the conclusions of the baseline model in empirical testing. These empirical conclusions reflect the particularity of China's capital market and provide a certain reference for the follow-up research into China's listed firms (Cheng et al., 2012).

2. Literature Review and Hypothesis Development

2.1 Main effect

Due to the relatively early development of the European and American securities markets, the majority of European and American listed firms are owned by MLS. In the USA, about 70% of listed firms have MLS. In contrast, the listed firms on Asian securities markets have a highly concentrated ownership structure (Edmans and Manso, 2011; Laeven and Levine, 2008; Maury and Pajuste, 2005).

Many studies focus on firms with MLS on European and American capital markets without reaching a consensus on the role of MLS in corporate governance. Some believe that MLS can monitor each other in the daily operation of listed firms, thereby improving the corporate governance. Pagano et al. (1998) found that listed firms with MLS have less serious principal-agent problems because of mutual monitoring among MLS. Yafeh and Yosha (2003) obtained a similar conclusion, that is, one large shareholder's pursuit of self-interest will be stopped by the other large shareholders, so the interests of small and medium shareholders can be protected. The reason is that under the ownership structure of a single large shareholder (SLS), minority shareholders have difficulty preventing large shareholders from harming the firm's interests. Differently from the highly concentrated ownership structure, the existence of MLS means that multiple shareholders have a certain degree of power over the firm. In other words, large shareholders are able to stop the unfavourable behaviour of each other. The study further shows that, compared with

SLS, MLS have more resources and information channels to monitor the management of a firm. Based on the same logic, existing literature has also pointed out that mutual monitoring among MLS brings higher corporate value, lower earnings management level and higher information disclosure quality (Attig et al., 2008; Boubaker and Sami, 2011; Jara and López-Iturriaga, 2011).

The above shows the potential reasons why MLS can enhance corporate governance in terms of shareholders' capabilities and resources. From the perspective of the company's future earnings, the existence of MLS may also bring stronger internal monitoring motivation. Compared to the situation of SLS, MLS are more sensitive to the firm's unfavourable behaviour because they have more earning sharing rights than small and medium shareholders. The small shareholders have lower earning sharing rights in a specific firm; the balance between monitoring costs and monitoring benefits is an important factor that leads to their weak monitoring motivation. If the firm develops in a healthy manner, the large shareholders can obtain considerable profits in the future due to their higher shareholding. Due to the predictability of future earnings, large shareholders are more sensitive to unfavourable factors that damage the company's long-term development (Shleifer and Vishny, 1986; 1997). Therefore, the large shareholders are more motivated to prevent behaviour that is detrimental to the company's future development. From the perspective of the company's ability and future earnings, MLS tend to monitor each other to protect their own interests.

In general, the mutual monitoring among MLS reduces behaviour such as related party transactions, misappropriation of corporate resources and investment in pet projects (pet projects provide personal gains for large shareholders but do not help the company's long-term development or even damage the company's current interests) by large shareholders (Laeven and Levine, 2008; Maury and Pajuste, 2005). The reduction of the above behaviour not only increases the firm's available resources, but also reduces the firm's inefficient investment. Therefore, we can reasonably expect that the existence of MLS can bring the improvement in company investment efficiency (Jiang et al., 2018). Under the premise of mutual monitoring among MLS and high company investment efficiency, the firm will not adopt aggressive measures to preserve financial resources. Although CTA activities can preserve resources, they are also risky activities that bring a series of non-tax costs (litigation costs, fines) (Chen et al., 2010). When the firm has sufficient resources and stable investment efficiency under the monitoring among MLS, the marginal revenue of CTA decreases because the firm does not need to obtain resources in this way, or the firm does not lack resources at this time; and tax avoidance has to bear potential non-tax costs. Therefore, in this situation, the frequency of utilizing CTA as an aggressive financial strategy to retain resources will decrease.

From the perspective of the positive impact of MLS on corporate governance, we propose the following research hypothesis.

Hypothesis 1a: MLS in Chinese listed firms monitor each other. This will enhance corporate governance and eventually reduce the level of CTA through improving investment efficiency.

However, many studies argue that a concentrated ownership structure in listed firms improves corporate governance because MLS may weaken the internal monitoring of listed firms and collude with each other to harm the firm's interests. Firstly, MLS bring the risk of reducing the level of corporate governance. Some studies claim that the coordination costs are relatively high for MLS, which will lead not only to a low decision-making efficiency but also insufficient monitoring for the firm's management (Chakraborty and Gantchev, 2013; Chhaochharia and Grinstein, 2009). In addition to the high coordination costs, the mutual shirking of responsibilities between MLS is also the reason for the weakening of monitoring over listed firms. If a large shareholder strengthens the monitoring, other large shareholders will also benefit from it. However, the monitoring costs are solely borne by the supervisor, which reflects the asymmetry of costs and benefits (Whyte, 1991). Previous studies have pointed out that listed firms with MLS tend to pay fewer dividends, have better earnings management behaviour and have higher investment risk than those with SLS. This fully demonstrates the negative impact of MLS on corporate governance (Faccio et al., 2001; Jiang et al., 2020; Kabir et al., 2013).

Secondly, collusion among MLS is a more important factor that must be considered in corporate governance. Ashbaugh-Skaife et al. (2006) demonstrated that MLS collude with each other to seek personal interests instead of mutual monitoring, which intensifies the principal-agent problem between shareholders and creditors. This phenomenon leads to high costs of debt capital for firms with MLS. Cheng et al. (2013) argue that MLS intensify the principal-agent problem not only between shareholders and creditors but also between large shareholders and minority shareholders. The problem is more serious when there is a business association among MLS. When a SLS seeks private interests by harming the firm's interests, it has to master the corresponding knowledge and skills and bear high costs. The most common costs are litigation and compensation costs (DuCharme et al., 2004). However, if there are MLS in the firm, the cost to each large shareholder decreases. In other words, if MLS seek personal gain by damaging the firm's interests, they afford lower costs but have more professional knowledge and skills than a SLS. Therefore, MLS are more inclined to perform related party transactions, embezzle the firm's resources and invest in pet projects to seek personal gain (Cai et al., 2016). In addition to the above methods, MLS may also use transfer pricing, unfair contract terms and dual voting rights to collude with each other to transfer resources (Dyck and Zin-

gales, 2004). These are actually the second type of principal-agent problem in the listed firms, which is the behaviour of MLS infringing the interests of minority shareholders. The more such behaviour, the fewer financial resources and the lower the company's value (Yeh et al., 2008).

