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EFFECT OF COMMON INSTITUTIONAL OWNERSHIP ON TUNNELING: EMPIRICAL EVIDENCE FROM CHINA

Efeito da propriedade institucional comum sobre o tunneling: Evidências empíricas da China

Efecto de la propiedad institucional común en el tunneling: Evidencia empírica de China

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ABSTRACT

This study examines the role of common institutional ownership (CIO) in reducing the tunneling behavior of controlling shareholders in Chinese listed companies. We empirically examined the influence of CIO on tunneling using a multiple regression model. The results show that CIO restrains tunneling, and the impact intensifies with an increase in CIO and a higher shareholding ratio. This effect is more pronounced in firms with poor information environments, low external supervision, non-state ownership, and a high degree of separation between ownership and control. We find that common institutional investors alleviate tunneling by using information advantage and engaging in shareholder activism. These results offer new evidence of the effect of common institutional investors on controlling shareholders' behavior.

Keywords: common institutional ownership, tunneling, information advantage, shareholder activism, China

RESUMO

Este estudo examina o papel da propriedade institucional comum (PIC) na redução do comportamento de tunneling dos acionistas controladores em empresas chinesas listadas em bolsa. Utilizando um modelo de regressão múltipla, a influência da PIC no tunneling é examinada empiricamente. Os resultados mostram que a PIC restringe o tunneling, e o impacto se intensifica com o aumento da PIC e um índice de participação acionária mais alto. Esse efeito é mais acentuado em empresas com ambientes de informações deficientes, baixa supervisão externa, propriedade não estatal e um alto grau de separação entre propriedade e controle. Descobrimos que os investidores institucionais comuns aliviam o tunneling usando a vantagem da informação e participando do ativismo dos acionistas. Esses resultados oferecem novas evidências sobre o efeito dos investidores institucionais comuns no comportamento dos acionistas controladores.

Palavras-chave: propriedade institucional comum, tunneling, vantagem de informação, ativismo dos acionistas.

RESUMEN

Este estudio examina el papel de la propiedad institucional común (PIC) en la reducción del comportamiento de tunneling de los accionistas controladores en las empresas chinas que cotizan en bolsa. Utilizando un modelo de regresión múltiple, se examina empíricamente la influencia de la PIC en el tunneling. Los resultados muestran que la PIC reduce el tunneling, y que el impacto se intensifica con el aumento de la PIC y del porcentaje de participación accionaria. Este efecto es más pronunciado en empresas con entornos de información deficientes, escasa supervisión externa, propiedad no estatal y un alto grado de separación entre propiedad y control. Encontramos que los inversores institucionales comunes alivian el tunneling utilizando la ventaja de la información y participando en el activismo accionarial. Estos resultados ofrecen nuevas pruebas sobre el efecto de los inversores institucionales comunes en el comportamiento de los accionistas de control.

Palabras clave: propiedad institucional común, tunneling, ventaja informativa, activismo de los accionistas, China.

INTRODUCTION

Although China's stock market continues to be dominated by individual investors, the comprehensive and deepening reform of the capital market has led to a year-on-year increase in the proportion of institutional investors (Wen et al., 2020). Specifically, the mergers and acquisitions of investment institutions and the development of industry exchange-traded funds in China have led to the merger of several institutional investors with separate holdings in different companies. This has increased institutional investors' holdings in multiple firms in the same industry (Du et al., 2021). This study focuses on common institutional investors (CIIs). According to the Securities Law of the People's Republic of China, institutional investors consist of mutual funds, qualified foreign institutional investors, securities dealers, insurance companies, social insurance institutions, trust companies, finance companies, and banks. Following He and Huang (2017), we define CIIs as investors holding more than 5% of the shares of two or more firms in the same industry. We use the term "common institutional ownership (CIO)" to refer to the existence, number, and shareholding ratio of CIIs. CIO, also referred to as institutional cross-ownership (Brooks et al., 2018; He et al., 2019) but also affects the outcomes of mergers and acquisitions (M&As, exerts a significant impact on a firm's operation and governance (Du et al., 2021; Park et al., 2019; Pawliczek & Skinner, 2018). Relative to small shareholders, CIIs have a higher shareholding ratio, richer investing experience, and more comprehensive information to monitor corporate behavior (Kang et al., 2018; Li et al., 2021). Thus, CIO may act as a powerful interested party and significantly influence controlling shareholders' behavior.

The separation of ownership and control gives rise to the principal-agent problem. Research on the principal-agent problem using data from developed countries is mainly based on the assumption of a decentralized shareholding structure, focusing on the agency problem between shareholders and managers. As the agent, managers may harm the interests of shareholders based on different motives. Compared with the decentralized shareholding structure in developed countries, most companies in China have retained a centralized shareholding structure since they were restructured and listed on the stock exchange, and the voting rights and other resources that come with a controlling stake have enhanced the ability of large shareholders to expropriate the interests of small and medium-sized shareholders. As a result, in China, the agency problem is mainly concentrated between majority shareholders and minority shareholders, which manifests in the appropriation of company assets by majority shareholders for the benefit of the parent company or their private interests to the detriment of minority shareholders. This phenomenon is known as "tunneling" (Johnson et al., 2000). Corporate governance theory holds that effective supervision of majority shareholders is very important to reduce the infringement of the interests of minority shareholders by their tunneling behavior.

Minority shareholders have limited shares and only engage in fragmented decision-making (Chen et al., 2009). This makes it difficult to inhibit the tunneling behavior of majority shareholders and highlights the need for a powerful interested party, such as a CII. Specifically, in Chinese

listed companies, although the high concentration of shareholding enhances a firm's decision-making efficiency, majority shareholders' greater voice makes it difficult for minority shareholders to impose effective constraints against the former's tunneling behavior (Jiang et al., 2015; Zhang et al., 2017). As an agency problem, tunneling undermines the interests of minority shareholders. However, the continuous development of China's capital market has led to laws that protect the rights and interests of minority shareholders (Chen et al., 2020). On March 1, 2020, China implemented the *New Securities Law* to curb market violations, enhance investor protection, and create a fairer investment environment for minority shareholders. These measures to curb tunneling behavior and the impact of tunneling have attracted wide attention.

In this context, this study investigates whether and how CIO influences tunneling behavior. Specifically, we reveal a negative relationship between CIO and tunneling. The results show that the entry, increase in number, and shareholding ratio of CIIs have a significantly negative relationship with tunneling. To alleviate endogeneity issues, we conduct a series of robustness checks and find consistent results. Subsequently, we study the mechanisms through which CIO influences tunneling. In this regard, we explore how the effect of CIO differs across firms. We find that CIIs alleviate tunneling by using information advantage and engaging in shareholder activism. We also perform heterogeneity tests. The results show that the effect of CIO is more pronounced in firms with poor information environments, low external supervision, non-state ownership, and a high degree of separation between ownership and control.

This study makes three important contributions to the literature. First, by studying the relationship between CIO and tunneling, we discuss the impact of CIO on corporate governance (Brooks et al., 2018; Du et al., 2021; Fu & Qin, 2021; Gao et al., 2019; He & Huang, 2017; He et al., 2019; Kostovetsky & Manconi, 2020; Park et al., 2019; Pawliczek & Skinner, 2018; Ramalingegowda et al., 2021) but also affects the outcomes of mergers and acquisitions (M&As). In this regard, most studies on CIIs use US data, while a small number of studies on Chinese CIIs focus on corporate governance (Du et al., 2021). To the best of our knowledge, there is no study on the impact of CIIs on controlling shareholders' behavior, and this study attempts to fill this gap. Second, this study enriches the literature on the determinants of tunneling (Boateng & Huang, 2017; Chen et al., 2009; Chen et al., 2020; Cheung et al., 2009; Gao et al., 2021; Jiang et al., 2015; Johnson et al., 2000; Li et al., 2021; Zhang et al., 2014; Zhang et al., 2017). Specifically, it showcases CIO—a previously overlooked factor—as an important explanatory factor for tunneling. Third, this study provides policy implications. Contrary to previous research that found CIO may generate monopoly power (Azar et al., 2018), we find the positive role of CIO in alleviating tunneling. As the proportion of institutional investors in China's stock market is still relatively low, policies that promote the development of institutional investors are encouraged.

The remainder of this paper is structured as follows. In Section 2, the related literature is reviewed and the hypotheses are developed. Section 3 discusses the sample selection, variable measurement, empirical models, and descriptive statistics of all variables. Section 4 presents the empirical evidence, including the baseline results, underlying mechanism analysis, further analysis, endogeneity tests, and robustness checks. Section 5 presents the conclusion.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Tunneling is mainly caused by the concentration of ownership (Jiang et al., 2015; Johnson et al., 2000; Li et al., 2021; Zhang et al., 2014). On the one hand, the presence and increase in the holding ratio of controlling shareholders can increase monitoring and management effectiveness, thereby alleviating agency conflict in the traditional sense (Boateng & Huang, 2017; Chan et al., 2016). On the other hand, the controlling shareholders can assign personnel to the management to strengthen the alignment of their interests with those of the management, thereby facilitating collusion (Jiang et al., 2015; Johnson et al., 2000; Zhang et al., 2014). Johnson et al. (2000) referred to this collusion as *tunneling*.

Previous research has shown that majority shareholders have economic incentives to expropriate minority shareholders in the absence of effective supervision (Jiang et al., 2015; Johnson et al., 2000). Tunneling is facilitated by information and power differences between majority and minority shareholders (Baek et al., 2006; Cheung et al., 2009; Gao & Kling, 2008; Li et al., 2021; Ye et al., 2015). Extant research has found that corporate governance can effectively curb tunneling (Du, 2014; Gao et al., 2021; Gao & Kling, 2008; Ye et al., 2015). In addition, firms can effectively restrain tunneling behavior by imposing equity constraints on shareholding, such as having multiple large shareholders, a high shareholder-equity ratio, or strong institutional investors (Boateng & Huang, 2017; Jiang et al., 2015; Li et al., 2021; Zhang et al., 2017). Since executives are usually appointed by the controlling shareholders, companies face difficulties in imposing strong constraints on tunneling in the absence of governance mechanisms. Hence, they rely on external supervision (Boateng & Huang, 2017; Gao et al., 2021; Ye et al., 2015). As an external investor with a large shareholding and strong industry influence, a CII can restrain the opportunistic behavior of the management and controlling shareholders and thereby alleviate the principal-agent problem (Du et al., 2021; Fu & Qin, 2021; Ramalingegowda et al., 2021). Recently, CIO has gained academic attention as a special ownership structure. Some studies have emphasized the effect of CII on anti-competition and related outcomes. CII decreases product market competition and encourages cooperation among firms (Azar et al., 2018; He & Huang, 2017), facilitates innovation diffusion (Gao et al., 2019; Kostovetsky & Manconi, 2020), and increases the probability of a merger (Brooks et al., 2018) but also affects the outcomes of mergers and acquisitions (M&As). Some studies pertain to the impact of CIO on corporate governance. By efficiently increasing monitoring, encouraging cooperation, and internalizing negative externalities, CIO enhances management disclosure incentives, improves the information environment (Park et al., 2019; Pawliczek & Skinner, 2018), increases firms' philanthropy (Fu & Qin 2021), and decreases earnings management (Du et al., 2021; Ramalingegowda et al., 2021).

Some studies have shown that institutional investors can suppress tunneling in the following ways (Jiang et al., 2015; Zhang et al., 2017). First, relative to individual investors,

CIIIs have information advantages, which can reduce information asymmetry and inhibit tunneling. Thus, a firm can reduce agency costs between majority and minority shareholders by reducing information asymmetry and strengthening external minority shareholders. However, the concealment of transactions and the cover-ups of executives make it difficult to detect tunneling behavior (Chan et al., 2016; Jiang et al., 2015) we investigate the relationship between tax avoidance (proxied by effective tax rates. Particularly, the external minority shareholders find it difficult to determine whether the managers are engaged in tunneling or critical business operations. Several managers (appointed by the controlling shareholders) may camouflage tunneling practices, for example, by decreasing the quality of information disclosure (Luo et al., 2011; Zhang et al., 2014). However, CIIIs can accurately monitor tunneling by procuring information from multiple holding companies in the same industry. This can be attributed to CIIIs' strong industry analysis capabilities as a result of their extensive shareholdings in multiple firms in the same industry—shareholding ratio—and the number of holding companies (He et al., 2019; Kang et al., 2018; Park et al., 2019). CIIIs also gain a greater information advantage by investing in the same industry rather than multiple industries (Kang et al., 2018).

Second, tunneling may lead to declining firm performance and investor returns (Zhang et al., 2017). CIIIs can curb tunneling, given their ability to proactively communicate with the management (Ramalingegowda et al., 2021). In other words, CIIIs can pressurize the management or actively participate in the firm's operations to restrain the controlling shareholders when they engage in tunneling. Jalil and Rahman (2010) showed that mere CII ownership may not engender positive results. They must be involved in shareholder activism to be effective as external monitors. Relative to individual investors, institutional investors can reduce the cost of activism and alleviate the free-rider problem of minority investors to a certain extent (Norli et al., 2015). He et al. (2019) found that CIO increases the possibility of voting against the management by internalizing governance externalities. As shareholders with more than 5% of the shares, Chinese CIIIs can raise their proposals to the board of directors at general meetings. In other words, the formal mechanism of CIO allows CIIIs to participate in firms' decision-making and question inappropriate decisions. CIIIs have high monitoring motivation, low-cost shareholder activism, and a formal mechanism. Influential and noncontrolling CIIIs can directly deny proposals by engaging in shareholder activism, such as transactions inducing tunneling-related costs. Based on this discussion, we propose the following hypotheses:

H1: CIO has a negative relationship with tunneling.

H2: CIIIs' information advantage and shareholder activism restrain tunneling.

SAMPLE, VARIABLES, AND EMPIRICAL APPROACH

Sample selection

We collected data on listed firms from the China Stock Market and Accounting Research (CSMAR) database. CSMAR provides comprehensive data on China's stock market, listed firms' financial reports, and corporate governance of listed firms. We selected the sample using the following criteria from previous literature (Du, 2014; Jiang et al., 2015). First, we eliminated insolvent firms (whose liabilities exceed assets). Second, we excluded firms with institutional shareholding ratios greater than 100%, as these could be considered abnormal values. Third, we removed firms with missing financial data. This elimination yielded a sample comprising 2,338 companies and 17,435 firm-year observations from 2007 to 2020. We winsorized all continuous variables at the 1% level to avoid the impact of extreme values.