From the above discussion, it can be seen that the existence of MLS may lead to weakened internal monitoring and more collusive behaviour among large shareholders. The weakening of internal monitoring and the increase in collusion among large shareholders will have a negative impact on the company's investment efficiency. The reason is that weak internal monitoring and collusion among large shareholders can lead to a greater number of inefficient transactions (e.g., related party transactions, investment in pet projects) and misappropriation of resources. The inefficient transactions and misappropriation of resources can lead to a decrease in the company's investment return while reducing the available economic resources within the firm, which has a negative impact on the company's investment efficiency from two aspects. Faced with a decrease in available economic resources and a decline in investment efficiency, firms tend to use aggressive financial strategies, including high-intensity CTA, to retain economic resources as much as possible within the firm (Edwards et al., 2016; Lanis and Richardson, 2012). At this time, the costs of external financing increase due to the decline in the firm investment efficiency, making the costs of obtaining funds from the outside higher than the sum of potential non-tax costs caused by CTA, and the marginal revenue of CTA increases. This also conforms to the basic idea of the pecking order theory, where internal financing is the top priority choice when the financial situation deteriorates (Myers and Majluf, 1984).

From the perspective of the negative impact of MLS, we propose another hypothesis as follows.

Hypothesis 1b: MLS in Chinese listed firms weaken the internal monitoring and collude with each other. This will impair company's investment efficiency and eventually increase the level of CTA through reducing investment efficiency.

2.2 Further research

The nature of ownership has an important impact on corporate governance. In the study of China's securities capital market, state-owned enterprises refer to listed firms whose ultimate control power is held by the government. From the perspective of corporate operations, state-owned firms have more policy burdens compared to non-state-owned firms because they need to maintain social stability and assist the government in implementing economic policies. Therefore, state-owned firms have the dual purpose of providing public services and

maximizing profits, leading to lower corporate governance, inefficient financial management and aggravation of the principal-agent problems (Demsetz, 1964).

From the perspective of external monitoring, state-owned firms also receive less monitoring. State-owned firms themselves have political connections, so the effectiveness of monitoring over them is often questioned. In addition, due to the close relationship between state-owned firms and the government, they are more capable of engaging in political lobbying, thereby reducing the tax monitoring and tax avoidance penalties they face (Vining and Boardman, 1992).

We believe that state-owned firms have more serious principal-agent problems and are subject to weaker external monitoring. Therefore, the relationship between MLS and CTA will be stronger in state-owned firms. Thus, we propose Hypothesis 2.

Hypothesis 2: The relationship between MLS and CTA is stronger in state-owned firms.

The external audit is an integral part of the external monitoring on corporate governance. Due to its relatively independent and objective perspective and rich financial expertise, high-quality external auditing is considered an effective external monitoring measure for listed firms. According to previous studies, high-quality external auditing can effectively suppress the aggressive financial choices of listed firms and improve the quality of their business performance. Empirical research shows that a high-quality external audit can restrain company's earnings management behaviour, enhance the quality of accounting information and inhibit CTA (Habib and Bhuiyan, 2011; Magnis and Iatridis, 2017; Zerni et al., 2012).

Therefore, we believe that high-quality external auditing can play an influential role in suppressing unfavourable behaviour of MLS and ultimately reducing the level of CTA. Thus, we propose Hypothesis 3.

Hypothesis 3: The relationship between MLS and CTA is weaker in firms with high-quality external auditing.

Securities analysts are also key stakeholders of listed firms. On the one hand, securities analysts, as market information publishers, are responsible for mining valuable information in the daily operations of listed firms and disclosing it to the market. As an information medium, analysts' analytical activities and information dissemination will affect the attention and investment decisions of external stakeholders towards the firms (Huang et al., 2017). On the other hand, due to the fact that analysts possess higher financial knowledge and professional skills compared to general public investors, their attention and analytical behaviour towards the firms can also enhance corporate governance and suppress aggressive financial behaviour. Existing research literature points out that, the tracking of securities analysts can reduce information

asymmetry between the firm and the outside world and suppress aggressive financial behaviour (Yu, 2008; Allen and Francis, 2016).

Therefore, we believe that when a firm receives more attention from analysts, the information dissemination function of securities analysts will attract more investors' attention to the firm. The increase in external attention will lead to a decrease in the negative impact of MLS on corporate governance, thereby reducing the level of CTA. In addition, the professional knowledge and skills possessed by analysts themselves can also effectively supervise MLS. Thus, we propose Hypothesis 4.

Hypothesis 4: The relationship between MLS and CTA is stronger in firms with fewer tracking of analysts.

Finally, we believe that the firm's geographical environment also has a significant impact on the relationship between the MLS and CTA. The more developed the economy and the higher the degree of marketization in the region, the more complete the market mechanism, the relatively lower the financing constraints faced by firms, and the more effective the monitoring of listed firms (Ades and Di Tella, 1999). This leads to relatively less aggressive financial behaviour of listed firms and collusion among shareholders in economically developed regions. In economically underdeveloped regions, due to imperfect market mechanisms and weak monitoring of listed firms, it is difficult to detect and stop the aggressive financial behaviour of listed firms and collusion among shareholders. At the same time, firms in underdeveloped regions face heavier financing constraints and imperfect capital markets (Henry, 2000), and are also highly likely to use aggressive financial strategies to seek or retain resources. Thus, we propose Hypothesis 5.

Hypothesis 5: The relationship between MLS and CTA is weaker in firms located in economically developed regions.

3. Research Methodology

3.1 Data sources

This research uses annual financial data of Chinese A-share non-financial listed firms from 2010 to 2020. The data are processed as follows: (1) Because of the special nature of the financial industry, we excluded the financial industry from the research sample. (2) We exclude firms with ST status and PT status. ST indicates special treatment, used to mark listed firms whose operating conditions are abnormal; PT indicates particular transfer, used to mark those listed firms that are suspended from listing. (3) We exclude samples with missing data. (4) We winsorize all continuous

variables at 1% and 99% levels to reduce the negative impact of extreme values on the empirical results. The data are retrieved from the Chinese Research Data Services and WIND databases. Both databases are commonly used to study the corporate governance of Chinese listed firms. They provide not only various basic data of Chinese listed firms but also relevant indicators of the Chinese macro-economy. For some firms with missing shareholder information, data are supplemented manually. In the end, a total of 22,801 observations for 3355 firms are obtained.

3.2 Definition of variables

In previous studies on CTA, the most common indicators are book tax difference (*BTD*) and effective tax rate (*ETR*) (Robinson et al., 2010). However, each of the two indicators has its own limitations. *ETR* is the proportion of the adjusted corporate income tax in the corporate pre-tax accounting profit, and it ignores the impact of the nominal tax rate. Therefore, *ETR* measures more of the company's actual tax burden, rather than the level of CTA. *BTD* does not exclude the impact of accrued income. As a result, some of the firm's normal business activities are regarded as CTA actions. To avoid the limitations of the above two indicators (Chen et al., 2010; Hanlon and Heitzman, 2010), the difference between nominal tax rate and *ETR* (*ETRD*) and *BTD* after deducting the impact of accrued income (*DDBTD*) are used to evaluate a firm's CTA in this study, denoted as *TA_ETRD* and *TA_DDBTD*.

According to existing studies, the calculation of *TA_ETRD* (Dyreng et al., 2010) is as follows.

$$TA\_ETRD = nominal\ tax\ rate - effective\ tax\ rate \tag{1}$$

In Equation (1), the nominal tax rate is the statutory tax rate of the Chinese listed firm, while the effective tax rate (*ETR*) is the actual tax rate of the listed firm, which is equal to (income tax – deferred income tax)/(pre-tax accounting profit – deferred income tax/nominal tax rate). The difference between the nominal tax rate and the effective tax rate reflects the level of CTA. The larger the differences, the higher the level of CTA.

The calculation of *TA_DDBTD* (Desai and Dharmapala, 2006) is shown in Equation (2):

$$BTD_{i,t} = \beta_1 \times TACC_{i,t} + u_i + \varepsilon_{i,t}$$

$$TA\_DDBTD_{i,t} = u_i + \varepsilon_{i,t} \tag{2}$$

In Equation (2), *BTD* = (pre-tax accounting profit – taxable income)/total assets at the end of the accounting period; taxable income = (income tax – deferred income tax)/nominal

income tax rate. *TACC* is accrued income, which is equal to (net profit – net cash flow from operating activities)/total assets. u_i and ε are the time-invariant parts of the corporate tax burden and the regression residuals, respectively. Through regression, the effect of accrued income is removed from *BTD*, and *TA_DDBTD* is the part of *BTD* that cannot be explained by accrued income. The larger the *TA_DDBTD* values, the higher the firm's CTA levels. In this study, *TA_DDBTD* is used for regression of the baseline model and further research, and *TA_ETRD* is used for the robustness test.

According to China's existing laws and regulations of listed firms (*Company Law of the People's Republic of China*), shareholders who hold more than 10% of a firm's equity have the right to appoint at least one director and a certain number of executives of the listed firm. Shareholders who individually or collectively hold more than 10% of a firm's equity have the right to convene an extraordinary shareholders' meeting and an extraordinary meeting of the board of directors. Therefore, in this study, when a listed firm has two or more shareholders holding more than 10% of the firm's equity, it is considered that the firm has MLS (including persons acting in concert), and then, *Multiple_Dummy* = 1 (Ben-Nasr et al., 2015; Lin et al., 2013). Additionally, to ensure the reliability of the empirical findings (Attig et al., 2008), the number of large shareholders *Multiple_Num* is also used as an explanatory variable for regression in this study.

Referring to existing studies (Desai and Dharmapala, 2009; Hanlon and Slemrod, 2009; Kim et al., 2011), the following control variables are selected: (1) *Size*; the natural logarithm of the firm's total assets; (2) *Ppe*; fixed assets divided by total assets; (3) *Lev*; the firm's asset-liability ratio, which is total liabilities divided by total assets; (4) *Liquid*; the firm's capital liquidity, which is equal to the difference between current assets and current liabilities divided by total assets; (5) *Dual*; whether the chairperson of the board and the CEO is the same person. When the chairperson of the board is also the CEO, *Dual* = 1; (6) *Indep*; the proportion of independent directors in the board of directors; (7) *Top1*; the proportion of equity held by the firm's largest shareholder; (8) *Age*; the firm's age, measured by the natural logarithm of the difference between the current year and the firm's established year plus 1. Table 1 displays the specific definitions of the variables.

Table 1: Definitions of variables

Type of variable	Variable	Definition
Explained variable	*TA_ETRD*	See above
	TA_DDBTD	See above
Explanatory variable	*Multiple_Dummy*	When two or more shareholders hold more than 10% of the firm's equity, Multiple_Dummy = 1
	Multiple_Num	Number of shareholders holding more than 10% of the firm's equity
Control variable	*Size*	Natural logarithm of the firm's total assets
	Ppe	Fixed assets/total assets
	Lev	Total liabilities/total assets
	Liquid	(Current assets – current liabilities)/total assets
	Dual	When the chairperson of the board is also the CEO, *Dual* = 1
	Indep	Number of independent directors / total number of directors
	Top1	Equity held by the largest shareholder
	Age	Natural logarithm of the difference between the current year and the firm's established year plus 1

3.3 Model specification

To verify the previous hypothesis, the following OLS model (3) is constructed:

$$TA\_DDBTD_{i,t} = \beta_0 + \beta_1 \times Multiple_{i,t} + \sum \beta_i \times controls_{i,t} + \sum Year + \sum Inds + \varepsilon_{i,t} \quad (3)$$

In Equation (3), the variable *Multiple* includes *Multiple_Dummy* and *Multiple_Num*; *controls* represents the above control variables; *Year* and *Inds* are the annual and industry fixed effects, respectively; $\varepsilon_{i,t}$ is the regression residuals term. If the regression coefficients of *Multiple_Dummy* and *Multiple_Num* are significantly positive, this means the existence of MLS increases the firm's CTA level.

However, the setting of the OLS model has potential endogenous problems, which are ignored by some studies on the ownership structures of Chinese listed firms. For example, some firms with MLS have a financially aggressive business culture and a relatively high level of CTA. However, CTA is the consequence of the corporate business culture, not necessarily the result of MLS. In other words, CTA is the firm's own choice; it cannot be concluded that

"the existence of MLS increases CTA". To overcome the self-selection bias, a treatment effect model (Maddala, 1983) is constructed to improve the accuracy of the conclusion. The treatment effect model is as follows:

$$Multiple\_Dummy_{i,t} = \beta_0 + \beta_1 \times Iv\_inds_{i,t} + \beta_2 \times Iv\_area_{i,t} + \sum \beta_i \times controls_{i,t} + \\ + \sum Year + \sum inds + \varepsilon_{i,t}$$

$$IMR_{i,t} = -\varphi(Multiple\_Dummy\hat{y}) / \phi(Multiple\_Dummy\hat{y}) \ \ if\ Multiple\_Dummy_{i,t} = 1$$

$$IMR_{i,t} = -\varphi(Multiple\_Dummy\hat{y}) / \left[1 - \phi(Multiple\_Dummy\hat{y})\right] \ \ if\ Multiple\_Dummy_{i,t} = 0$$

$$TA\_DDBTD_{i,t} = \beta_0 + \beta_1 \times Multiple\_Dummy_{i,t} + \beta_2 \times IMR_{i,t} + \sum \beta_i \times controls_{i,t} + \\ + \sum Year + \sum Inds + \varepsilon_{i,t} \quad (4)$$

In the first step, the probit regression is used to predict whether a firm has MLS. Apart from the control variables in the OLS model (3), this stage follows the previous studies (Paligorova and Xu, 2012; Zhang et al., 2016) to add two instrumental variables, including *Iv_inds* and *Iv_area*. *Iv_inds* is the proportion of firms with MLS in one industry, and *Iv_area* is the proportion of firms with MLS in the region where a firm is located. $Multiple\_Dummy\hat{y}$ is the fitted value predicted in the first stage, and *IMR* is inverse Mills ratio. $\varphi(\,)$ and $\phi(\,)$ are the density and cumulative distribution functions of the standard normal distribution, respectively. The second step adds the predicted *IMR* to the regression. If *Multiple_Dummy* is still significant in the regression, the relation between MLS and CTA still holds after controlling for the self-selection bias.