Variable measurement

Dependent variable: Tunneling

Controlling shareholders employ the following tunneling methods: direct illegal occupation, guarantees, related-party transactions, mergers and acquisitions, and excessive dividends (Chen et al., 2009; Cheung et al., 2009; Jiang et al., 2015). Some majority shareholders occupy the funds of listed companies through daily related-party transactions, which are more concealed than a direct illegal occupation. Related-party transactions refer to business transactions between a listed company and its largest shareholder, parent company, actual controller, or another company controlled by the largest shareholder (Jian & Wong, 2010). Undoubtedly, related-party transactions with fair prices can reduce transaction costs and improve production efficiency. However, related-party transactions can be used to expropriate minority shareholders, given the difficulties in identifying related parties, measuring fair pricing for minority investors, and deciphering transaction forms (Cheung et al., 2009; Jian & Wong, 2010). We employed related-party transactions to measure tunneling. We used the following two indicators of related-party transactions of majority shareholders. The first indicator was the sum of all related-party transactions. The second indicator excluded the following categories: cooperation projects, license agreements, research and development results, key management personnel compensation, and noise transactions. When performing the regression, we used the natural logarithm of the sum of all the above related-party transactions plus 1.

Independent variable: Common institutional ownership

Following extant literature (He et al., 2019; Kostovetsky & Manconi, 2020; Park et al., 2019), we employed three methods to measure CIO. *CIO1* was a dummy variable that takes the value of 1 if the firm has CIIs. *CIO2* was the number of CIIs. *CIO3* was the sum of the shareholding ratio of the CIIs. The estimation steps were as follows. First, we obtained the shareholding details of institutional investors from the CSMAR; the dataset included firm code, industry code, and institutional investor ID, name, and shareholding ratio each quarter. Second, we removed observations with a shareholding ratio of less than 5%. Third, if the investor ID belonged to an investor owning shares of two or more companies within the same industry on a quarterly date, we treated the investor as a CII. Fourth, we calculated the number of CIIs of each listed company at the quarterly level and summed up their shareholding ratio. Fifth, if a company had no CII for any quarter of a year, we denoted *CIO1* for the year as 0; otherwise, *CIO1* was equal to 1. By adding the number of CIIs for the four quarters of the year, we obtained *CIO2*. *CIO3* was defined as the average shareholdings of CIIs over the four quarters of the year.

Control variables

We included several factors that can affect tunneling. First, we controlled for firm-specific characteristics, including size, leverage, turnover, and return on assets (ROA) (Chen et al., 2020; Li et al., 2021; Zhang et al., 2017). We used the natural logarithm of market value as firm size (*Size*) as companies of different sizes differ in tunneling (Gao & Kling, 2008). Gao and Kling (2008) showed that highly leveraged firms experience higher tunneling. Hence, we used the debt-to-equity ratio to measure leverage. *Turnover* is the difference between the annual average values of monthly turnover rates of the enterprise in the t-1 and t-2 years. Turnover is a measurement of liquidity related to tunneling through informed trading (Zhang et al., 2017). We also considered ROA as a performance indicator; ROA is closely related to managerial behavior and tunneling (Zhang et al., 2017).

Second, we controlled for ownership structure. The property rights of firms (*SOE*) significantly influence tunneling (Liu et al., 2016). The shareholding ratio of the controlling shareholder (*ContrProp*) is the power base and motivation for tunneling. The higher the shareholding ratio, the greater the impact on the firm and the more convenient the conditions for tunneling (Chen et al., 2020). As an external investor, the higher the shareholding ratio of institutional investors (*InsProp*), the greater the motivation and power to supervise tunneling (Zhang et al., 2017). When the management's shareholding ratio is high, tunneling harms the interests of the management. Hence, we controlled the proportion of the management's holding (*MngmProp*) (Jiang et al., 2015; Li et al., 2021).

The board of directors also plays a crucial role in corporate governance and monitoring tunneling behavior. Hence, we controlled the characteristics of the board of directors by including the size of the board (*Bsize*), the ratio of independent directors in the board (*Indratio*), and CEO duality, the practice that the same person holds the position of chairman and general manager at the same time (*Dposition*). A large board, a high ratio of independent directors, and separation between the chairman and general manager increase corporate governance and effectiveness in monitoring tunneling behavior (Boateng & Huang, 2017).

Empirical models

To investigate the impact of CIO on tunneling, we estimated the following model:

$$Tunneling_{it} = \beta_0 + \beta_1 CIO_{it} + \Sigma \beta_j CONTROLS_{it} + \lambda_i + \lambda_t + \varepsilon_{it}, \quad (1)$$

where tunneling is measured using the natural logarithm of related-party transactions at the end of the year; CIO is measured by *CIO1*, *CIO2*, and *CIO3*; CONTROLS includes all the aforementioned control variables. λ_i and λ_t represent the firm and year fixed effects, respectively. ε_{it} is the error term. β_1 measures the influence of CIO on tunneling and tests H1. We expect β_1 to be negative.

Descriptive statistics

Table 1 presents the descriptive statistics. The mean values of *Tunneling1* and *Tunneling2* are 18.643 and 18.469, respectively, with *Tunneling1* ranging from 13.2 to 23.037. This indicates significant differences in tunneling across different firms. The mean value of *CIO1* is 0.205. On average, 20.5% of the companies have CIIs. The maximum value of *CIO2* is 16, indicating that one listed firm has up to 16 CIIs. The mean value of *SOE* is 0.205, showing that 20.5% of the firms are SOEs. The ownership structure of companies varies greatly. The minimum, mean, and maximum values of *ContrProp* are 11.34, 35.84, and 69.84, respectively, suggesting that controlling shareholders typically hold more power relative to other shareholders. Some firms have high management holdings, with the maximum value being 64.677). However, on average, it may be difficult to impose constraints on the majority shareholders (mean is 4.904). Additionally, there are a minimum and maximum of 5 and 14 board members, respectively. About 20% of the firms have the same person holding the position of chairman and general manager at the same time (mean 0.2). The values of the other control variables are within reasonable ranges.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Tunneling1	17,435	18.643	1.851	13.200	23.037
Tunneling2	17,435	18.469	2.083	11.775	22.974
CIO1	17,435	0.205	0.404	0	1
CIO2	17,435	0.768	1.699	0	16
CIO3	17,435	8.486	18.900	0.000	95.176
Size	17,435	22.976	1.079	21.098	25.992
Leverage	17,435	0.553	0.249	0.125	1.000
Turnover	17,435	-5.750	38.589	-143.444	74.666
ROA	17,435	0.050	0.061	-0.147	0.197
SOE	17,435	0.205	0.403	0	1
ContrProp	17,435	35.841	14.560	11.340	69.840
InsProp	17,435	51.570	18.887	1.557	88.278
MngmProp	17,435	4.904	11.364	0.000	64.677
Indratio	17,435	36.864	4.702	33.330	50.000
Bsize	17,435	8.835	1.679	5	14
Dposition	17,435	0.200	0.400	0	1

Note: This table presents the descriptive statistics for the sample firms. The sample consists of 17,435 firm-year observations for 2338 non-financial firms over the 14-year period from 2007 to 2020. All continuous variables are winsorized at 1% and 99%

EMPIRICAL EVIDENCE

Common institutional ownership and tunneling

Table 2 presents the regression results of Eq. (1). CIO is measured by *CIO1* (Columns 1 and 4), *CIO2* (Columns 2 and 5), and *CIO3* (Columns 3 and 6). Tunneling is measured by *Tunneling1* (Columns 1–3) and *Tunneling2* (Columns 4–6). In all columns, the coefficients on CIO are significantly negative. The result is consistent for *CIO1*, *CIO2*, *CIO3*, *Tunneling1*, and *Tunneling2*. The existence of CIIs restrains tunneling; specifically, an increase in the number and shareholding ratio of CIIs in a firm effectively inhibits tunneling. Table 2 also shows that while an increase in the shareholding ratio of controlling shareholders increases tunneling, an increase in the shareholding ratio of institutional investors and management curbs tunneling. Our baseline results verify H1.