4. Empirical Results

4.1 Descriptive statistics and correlation coefficients

Table 2 displays the descriptive statistics of the variables. Regarding Table 2, firms with a SLS account for 58% of the total observations, and the mean values of *Top*1 in the two groups are 0.380 and 0.320, respectively. This result confirms that Chinese listed firms have a high degree of ownership concentration. The value of *TA_DDBTD* is higher in firms with MLS and significant in the T-test (−4.168), indicating that firms with MLS have a high level of CTA, which preliminarily proves Hypothesis 1b.

The correlation coefficients between the variables are all lower than 0.5, suggesting that there is no multi-collinearity problem among the variables. Considering the space limitations, the correlation coefficients are is not included but are available upon request.

Table 2: Descriptive statistics

	Multiple_Dummy = = 0 Obs = 13112				Multiple_Dummy = = 1 Obs = 9689					
Variable	**Mean (a)**	**sd**	**min**	**max**	**Mean (b)**	**sd**	**min**	**max**	**(a)-(b)**	**t-value of (a)-(b)**
TA_DDBTD	−0.001	0.025	−0.076	0.079	0.000	0.025	−0.076	0.079	−0.001	−4.168
Multiple_ Num	0.972	0.164	0.000	1.000	2.252	0.500	2.000	4.000	−1.278	< −100
Size	22.167	1.226	19.911	26.217	22.114	1.414	19.911	26.217	0.053	3.025
Ppe	0.213	0.159	0.002	0.696	0.207	0.159	0.002	0.696	0.006	2.925
Lev	0.423	0.201	0.047	0.861	0.384	0.206	0.047	0.861	0.039	14.491
Liquid	0.237	0.239	−0.318	0.820	0.287	0.261	−0.318	0.820	−0.050	−14.986
Dual	0.260	0.439	0.000	1.000	0.295	0.456	0.000	1.000	−0.035	−5.852
Indep	0.373	0.052	0.333	0.571	0.375	0.054	0.333	0.571	−0.002	−2.430
Top1	0.380	0.162	0.088	0.750	0.320	0.119	0.101	0.750	0.060	31.029
Age	2.901	0.305	1.946	3.555	2.844	0.329	1.946	3.555	0.057	13.462

Source: authors' calculations

4.2. Regression results of baseline model

Table 3 represents the regression results of the OLS model (3) and the treatment effect model (4). There are significant positive correlations among *TA_DDBTD*, *Multiple_Dummy and Multiple_Num* (Table 3), which validates Hypothesis 1b. When a firm has MLS, they tend to weaken internal monitoring and collude with each other instead of monitoring each other, leading to an increase in the level of CTA. Columns 3–4 in Table 3 are the results of Model (4). In the first step, *Iv_inds* and *Iv_area* both demonstrate a significant positive correlation with *Multiple_Dummy*, indicating the significant effects of industry factors and geographical factors on the ownership structure of Chinese listed firms. In the second step, there is a significant positive correlation between the level of CTA and ownership structure, confirming that the conclusion of the OLS model still holds after controlling for the self-selection problem.

Table 3: Regression outcome of baseline model

VARIABLES	(OLS) TA_DDBTD	(OLS) TA_DDBTD	(First step) Multiple_Dummy	(Second step) TA_DDBTD
Multiple_Dummy	0.0010*** (2.806)			0.0177*** (4.100)
Multiple_Num		0.0008*** (3.403)		
Iv_inds			2.6724* (1.957)	
Iv_area			2.5112*** (14.077)	
Size	0.0013*** (7.432)	0.0013*** (7.439)	0.1150*** (12.995)	0.0007*** (2.601)
Ppe	0.0079*** (5.181)	0.0079*** (5.163)	0.4090*** (5.040)	0.0058*** (3.442)
Lev	−0.0214*** (−14.392)	−0.0214*** (−14.377)	−0.1800** (−2.333)	−0.0202*** (−12.579)
Liquid	−0.0076*** (−5.725)	−0.0076*** (−5.765)	0.7096*** (10.319)	−0.0119*** (−6.572)
Dual	0.0001 (0.189)	0.0001 (0.214)	0.0255 (1.265)	−0.0002 (−0.488)
Indep	0.0007 (0.233)	0.0007 (0.223)	0.5348*** (3.229)	−0.0027 (−0.790)
Top1	0.0021* (1.696)	0.0022* (1.815)	−2.2321*** (−35.427)	0.0154*** (4.147)
Age	0.0026*** (4.309)	0.0027*** (4.378)	−0.5762*** (−18.035)	0.0061*** (5.501)
IMR				−0.0104*** (3.852)
Constant	−0.0067 (−1.398)	−0.0076 (−1.580)	−3.0276*** (−6.468)	−0.0080 (−1.624)
Year	Yes	Yes	Yes	Yes
Inds	Yes	Yes	Yes	Yes
Observations	22,801	22,801	22,801	22,801
R-squared	0.061	0.061		
adj_R2	0.0596	0.0598		

Notes: the parentheses show the robust t-value (z-value) of the regression coefficient; *, ** and *** denote the significance levels of 0.1, 0.05 and 0.01, respectively.

Source: authors' calculations

5. Further Research and Cross-sectional Analysis

5.1 Influence of the nature of ownership

Based on the previous analysis, the relationship between MLS and CTA is stronger in state-owned firms, owing to the relatively low corporate governance level and serious principal-agent problems. According to the nature of ownership, this study divides the samples into two subsamples: state-owned firms (*Soe* = 1) and non-state-owned firms (*Soe* = 0). Table 4 shows the results of Model (3) in the two subsamples. The results of the cross-sectional test (grouped regression) show that the significant positive correlation between MLS and CTA exists in both subsamples, and the regression coefficients of the two explanatory variables are larger in the subsample of state-owned firms (Table 4). The coefficient difference test (Chow test) shows the regression coefficients of *Multiple_Dummy* and *Multiple_Num* are significantly larger in state-owned firms (the test statistics are 5.55 and 5.60, respectively). Therefore, the promotion effect of MLS on CTA is stronger in state-owned firms; Hypothesis 2 is thus verified.