Table 2. Common Institutional Ownership and Tunneling

	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.1050**			-0.1406**		
	(-2.0131)			(-2.3521)		
CIO2		-0.0382***			-0.0447***	
		(-2.9796)			(-3.0765)	
CIO3			-0.0031**			-0.0037***
			(-2.5446)			(-2.6591)
Size	0.6127***	0.6127***	0.6115***	0.6177***	0.6172***	0.6158***
	(19.2116)	(19.2366)	(19.1907)	(17.4355)	(17.4389)	(17.3911)
Leverage	-0.8096***	-0.8075***	-0.8090***	-0.9669***	-0.9643***	-0.9661***
	(-9.3077)	(-9.2878)	(-9.2993)	(-9.7841)	(-9.7636)	(-9.7748)
Turnover	0.0005	0.0005	0.0005	0.0008**	0.0008**	0.0008**
	(1.5603)	(1.5622)	(1.5541)	(2.0181)	(2.0204)	(2.0125)
ROA	0.1339	0.1278	0.1234	0.0896	0.0826	0.0774
	(0.5238)	(0.5000)	(0.4827)	(0.3101)	(0.2862)	(0.2679)
SOE	-0.0025	-0.0068	-0.0038	-0.0076	-0.0123	-0.0089
	(-0.0629)	(-0.1670)	(-0.0939)	(-0.1677)	(-0.2732)	(-0.1967)
ContrProp	0.0069***	0.0068***	0.0070***	0.0078***	0.0077***	0.0079***
	(3.3906)	(3.3227)	(3.4220)	(3.4296)	(3.3886)	(3.4926)
InsProp	-0.0027*	-0.0026*	-0.0025	-0.0027	-0.0025	-0.0024
	(-1.8096)	(-1.6932)	(-1.6177)	(-1.5945)	(-1.4986)	(-1.4152)
MngmProp	-0.0058**	-0.0058**	-0.0058**	-0.0050*	-0.0050*	-0.0050*

Continue

Table 2. Common Institutional Ownership and Tunneling

Concludes

	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
	(-2.4275)	(-2.4088)	(-2.4234)	(-1.8271)	(-1.8144)	(-1.8289)
Indratio	-0.0051	-0.0053	-0.0051	-0.0057	-0.0059	-0.0057
	(-1.2253)	(-1.2732)	(-1.2248)	(-1.2286)	(-1.2829)	(-1.2314)
Bsize	-0.0093	-0.0091	-0.0085	-0.0057	-0.0055	-0.0048
	(-0.6517)	(-0.6373)	(-0.5945)	(-0.3592)	(-0.3499)	(-0.3036)
Dposition	-0.0629	-0.0620	-0.0639	-0.0490	-0.0481	-0.0503
	(-1.4926)	(-1.4725)	(-1.5182)	(-1.0389)	(-1.0199)	(-1.0678)
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	17225	17225	17225	17225	17225	17225
R2	0.4736	0.4738	0.4737	0.4637	0.4638	0.4637

Note: This table reports the results of the tests on the effect of common institutional ownership on tunneling. CIO is measured by *CIO1* (Columns 1 and 4), *CIO2* (Columns 2 and 5), and *CIO3* (Columns 3 and 6). Tunneling is measured by *Tunneling1* (Columns 1–3) and *Tunneling2* (Columns 4–6).

Definitions of all variables are described in Section 3.2. The models in all columns are estimated with firm and year fixed effects. Coefficient estimates are reported and t-statistics are displayed in parentheses below. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively. These settings apply to all remaining tables.

Robustness checks and endogeneity

Alternative measure of common institutional ownership

We define CIIs as investors holding more than 5% equity in two or more firms in the same industry. To test the robustness of this definition, we used other CIO measures. First, in China, the top ten shareholders of listed companies experience more risk exposure and have a greater influence on the firm. Thus, we defined the top ten shareholders of two or more listed companies in the same industry as CIIs. The *CIO1_T* dummy variable is equal to 1 if the CIIs are among the top ten shareholders; *CIO2_T* denotes the number of CIIs in the companies. Second, the company law in China stipulates that shareholders with more than 3% of the company's

shares may submit an interim proposal to the board of directors for consideration at the general meeting 10 days before the meeting. It is reasonable to conclude that shareholders with more than 3% of the company's shares exercise a certain influence on the company's decisions. We changed the criteria from 5% to 3% and recalculated *CIO1_3%*, *CIO2_3%*, and *CIO3_3%*. We re-estimated all the models; the results are presented in Table 3. Panel A shows that CIO is negatively related to tunneling. The coefficients of *CIO1_T* and *CIO2_T* are larger than the coefficients in Table 2. Since investors among the top ten shareholders have greater influence, we believe the results are reasonable. The results of Panel B show that although the estimated coefficients when CIO is measured at 3% are smaller than that when it is measured at 5%, CIO measured at 3% continues to exert a significantly inhibiting effect on tunneling. Overall, these results indicate that our findings are robust to alternative proxies of CIO.

Table 3. Alternative Measure of Common Institutional Ownership

Panel A: Top 10 shareholders						
	(1)	(2)	(3)	(4)		
	Tunneling1		Tunneling2			
<i>CIO1_T</i>	-0.1225**		-0.1589***			
	(-2.3852)		(-2.7320)			
<i>CIO2_T</i>		-0.1005**		-0.1209**		
		(-2.2321)		(-2.3934)		
CV	YES	YES	YES	YES		
YEAR FE	YES	YES	YES	YES		
FIRM FE	YES	YES	YES	YES		
N	17225	17225	17225	17225		
R2	0.4620	0.4619	0.4546	0.4545		
Panel B: 3% shareholding						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1		Tunneling2			
<i>CIO1_3%</i>	-0.0446		-0.0658*			
	(-1.3285)		(-1.7266)			

Continue

Table 3. Alternative Measure of Common Institutional Ownership

Concludes

Panel B: 3% shareholding						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO2_3%		-0.0267***			-0.0311***	
		(-3.3425)			(-3.4497)	
CIO3_3%			-0.0024**			-0.0029***
			(-2.5265)			(-2.7235)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	18139	18139	18139	18139	18139	18139
R2	0.4619	0.4622	0.4621	0.4546	0.4549	0.4548

Note: This table reports the results of a robustness check on the effect of common institutional ownership on tunneling by adopting alternative measures of common institutional ownership. In Panel A, The CIO1_T dummy variable is equal to 1 if the CIIs are among the top ten shareholders; CIO2_T denotes the number of CIIs in the companies. In Panel B, We change the criteria from 5% to 3% and recalculate CIO1_3%, CIO2_3%, and CIO3_3%.

Instrumental variable

Our main analysis identified that CIO decreases tunneling. However, this relationship may suffer from reversed causality. Firms engaged in less tunneling may be more attractive to investors, which may increase CIO. We alleviated the potential endogeneity issue by using the industry average shareholding ratio of CIIs as an instrumental variable. Enterprises in the same industry have similar industrial policies and technological conditions. Hence, there is a correlation between the average shareholding ratio of CIIs in the industry and an individual enterprise. At the same time, the industry average does not directly influence tunneling, and hence, it satisfies the exogenous assumption. We applied the two-stage least-squares regression; the results of the second step are reported in Panel A of Table 4. Consistent with previous results, the coefficients of CIO2 and CIO3 are significantly negative, implying that CIO decreases tunneling. Kleibergen-Paap rk LM statistic indicates that there are no underidentifying restrictions, and Cragg-Donald Wald F statistic indicates that there are no weak instrument restrictions.

This test verifies the robustness of the negative relationship between CIO and tunneling, after mitigating the endogeneity issue.

Propensity score matching and ordinary least square

The reverse causality and sample selection bias may also lead to a negative CIO coefficient. Sample selection bias may occur if CIIs select investment targets according to firm characteristics. Therefore, we used propensity score matching (PSM) to control for sample selection bias and alleviate the endogeneity problem caused by selection bias. We divided the sample into firms with and without CIO (*CIO1* as the treatment variable). We employed the logit model to compute the propensity score. We also used the control variables in Eq. (1) as matching variables (*Size*, *Leverage*, *Turnover*, *ROA*, *SOE*, *ContrProp*, *InsProp*, *MngmProp*, *Indratio*, *Bsize*, and *Dposition*). We used the nearest neighbor matching to find firms with similar characteristics in the control group; subsequently, we re-estimated our model using the matched sample. Panel B of Table 4 shows that the coefficients of *CIO2* and *CIO3* are significantly negative, supporting our conclusion that CIO alleviates tunneling.

Propensity score matching and difference-in-differences

We used the staggered DID method to further explore the robustness of our conclusion. Specifically, we used the method to estimate the difference in tunneling in the absence and presence of CII, that is, *CIO1* changing from 0 to 1. The estimation model is as follows:

$$\begin{aligned} Tunneling_{i,t} = & \beta_0 + \beta_1 Treat_{in_i}(Treat_{out_i}) \times Period_{i,t} + \\ & \Sigma \beta_j CONTROLS_{i,t} + \lambda_i + \lambda_t + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

We defined the sample without CII as the control group and set *Treat_in* as 0. During the sample period, firms with *CIO1* changing from 0 to 1 were considered the treatment group; we set *Treat_in* as 1. Period equal to 1 if the year falls after CIIs' entry into the treatment group and 0 otherwise. Other variables were defined in the same way as those in Eq (1). In this estimation, we eliminated firms with CII. To avoid selection bias, we also conducted the test based on the sample from PSM (the same as that in Section 4.2.3). The results in Columns (1) and (2) of Panel C present the coefficients of *Treat_inPeriod*, which are negative. The entry of CII significantly reduces tunneling. We also showed the impact of CIIs' withdrawal from certain firms through a similar analysis. While the definition of the control group is the same, we set the treatment group as firms with *CIO1* changing from 1 to 0 during the sample period. Period equal to 1 if the year falls after the withdrawal of CII, and 0 otherwise. Columns (3) and (4) of Panel C show the results wherein the coefficients of *Treat_outPeriod* are significantly positive. Tunneling increases after CIIs' exit from firms, which further validates our findings.

Exogenous shock of the Anti-monopoly Law

To examine the change in the impact of CIO on tunneling after the implementation of the Anti-monopoly Law, we introduced an anti-monopoly law implementation dummy variable *Post*. It takes the value of 1 if the year is in 2009 and afterward, and 0 otherwise. The interaction between this variable and the CIO variable is included in the regression. The estimation model is as follows:

$$Tunneling_{it} = \beta_0 + \beta_1 CIO_{it} \times Post_t + \Sigma \beta_j CONTROLS_{it} + \lambda_i + \lambda_t + \varepsilon_{it} \quad (3)$$

The regression results are shown in Panel D of Table 4. The coefficients of the interaction term of CIO and *Post* are significantly negative in all regressions regardless of which CIO measure is used. The results indicate that the Anti-monopoly Law has a certain degree of deterrent effect on the collusion motivation of CIO, and after the implementation of the Anti-monopoly Law, the collusion effect of CIO is weakened, and tunneling behavior is alleviated.

Table 4. Endogeneity

Panel A: IV				
	(1)	(2)	(3)	(4)
	Tunneling1		Tunneling2	
CIO2	-0.1911**		-0.1871**	
	(-2.3302)		(-2.0202)	
CIO3		-0.0379***		-0.0384***
		(-4.2146)		(-3.7993)
CV	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES
N	17225	17225	17225	17225
Underidentification test (Kleibergen-Paap rk LM statistic)	9.24(0.002)		9.58(0.003)	
Weak instrument test (Cragg-Donald Wald F statistic)	24.88		26.42	

Continue

Table 4. Endogeneity

Panel B: PSM-OLS				
	(1)	(2)	(3)	(4)
	Tunneling1		Tunneling2	
CIO2	-0.0548***		-0.0677***	
	(-2.6553)		(-2.9209)	
CIO3		-0.0039*		-0.0046*
		(-1.8573)		(-1.9437)
CV	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES
N	5227	5227	5227	5227
Panel C: PSM-DID				
	(1)	(2)	(3)	(4)
	Tunneling1	Tunneling2	Tunneling1	Tunneling2
Treat_in*Period	-0.1982*	-0.2277**		
	(-1.8838)	(-2.0626)		
Treat_out*Period			0.2580*	0.2789*
			(1.6962)	(1.8310)
CV	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES
N	3014	3014	4571	4571

Continue

Table 4. Endogeneity

Concludes

Panel D: Exogenous shock of the Anti-monopoly Law						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.0274*			-0.0482*		
	(-1.8414)			(-1.7832)		
CIO2		-0.0182***			-0.0206***	
		(-3.1875)			(-3.2831)	
CIO3			-0.0019**			-0.0022***
			(-2.6434)			(-2.6062)
Post	-0.0225***	-0.0218***	-0.0325***	-0.0318***	-0.0204***	-0.0248***
	(-4.84)	(-5.02)	(-5.32)	(-5.06)	(-3.88)	(-3.82)
CIO1*Post	-0.0052**			-0.0068**		
	(-2.45)			(-2.56)		
CIO2*Post		-0.0032*			-0.0044**	
		(-1.92)			(-1.94)	
CIO3*Post			-0.0026*			-0.0028**
			(-1.88)			(-1.76)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	18139	18139	18139	18139	18139	18139
R2	0.4702	0.4698	0.4684	0.4592	0.4580	0.4596

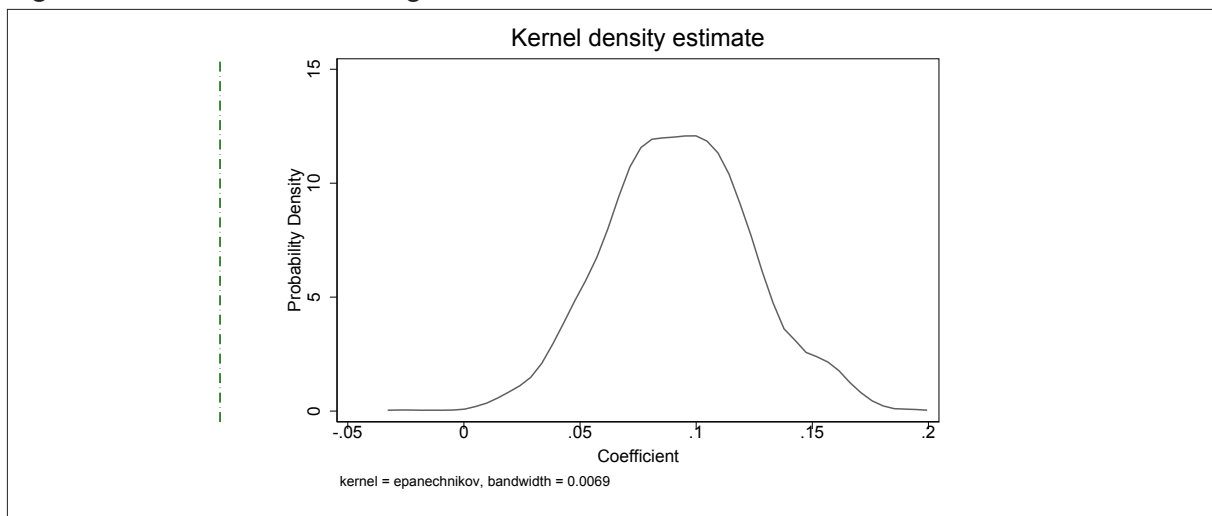
Note: This table reports the results of a robustness check on the effect of common institutional ownership on tunneling by alleviating potential endogeneity. In Panel A, we alleviate the potential endogeneity issue by using the industry average shareholding ratio of CIIs as an instrumental variable. In Panel B, we use PSM to control for sample selection bias. In Panel C, we use the staggered DID method. Specifically, we use the method to estimate the difference in tunneling in the absence and presence of CII, that is, CIO1 changing from 0 to 1. In Panel D, to examine the change in the impact of CIO on tunneling after the implementation of the Anti-monopoly Law, we introduce an anti-monopoly law implementation dummy variable Post. It takes the value of 1 if the year is in 2009 and afterward, and 0 otherwise. The interaction between this variable and the CIO variable is included in the regression.