Table 4: Cross-sectional analysis of ownership nature

VARIABLES	(SOE = 0) TA_DDBTD	(SOE = 1) TA_DDBTD	(SOE = 0) TA_DDBTD	(SOE = 1) TA_DDBTD
Multiple_Dummy	0.0008* (1.861)	0.0020*** (3.460)		
Multiple_Num			0.0007** (2.482)	0.0017*** (3.959)
Constant	−0.0173** (−2.347)	0.0118* (1.757)	−0.0182** (−2.452)	0.0103 (1.533)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Inds	Yes	Yes	Yes	Yes
Observations	14,509	8,292	14,509	8,292
R-squared	0.055	0.096	0.055	0.096
adj_R2	0.0526	0.0918	0.0528	0.0922

Notes: the parentheses show the robust t-value of the regression coefficient; *, ** and *** denote the significance levels of 0.1, 0.05 and 0.01, respectively.

Source: authors' calculations

5.2. Influence of external audit

To examine the influence of external audit on the conclusion of the baseline model, the samples are divided into a high-quality audit group (*Audit* = 1) and a low-quality audit group (*Audit* = 0) (Rajgopal et al., 2021). When a firm's annual financial statements are audited by the Big Four international accounting firms (Deloitte, Ernst & Young, KPMG, and PricewaterhouseCoopers), it is considered that the external audit quality is high. The results of the cross-sectional test (grouped regression) are presented in Table 5. It can be seen that a significant positive correlation only exists in the low-quality audit group. Therefore, it is concluded that high-quality external auditing can restrain the CTA behaviour caused by MLS; Hypothesis 3 is thus verified.

Table 5: Cross-sectional analysis of external audit quality

VARIABLES	(Audit = 0) TA_DDBTD	(Audit = 1) TA_DDBTD	(Audit = 0) TA_DDBTD	(Audit = 1) TA_DDBTD
Multiple_Dummy	0.0007** (2.031)	0.0015 (0.941)		
Multiple_Num			0.0006*** (2.676)	0.0010 (0.827)
Constant	−0.0028 (−0.536)	0.0002 (0.013)	−0.0035 (−0.680)	−0.0017 (−0.101)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Inds	Yes	Yes	Yes	Yes
Observations	21,371	1,430	21,371	1,430
R-squared	0.061	0.099	0.061	0.099
adj_R2	0.0597	0.0782	0.0598	0.0781

Notes: the parentheses show the robust t-value of the regression coefficient; *, ** and *** denote the significance levels of 0.1, 0.05 and 0.01, respectively.

Source: authors' calculations

5.3 Influence of securities analysts

To examine the impact of securities analysts on the relationship between MLS and CTA, the median number of securities analysts tracking the firm in the same industry and the same year, denoted as *Analyst*, is used to divide the samples into two groups: a group with a small

number of analysts (*Analyst* = 0) and another with a large number of analysts (*Analyst* = 1). The results of the cross-sectional test (grouped regression) are presented in Table 6. It can be seen that a significant positive correlation only exists in the low securities analysts tracking group. The results show that an increased number of analysts brings stronger external supervision and attention, thereby alleviating the negative impact of MLS on corporate governance. Hypothesis 4 is therefore verified.

Table 6: Cross-sectional analysis of analysts

VARIABLES	(Analyst = 0) TA_DDBTD	(Analyst = 1) TA_DDBTD	(Analyst = 0) TA_DDBTD	(Analyst = 1) TA_DDBTD
Multiple_Dummy	0.0013** (2.446)	0.0007 (1.552)		
Multiple_Num			0.0013*** (3.555)	0.0005 (1.518)
Constant	−0.0059 (−0.739)	−0.0014 (−0.237)	−0.0076 (−0.946)	−0.0020 (−0.329)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Inds	Yes	Yes	Yes	Yes
Observations	9,344	13,457	9,344	13,457
R-squared	0.054	0.069	0.054	0.069
adj_R2	0.0502	0.0662	0.0509	0.0662

Notes: the parentheses show the robust t-value of the regression coefficient; *, ** and *** denote the significance levels of 0.1, 0.05 and 0.01, respectively.

Source: authors' calculations

5.4 Influence of firm location

According to the regional classification of mainland China by the National Bureau of Statistics of China, this study divides the sample into three groups (i.e., western area, central area and eastern area) to analyse how the operating environment of the listed firms affects the results of the baseline model. The results of the cross-sectional test (grouped regression) in Table 7 indicate that a significant positive correlation between the MLS and CTA only exists in the

central and western areas. CTA is subject to relatively weak monitoring in the two regions due to the low level of economic development and lack of market infrastructure. The aggressive corporate financial behaviour decreases considerably in the economically developed eastern region due to the frequent market transactions, lower financial constraints and the better market monitoring system. Hypothesis 5 is hereby verified.

Table 7: Cross-sectional analysis of firm location

VARIABLES	EA	CA	WA	EA	CA	WA
	TA_DDBTD	TA_DDBTD	TA_DDBTD	TA_DDBTD	TA_DDBTD	TA_DDBTD
Multiple_Dummy	0.0002 (0.446)	0.0033*** (3.820)	0.0030*** (2.655)			
Multiple_Num				0.0003 (1.199)	0.0027*** (4.358)	0.0017** (2.127)
Constant	−0.0182*** (−3.078)	0.0233* (1.939)	−0.0085 (−0.651)	−0.0187*** (−3.146)	0.0211* (1.750)	−0.0097 (−0.736)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Inds	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,424	3,768	2,609	16,424	3,768	2,609
R-squared	0.061	0.103	0.074	0.061	0.104	0.073
adj_R2	0.0588	0.0953	0.0616	0.0588	0.0965	0.0606

Notes: the parentheses show the robust t-value of the regression coefficient; *, ** and *** denote the significance levels of 0.1, 0.05 and 0.01, respectively. EA = eastern area; CA = central area; WA = western area.

Source: authors' calculations

5.5 Mediating effect of investment efficiency

Based on the above analysis, it is believed that the promotion effect of MLS on CTA is achieved by reducing the company investment efficiency. The harm caused by MLS to the firm is mainly reflected in the weakening of internal monitoring and collusion among large shareholders, leading to an increase in the likelihood of resource transfer or improper investment, which in turn

has a negative impact on the company investment efficiency (Cai et al., 2016). Specifically, transferring resources leads to a decrease in the economic resources available to the firm, while making inappropriate investment decisions can lead to a decrease in return on investment. Both of these ultimately lead to a decline in the company investment efficiency. When faced with a decline in investment efficiency, the probability of firms choosing to use aggressive financial strategies, including CTA, to retain resources will also increase (Edwards et al., 2016; Lanis and Richardson, 2012).

To test whether investment efficiency is a mediating variable between MLS and CTA, we calculate the investment efficiency of Chinese A-share listed firms from 2010 to 2020 (Gao and Yu, 2020) according to Equation (5).

$$\begin{aligned} Invest_{i,t} &= \beta_0 + \beta_1 \times Q_{i,t-1} + \beta_2 \times Q_{2i,t-1} + \beta_3 \times Q_{3i,t-1} + \beta_4 \times Q_{4i,t-1} + \beta_5 \times CF_{i,t} + \\ &+ \beta_6 \times Growth_{i,t-1} + \beta_7 \times Invest_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{5}$$

$$Efficiency_{i,t} = abs(\varepsilon_{i,t})$$

In Equation (5), *Invest* represents the investment expenditure of a listed firm, measured by dividing the firm's investment expenditure by the total assets. *Q* represents corporate Tobin's Q, measured by dividing the market value of assets by their book value. Q_2 (Q_3; Q_4) equals *Q* times an indicator variable that equals 1 if *Q* is in the second (third; fourth) quartile of its industry-year distribution. *CF* represents the firm's operating cash flows. *Growth* is the firm's investment opportunities, determined by the growth rate of the firm's total asset. The absolute value of the residuals obtained from the regression is the company investment efficiency, *Efficiency*, which reflects the degree of the firm's deviation from its optimal investment level. The larger the value of this variable, the farther the firm's current investment level is from its optimal investment level and the lower its investment efficiency.

After calculating the investment efficiency, we analyse the mediating effect of three factors: the existence of MLS, investment efficiency and CTA (Preacher and Hayes, 2008). The test results of the mediating effect are demonstrated in Table 8. Firstly, there is a significant and positive correlation between the MLS and CTA, implying that the conclusion of the baseline model still holds. Then, there is a significant positive correlation between the MLS and the company's investment inefficiency. This result suggests that the unfavourable behaviour of MLS decrease the company investment efficiency, affecting the firm's future development. Lastly, there are significant and positive correlations among the company's investment inefficiency, MLS and CTA. According to this result, the unfavourable behaviour of MLS reduce the company investment efficiency and affect its future development. To retain resources and offset the negative effect of MLS, firms tend to adopt aggressive financial strategies, such as CTA.

Table 8: Analysis of mediating effect

VARIABLES	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)
	TA_DDBTD	Efficiency	TA_DDBTD	TA_DDBTD	Efficiency	TA_DDBTD
Multiple_Dummy	0.0010*** (2.806)	0.0031*** (3.067)	0.0010** (2.564)			
Multiple_Num				0.0008*** (3.403)	0.0020*** (2.678)	0.0008*** (2.999)
Efficiency			0.0118*** (3.595)			0.0118*** (3.592)
Constant	−0.0067 (−1.398)	0.0887*** (6.513)	−0.0147*** (−2.776)	−0.0076 (−1.580)	0.0864*** (6.338)	−0.0156*** (−2.939)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Inds	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,801	18,222	18,222	22,801	18,222	18,222
R-squared	0.061	0.071	0.069	0.061	0.071	0.069
adj_R2	0.0596	0.0692	0.0673	0.0598	0.0691	0.0674

Notes: the parentheses show the robust t-value of the regression coefficient; *, ** and *** denote the significance levels of 0.1, 0.05 and 0.01, respectively.

Source: authors' calculations

6. Additional Tests and Robustness Tests

To enhance the reliability of the conclusions of this study, the following additional tests and robustness tests are conducted.

6.1 Adding control variables

We conduct additional tests by adding control variables. Firstly, according to existing relevant literature (Ashbaugh-Skaife et al., 2006; Francis et al., 2014), a firm's CTA level is related to the personal characteristics of the top management of the listed firm and its debt characteristics. Therefore, this paper refers to the existing relevant literature research and selects three variables as new control variables to add to the regression model, namely, whether the chair-

man of the board is a woman *Chair_female* (when the chairman is female, this variable is taken as 1; otherwise, it is taken as 0), the overconfidence of the listed firm's senior executives *Over* (if the firm implements five mergers and acquisitions within three years, it indicates that the firm's management is overconfident; the variable value is taken as 1; otherwise, it is 0) (Doukas and Petmezas, 2010; Brown and Sarma, 2007) and the proportion of the listed firm's long-term liabilities in total assets *L_debt* (ratio of long-term debt to total assets). Secondly, we also consider the impact of related party transactions on the baseline model. Specifically, we add the proportion of corporate related party transactions to total assets *Related_T* as a control variable for the conclusion. Finally, in order to consider the impact of minority shareholding, we also deduct the circulating shares held by MLS and add the circulating shares held by minority shareholders *Minority_H* as control variables for the model. The results of the regression are consistent with the previous text and there is still a significant positive correlation between MLS and CTA. Due to space limitations, the results of this test are not presented in the main text and are retained for future reference.

6.2 Explanatory variables with one lag period

To deal with the possible reversed cause and effect problem, the one-period lagged values of the variables *Multiple_Dummy* and *Multiple_Num* are used for the baseline regression. Based on the results in columns 1-2 of Table 9, the lagged terms are significantly and positively correlated with the level of CTA, confirming our baseline model results (i.e., the existence of MLS increases the level of CTA).