Placebo tests

We also conducted a placebo test to exclude the influence of unobservable random disturbances on tunneling. We set a falsified variable of *CIO1* using a simulation method of randomly assigning

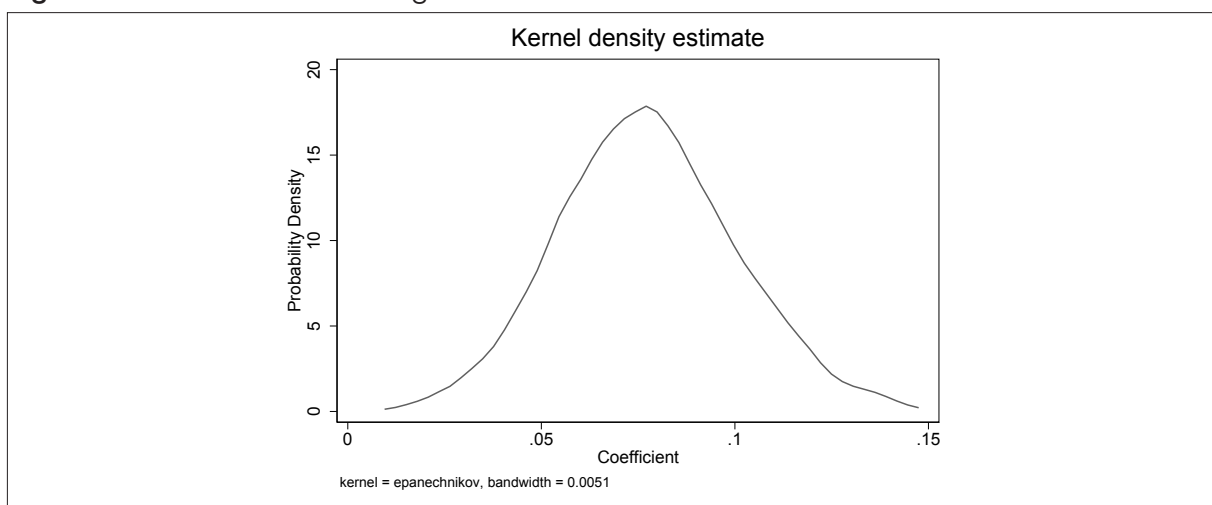
values to the firms in the treatment group. The process was repeated 1,000 times to ensure that the placebo test could effectively identify causality. Figure 1 (*Tunneling1* is the explained variable) and Figure 2 (*Tunneling2* is the explained variable) show the probability density distribution diagrams of the estimated coefficients of the falsified *CIO1* variables. Accordingly, in both diagrams, the estimated values of the randomly generated *CIO1* variables are far from the estimates in the baseline regression. Thus, the result verifies that no unobservable random disturbances affect the causal conclusion; the *CIO1* variables randomly generated have no impact on the tunneling of firms. Therefore, the negative and significant impact of CIO on tunneling behavior is not affected by unobservable random disturbances.

Figure 1. Placebo Test (*Tunneling1*)



Note: This figure shows the result of a placebo test to exclude the influence of unobservable random disturbances on tunneling. We set a falsified variable of *CIO1* using a simulation method of randomly assigning values to the firms in the treatment group. The process is repeated 1,000 times to ensure that the placebo test can effectively identify causality. Figure 1 (*Tunneling1* is the explained variable) and Figure 2 (*Tunneling2* is the explained variable) show the probability density distribution diagrams of the estimated coefficients of the falsified *CIO1* variables.

Figure 2. Placebo Test (*Tunneling2*)



Possible mechanisms

We attempted to exploit possible mechanisms driving the impact of CIO on tunneling. To this end, we studied how the relationship between CIO and tunneling differs across firms. First, tunneling is not lowered by investors holding firms' equity in other industries. However, CIIs owning equity in a larger number of firms in the same industry have a greater advantage of collecting and analyzing information and thus exert a more significant effect on tunneling. Hence, information advantage is one of the mechanisms through which CIO reduces tunneling. Second, the shareholder activism of CIIs has increased the proportion of non-controlling shareholders' voting in general meetings. By voting and submitting proposals in general meetings, CIIs can challenge unreasonable corporate decisions, such as related-party transactions (tunneling).

Information advantage

Equity ownership in multiple companies in the same industry provides institutional investors with information advantages, which is crucial for supervising tunneling behavior. Therefore, first, we compared whether the impact of equity ownership in multiple companies in the same industry was consistent with equity ownership in multiple companies in all industries (Kang et al., 2018). We defined CII as an investor ($CIO1_F$) owning 5% equity in two or more listed companies (not restricted by industry); we also calculated the number of CIIs ($CIO2_F$) and the shareholding ratio ($CIO3_F$). Subsequently, we re-estimated Eq. (1). The results in Table 5 show that the coefficients of $CIO1_F$, $CIO2_F$, and $CIO3_F$ are negative but not significant. The results indicate that only CIIs in the same industry can gain information advantages and restrain tunneling.

Table 5. Information Advantage 1

	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
$CIO1_F$	-0.0189			-0.0419		
	(-0.4226)			(-0.8328)		
$CIO2_F$		-0.0111			-0.0145	
		(-1.0953)			(-1.2919)	
$CIO3_F$			-0.0015			-0.0020*
			(-1.4588)			(-1.7173)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	17225	17225	17225	17225	17225	17225
R2	0.4617	0.4618	0.4618	0.4543	0.4543	0.4544

Note: This table reports the results of tests on a potential mechanism of information advantage (equity ownership in multiple companies in the same industry). We define CII as an investor ($CIO1_F$) owning 5% equity in two or more listed companies (not restricted by industry); we also calculate the number of CIIs ($CIO2_F$) and the shareholding ratio ($CIO3_F$).

Second, the information advantage of CII may be related to their industry power. The larger the number of CIIs' holding equity in firms in the same industry, the more capable and motivated they are to collect relevant information about the firms. This may lead to a greater information advantage (Du et al., 2021; Park et al., 2019). Following Du et al. (2021), we constructed CIIs' industry power indicator (*Power*) and add *PowerCIO2(CIO3)* to Eq. (1). The estimation model is as follows:

$$Tunneling_{it} = \beta_0 + \beta_1 Power_{it} \times CIO2_{it} (CIO3_{it}) + \sum \beta_j CONTROLS_{it} + \lambda_i + \lambda_t + \varepsilon_{it} \quad (4)$$

We calculated *Power* in the following manner. We added the number of all firms held by all CIIs in the same industry on a quarterly basis. Subsequently, we calculated the annual average, added one to it, and then took the natural logarithm. Table 6 shows that the coefficients of *PowerCIO2(CIO3)* are significantly negative. The higher the power of CII, the stronger its inhibiting effect on tunneling. The results reveal that the ownership of a large number of firms in the same industry strengthens CIIs' information advantage and, in turn, equips them to restrain tunneling effectively.