6.3 Replacing explained variable and explanatory variable

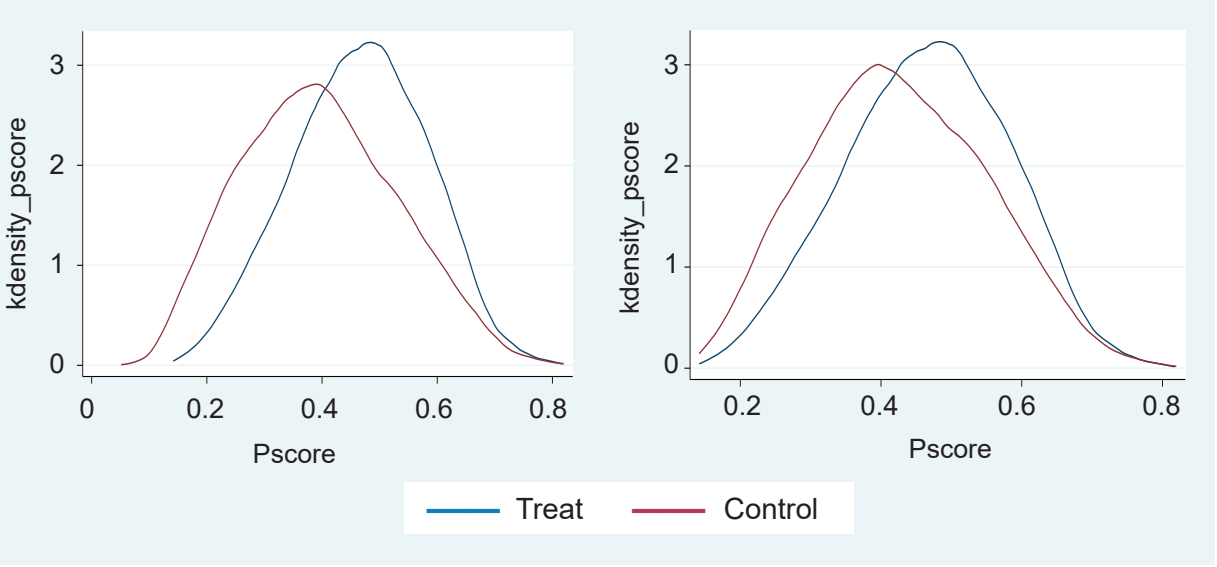
The explained variable is replaced by *TA_ETRD* and then regression of the OLS model (3) is conducted. The results (columns 3 – 4 of Table 9) show that the explained variable has significant and positive correlations with the explanatory variables, *Multiple_Dummy* and *Multiple_Num*, and therefore, the conclusion drawn above is still valid.

According to the trading regulations of China's securities market (*Security Law of the People's Republic of China*), when a shareholder owns more than 5% of the equity of a listed firm, the increase or decrease of his shareholding by more than 1% should be announced to the outside world. Therefore, from the perspective of the transaction, shareholders who hold more than 5% of the firm's shares can also be regarded as the firm's large shareholders. We use 5% as the dividing line and rebuild the variables *Multiple_Dummy5%* and *Multiple_Num5%* and then regression of Model (3) is conducted. The conclusion drawn above is still valid (columns 5–6 of Table 9).

6.4 Propensity score matching

There are differences between firms without MLS (i.e., the control group) and those with MLS (i.e., the experimental group). To reduce the impact of the differences on the accuracy of the empirical conclusion, propensity score matching (PSM) is used to match the samples. Firstly, the above control variables are used to perform 1 to 3 nearest neighbour matching for the samples. At the same time, the difference is less than 0.01 in the propensity scores among the samples. Figure 1 compares the differences between the two groups before and after matching and confirms a reduction in the differences after matching. Secondly, the samples that are not successfully matched are eliminated. Then, using the remaining samples to conduct regression, the results (columns 7–8 of Table 9) are still consistent with the previous conclusion that the existence of MLS increases the level of CTA.

Figure 1: Differences between groups before and after propensity score



Source: authors' calculations

To verify the effectiveness of PSM, we also used entropy balancing to match samples (Madsen and McMullin, 2020; McMullin and Schonberger, 2020). The conclusion of regression after entropy balancing is consistent with the above, which confirms that PSM is effective. Due to space limitation, the results of regression after entropy balancing are not included but are available upon request.

6.5 Falsifiability test: assuming false key explanatory variables

The actual time of changes in the ownership structures of listed firms moves forward one to three years (Li et al., 2020) to construct three false explanatory variables: *Multiple_Wrong1*, *Multiple_Wrong2* and *Multiple_Wrong3*. Then, the false variables are regressed against the explained variables. If the constructed false explanatory variable has a significant relationship with the explained variable, the level of CTA has a significant difference before the change in the ownership structure. On the contrary, if the false explanatory variable has an insignificant relationship with the explained variables, the firm's CTA is significantly affected by the changes in ownership structures. The regression data are presented in column 9 of Table 9. Notably, the false explanatory variables have no significant relationship with the explained variables, indicating that the previous conclusions still hold.

Table 9: Robustness test results

VARIABLES	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(PSM)	(PSM)	(OLS)
	TA_ DDBTD	TA_ DDBTD	TA_ ETRD	TA_ ETRD	TA_ DDBTD	TA_ DDBTD	TA_ DDBTD	TA_ DDBTD	TA_ DDBTD
L.Multiple_ Dummy	0.0007* (1.786)								
L.Multiple_ Num		0.0005** (2.065)							
Multiple_ Dummy			0.0034** (2.512)				0.0011*** (3.112)		
Multiple_ Num				0.0021** (2.313)				0.0009*** (3.606)	
Multiple_ Dummy5%					0.0002 (0.476)				
Multiple_ Num5%						0.0005*** (3.361)			
Multiple_ Wrong1									0.0013 (1.086)
Multiple_ Wrong2									−0.0002 (−0.179)
Multiple_ Wrong3									0.0013 (0.953)
Constant	−0.0219*** (−3.944)	−0.0225*** (−4.051)	0.0246 (1.191)	0.0224 (1.081)	−0.0068 (−1.409)	−0.0087* (−1.785)	−0.0155*** (−3.055)	−0.0164*** (−3.237)	−0.0067 (−1.393)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inds	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observa-tions	17,909	17,909	22,801	22,801	22,801	22,801	19,669	19,669	22,801
R-squared	0.071	0.071	0.059	0.059	0.061	0.061	0.064	0.064	0.061
adj_R2	0.0696	0.0697	0.0577	0.0576	0.0593	0.0598	0.0619	0.0621	0.0593

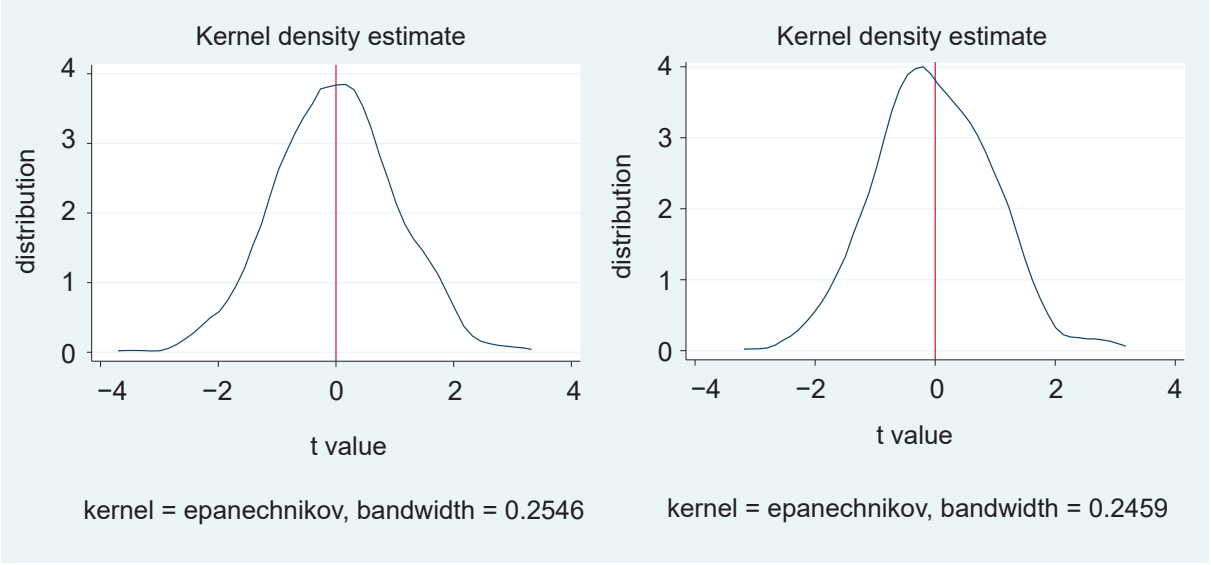
Notes: the parentheses show the robust t-value of the regression coefficient; *, ** and *** denote the significance levels of 0.1, 0.05 and 0.01, respectively.

Source: authors' calculations

6.6 Placebo test: random sampling 500 times

To eliminate the possibility that the firm's CTA is not influenced by the firm's ownership structure during the sample period, the explanatory variables *Multiple_Dummy* and *Multiple_Num* are placed out of order and the values are randomly assigned to the samples for regression. The regression coefficients and the t-value are recorded (Li et al., 2020). If the regression coefficient is significant, the change in the level of CTA is not caused by differences in corporate ownership structure; otherwise, the level of CTA is affected by the corporate ownership structure. Figure 2 shows the results of repeating this step 500 times. The t-statistic distribution shows an inverted U-shape whose centre is at 0. Based on this distribution, the level of CTA has an insignificant relationship with the randomly generated variables. In addition, the t-test result on the t-statistics obtained by random sampling failed to reject the null hypothesis that the t-statistics were not different from 0 (the t-test values are −0.2110 and −0.5630, respectively).

Figure 2: Results of random sampling



Source: authors' calculations

7. Conclusion and Policy Implications

Using annual financial data of Chinese A-share listed firms from 2010 to 2020, the relationship between the existence of MLS and CTA was investigated in this study. The results indicate a significant and positive correlation between them. The cross-sectional analysis showed that the nature of ownership, the quality of external audits, the tracking of securities analysts and

the firm's location all significantly affect the results of the baseline model. Furthermore, the existence of MLS increases CTA by reducing the company investment efficiency.

The empirical results of this study demonstrate that the presence of MLS increases the level of CTA, supporting the conclusion that MLS have a negative impact on corporate governance in existing literature (Ashbaugh-Skaife et al., 2006). The mediating test shows that investment efficiency is the mediating variable in this relationship, providing evidence for the existence of weakening of internal monitoring and collusion among large shareholders brought by MLS, which is consistent with conclusions in existing literature (Dyck and Zingales, 2004; Chakraborty and Gantchev, 2013). Furthermore, the firm choosing to retain resources through more aggressive CTA in the face of declining investment efficiency and deteriorating financial situation also conforms to the pecking order theory (Myers and Majluf, 1984).

However, it is worth noting that our conclusion is different from some existing literature (Jiang et al., 2018; Ouyang et al., 2020). Therefore, we will elaborate on the possible reasons why our research conclusions differ from previous research findings in terms of empirical strategies and institutional background. From the empirical strategy perspective, we believe that using different tax avoidance indicators (effective tax rate relative to book tax difference after deducting the impact of accrued income) will also have an impact. ETR is more a reflection of the corporate tax burden than the degree of CTA, because it did not consider stripping the corporate non-subjective factors from the tax burden indicators. This reflects, to some extent, the impact of deferred items, statutory tax rates and accrued items on different tax avoidance indicators, which can lead to different conclusions on the intensity of CTA (Chen et al., 2010; Hanlon and Heitzman, 2010). At the same time, we also use different indicators when measuring investment efficiency. We use the degree of deviation between the corporate investment level and the optimal investment level to measure the company investment efficiency, while Jiang et al. (2018) used changes in corporate investment costs to measure the company investment efficiency. Finally, Ouyang et al. (2020) focused on the monitoring effect of non-top large shareholders over the top larger shareholder, and their hypothesis development focused on elaborating on the possibility of collusion or monitoring between non-top shareholders and top large shareholders. We were concerned about the economic consequences caused by MLS as a whole, including the top large shareholder. Therefore, in our research, we focused more on the motivations and economic consequences of the actions of MLS, which can also lead to different conclusions.

From the perspective of institutional background, due to the rapid development and continuous reforms (split share structure reform and mixed ownership reform) on the Chinese securities market (Wang et al., 2021), we reasonably infer that the different selection of sample observation periods is also one of the important reasons for different empirical conclusions. The rapidly changing market environment implies different corporate governance scenarios, and the behavioural patterns among shareholders on China's securities capital market need further exploration. In addition, due to the low delisting rate of the Chinese securities capital market, shareholders of listed firms face low operating pressure and have relatively high authority. Based on this practice, the difficulty of monitoring and observing its negative impact is relatively higher than on Western securities capital markets. Lastly, the difference in regulatory intensity is also an important reason for shaping the behaviour patterns among shareholders. Compared to the Western securities capital markets, the regulatory intensity and penalty costs of China's securities capital market are relatively low, which leads to a high tendency for MLS to collude with each other or shift from mutual supervision to collusion in a short period of time. Therefore, factors related to institutional background can also lead to different empirical conclusions.

The empirical results of this study show that MLS reduce a company's investment efficiency, thus leading the firm to increase the level of CTA in order to retain resources. The findings of this study add to our knowledge about CTA and ownership structure of Chinese listed firms and provide references for the governance of these firms. In the monitoring of listed firms, the government should not only focus on the violations but also pay attention to the internal factors that cause such violations. Due to the rapid development and increase in equity transactions of listed firms in China, the regulators should pay attention to the effect of MLS on corporate governance. Firstly, policymakers should pay more attention to financial fraud and tax violations caused by the negative effect of MLS compared with firms with a SLS in the tax audit procedure. Secondly, when promoting the ownership reform of Chinese listed firms, policymakers should encourage mutual monitoring among MLS to enhance corporate compliance. Lastly, the existence of MLS may reduce the company's investment efficiency through weakening internal monitoring and collusion with each other. To restrain the negative impact of MLS on the company's investment efficiency, the listed firm's top management should evaluate carefully whether the investment projects proposed by large shareholders have legitimate reasons and whether the projects benefit the company's future development. Since most Chinese listed firms are still owned by a single largest shareholder, the findings of this study also provide certain references for an ownership structure reform of Chinese listed firms.

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