Table 6. Information Advantage 2

	(1)	(2)	(3)	(4)
	Tunneling1		Tunneling2	
PowerCIO2	-0.0202*		-0.0217*	
	(-1.8258)		(-1.7119)	
CIO2	-0.0329**		-0.0386**	
	(-2.4367)		(-2.5712)	
PowerCIO3		-0.0036***		-0.0039***
		(-2.8701)		(-2.6093)
CIO3		-0.0024**		-0.0030**
		(-1.9987)		(-2.2192)
CV	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES
N	18680	18595	18680	18595
R2	0.4469	0.4496	0.4372	0.4412

Note: This table reports the results of tests on a potential mechanism of information advantage (industry power). We construct CIIs' industry power indicator (*Power*) and add *PowerCIO2(CIO3)* to Eq. (1).

Shareholder activism

Shareholder activism manifests through shareholders' voting at general meetings, proposals, change management, and participation at important meetings (Li et al., 2018; Norli et al., 2015). Following Li et al. (2018), we used the voting rate of non-controlling shareholders at general meetings as a proxy for shareholder activism. The general meeting of shareholders is the highest decision-making body of a firm; it is also an important platform through which shareholders influence the firm (Jong et al., 2006). Specifically, non-controlling shareholders can directly express their demands and influence corporate decision-making by voting at the general meeting and submitting proposals (Li et al., 2018). Therefore, the voting rate of non-controlling shareholders at general meetings effectively reflects their activism. We used *MSP*, *MSP_Annual*, and *MSP_Extra* to measure the activism of non-controlling shareholders to participate in corporate decision-making. *MSP* denotes the proportion of voting by non-controlling shareholders at general meetings. *MSP_Annual* and *MSP_Extra* denote the proportion of voting by non-controlling shareholders at annual and extraordinary general meetings, respectively. We changed the dependent variable in Eq. (1) to *MSP* and estimated the effect of CIO on *MSP*. The estimation model is as follows:

$$MSP (MSP_Annual/MSP_Extra)_{it} = \beta_0 + \beta_1 CIO_{it} + \Sigma \beta_j CONTROLS_{it} + \lambda_i + \lambda_t + \varepsilon_{it} \quad (5)$$

Table 7 shows that although the coefficient of *CIO1* in Column (7) is not significant, the other coefficients of *CIO1*, *CIO2*, and *CIO3* are significantly positive. CIO significantly improves the activism of non-controlling shareholders to participate in general meetings, both annual and extraordinary. Therefore, meetings enable CIIs to engage in shareholder activism, thereby impacting company operations and restraining tunneling behavior.

Table 7. Shareholder Activism

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	MSP			MSP_Annual			MSP_Extra		
CIO1	0.0109***			0.0135***			0.0073		
	(2.7086)			(3.2114)			(1.4110)		
CIO2		0.0037***			0.0037***			0.0033**	
		(3.5017)			(3.3895)			(2.3360)	

Continue

Table 7. Shareholder Activism

Concludes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	MSP			MSP_Annual			MSP_Extra		
CIO3			0.0004***			0.0005***			0.0003**
			(3.6469)			(4.3663)			(2.1061)
CV	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	6578	6578	6578	6577	6577	6577	5615	5615	5615
R2	0.8544	0.8546	0.8547	0.8249	0.8250	0.8253	0.8075	0.8077	0.8077

Note: This table reports the results of tests on a potential mechanism of shareholder activism. We use *MSP*, *MSP_Annual*, and *MSP_Extra* to measure the activism of non-controlling shareholders to participate in corporate decision-making. *MSP* denotes the proportion of voting by non-controlling shareholders at general meetings. *MSP_Annual* and *MSP_Extra* denote the proportion of voting by non-controlling shareholders at annual and extraordinary general meetings, respectively.

Further analysis

This section discusses firms with different information environments, tunneling constraints, and controlling shareholders' characteristics.

Information environment

We explored whether CIIs play the same role in firms with different information environments. Firms engaged in high-quality information disclosure may have better information environments and internal governance, lower supervision costs of minority shareholders, and a focus on tunneling. Hence, we expected CIIs to have a negligible effect on tunneling in firms with a better information environment. The Kim and Verrecchia (KV) value reflects the actual effect of information disclosure of listed firms, including mandatory and voluntary information disclosures (Kim & Verrecchia, 2001). The higher the KV, the lower the quality of information disclosure. Based on whether the quality of information disclosure exceeds the average value, we split the sample into high- and low-information-disclosure-quality firms. Panels A and B of Table 8 show that CIO significantly restrains tunneling only in firms with low information disclosure quality. The results indicate that CIO can play a greater role in firms with a poor information environment, consistent with our prediction.

Table 8. Information Environment

Panel A: High-information-disclosure quality						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	0.0340			0.0362		
	(0.4689)			(0.4557)		
CIO2		-0.0228			-0.0230	
		(-1.2911)			(-1.1915)	
CIO3			-0.0011			-0.0007
			(-0.6242)			(-0.3930)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	8544	8544	8544	8544	8544	8544
R2	0.4646	0.4647	0.4646	0.4530	0.4531	0.4530
Panel B: Low-information-disclosure quality						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.2143 ^{**}			-0.3028 ^{***}		
	(-2.5033)			(-2.9474)		
CIO2		-0.0641 ^{***}			-0.0810 ^{***}	
		(-3.0064)			(-3.1900)	
CIO3			-0.0055 ^{***}			-0.0069 ^{***}
			(-2.8057)			(-2.9959)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	8160	8160	8160	8160	8160	8160
R2	0.4450	0.4452	0.4451	0.4384	0.4385	0.4384

Note: This table reports the test results on the effect of CIO on tunneling in firms with high-information-disclosure quality versus firms with low-information-disclosure quality. Based on whether the quality of information disclosure exceeds the average value, we split the sample into high- and low-information-disclosure-quality firms.

Constraints on tunneling

Previous studies found that external governance effectively restrains tunneling behavior (Jiang et al., 2015; Zhang et al., 2014). We found that CIO effectively restrains tunneling by shareholder activism. Using network attention and excess on-the-job consumption as measures of external governance, we discussed the effects of CIO on tunneling under different tunneling constraints.

Network attention. Based on whether the total number of news items in which the firm appears is higher than the industry-adjusted mean value, we split the sample into high- and low-network-attention groups. When a firm belongs to a high-network-attention group, the firm's external environment plays a key role. Such an external environment allows for the effective supervision of internal enterprise behavior. Therefore, we predicted that CIO may have less effect on tunneling in the high-network-attention group. Table 9 shows that CIO only decreases the tunneling of firms in the low-network-attention group.

Table 9. External Attention

Panel A: High network attention						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.0158			-0.0962		
	(-0.1412)			(-0.7286)		
CIO2		-0.0214			-0.0352	
		(-0.8839)			(-1.2862)	
CIO3			-0.0018			-0.0033
			(-0.7897)			(-1.2377)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	4076	4076	4076	4076	4076	4076
R2	0.5129	0.5131	0.5130	0.4919	0.4921	0.4921

Continue

Table 9. External Attention

Concludes

Panel B: Low network attention						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.1060			-0.1361*		
	(-1.6006)			(-1.8132)		
CIO2		-0.0415**			-0.0476**	
		(-2.3829)			(-2.4064)	
CIO3			-0.0039**			-0.0043**
			(-2.3721)			(-2.3430)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	12651	12651	12651	12651	12651	12651
R2	0.4407	0.4409	0.4409	0.4396	0.4398	0.4398

Note: This table reports the test results on the effect of CIO on tunneling in firms with high network attention versus firms with low network attention. Based on whether the total number of news items in which the firm appears is higher than the industry-adjusted mean value, we split the sample into high- and low-network-attention groups.

Excess on-the-job consumption. We used the excess on-the-job consumption of executives to proxy non-monetary private income, measured by the difference between the actual and optimal on-the-job consumption of executives (Luo et al., 2011). We split the sample into high- and low-excess on-the-job consumption groups, according to whether the excess on-the-job consumption exceeds the average. When a firm belongs to a low-excess on-the-job consumption group, it implies strict external monitoring of the firm and tunneling practices. CIO may have less impact on tunneling of firms with low-excess on-the-job consumption. The results in Panels A and B show that CIO strongly influences tunneling of firms in the high-excess on-the-job consumption group. In sum, as a complement to informal external governance mechanisms, CIO significantly impacts corporate governance in poor external governance environments. Table 10 presents the results.

Table 10. Excess On-the-job Consumption

Panel A: High-excess on-the-job consumption						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.0910			-0.1331		
	(-1.0754)			(-1.3507)		
CIO2		-0.0380*			-0.0477**	
		(-1.8393)			(-1.9784)	
CIO3			-0.0045**			-0.0057**
			(-2.2011)			(-2.3721)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	6772	6772	6772	6772	6772	6772
R2	0.4197	0.4200	0.4202	0.4086	0.4088	0.4091
Panel B: Low-excess on-the-job consumption						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.0643			-0.0832		
	(-0.7724)			(-0.8899)		
CIO2		-0.0271			-0.0309	
		(-1.3091)			(-1.3530)	
CIO3			-0.0022			-0.0024
			(-1.1138)			(-1.0963)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	8563	8563	8563	8563	8563	8563
R2	0.5015	0.5016	0.5016	0.4966	0.4967	0.4967

Note: This table reports the test results on the effect of CIO on tunneling in firms with high-excess on-the-job consumption versus firms with low-excess on-the-job consumption. We split the sample into high- and low-excess on-the-job consumption groups according to whether the excess on-the-job consumption exceeds the average.

Different types of controlling shareholders

SOEs and non-SOEs. When examining the impact of institutional investors on corporate governance, previous studies have distinguished the sub-samples of SOEs and non-SOEs, especially when using Chinese data (Du, 2014; Liu et al., 2016). Liu et al. (2016) showed that the restraining effect of independent directors' attendance on tunneling is more pronounced in non-SOEs. Thus, we split the sample into SOEs and non-SOEs to distinguish the effect of CIO on tunneling in different firms. Table 11 shows that CIO significantly influences tunneling in non-SOEs and has no impact on SOEs' tunneling. On the one hand, owing to the particularity of the SOEs, CIIs have less influence on firms' managers. On the other hand, owing to the absence of owners in SOEs, tunneling often occurs for political reasons, and it is difficult for CIIs to exert influence.

Table 11. SOEs and non-SOEs

Panel A: Non-SOE						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.1072*			-0.1689**		
	(-1.7005)			(-2.3171)		
CIO2		-0.0484***			-0.0631***	
		(-3.0361)			(-3.4856)	
CIO3			-0.0040**			-0.0056***
			(-2.4832)			(-3.0281)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	13633	13633	13633	13633	13633	13633
R2	0.4726	0.4729	0.4728	0.4622	0.4626	0.4625
Panel B: SOE						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.0369			0.0147		
	(-0.2942)			(0.1062)		
CIO2		-0.0099			0.0006	
		(-0.3358)			(0.0194)	
CIO3			-0.0010			0.0003
			(-0.3897)			(0.1074)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	3448	3448	3448	3448	3448	3448
R2	0.4897	0.4897	0.4897	0.4806	0.4806	0.4806

Note: This table reports the test results on the effect of CIO on tunneling in SOEs versus non-SOEs. We split the sample into SOEs and non-SOEs to distinguish the effect of CIO on tunneling in different firms.

Separation of ownership and control. The separation of ownership and control is the root cause of tunneling (Gao et al., 2021; Zhang et al., 2014). Separation incentivizes controlling shareholders to engage in self-dealing transactions and thereby sacrifice the interests of minority shareholders (Jiang et al., 2015; Johnson et al., 2000). Gao et al. (2021) found that analysts' restraining effect on tunneling is more salient in highly separated firms. To distinguish the effect of CIO on tunneling in different separation scenarios, we split the sample into highly separated and relatively unseparated firms according to whether the value of the separation ratio exceeds the mean value. The separation ratio is calculated using the ownership ratio/control ratio of the actual controller. Table 12 presents the results. Panel A shows that CIO significantly reduces tunneling in highly separated firms. However, Panel B shows that the coefficients of CIO are not statistically significant in less separated firms. Controlling shareholders in highly separated firms have a stronger motivation for tunneling, and CIO has a more salient impact on these firms.

Table 12. Separation between Ownership and Control

Panel A: Highly separated firms						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.1050*			-0.1336*		
	(-1.6654)			(-1.8690)		
CIO2		-0.0438***			-0.0509***	
		(-2.9072)			(-3.0041)	
CIO3			-0.0036**			-0.0041**
			(-2.5070)			(-2.5381)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	11697	11697	11697	11697	11697	11697
R2	0.4753	0.4756	0.4755	0.4679	0.4683	0.4681
Panel B: Less separated firms						
	(1)	(2)	(3)	(4)	(5)	(6)
	Tunneling1			Tunneling2		
CIO1	-0.0732			-0.1471		
	(-0.7180)			(-1.2401)		
CIO2		-0.0336			-0.0477	
		(-1.2166)			(-1.4906)	
CIO3			-0.0032			-0.0048
			(-1.1844)			(-1.5971)
CV	YES	YES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES
N	5353	5353	5353	5353	5353	5353
R2	0.4326	0.4327	0.4327	0.4244	0.4245	0.4245

Note: This table reports the test results on the effect of CIO on tunneling in highly separated versus relatively unseparated firms. We split the sample into highly separated and relatively unseparated firms according to whether the value of the separation ratio exceeds the mean value. The separation ratio is calculated using the ownership ratio/control ratio of the actual controller.

CONCLUSION

We found a negative relationship between CIO and tunneling. The entry of CIIs reduces tunneling. The larger the number of investors and the higher the shareholding ratio, the greater the inhibitory effect of CIO on tunneling. We re-estimated CIO and showed that our findings are robust to the alternative proxy of CIO. The results of instrumental variables (IV), PSM, and PSM-DID show that the negative relationship remains significant after controlling for endogeneity. The mechanism analysis also provides evidence consistent with the findings that CIO mitigates tunneling through information advantage and shareholder activism. Additionally, the negative relationship between CIO and tunneling is more pronounced among firms with poor information environment, low external supervision, non-state ownership, and a high degree of separation.

These findings have the following three policy implications. First, listed companies should actively introduce CIIs to improve corporate governance, as CIIs' management experience, information resources, and motivation equip them to execute external governance functions. The government should also protect the legitimate rights and interests of CIIs to ensure they can effectively supervise management behaviors. Second, listed companies should motivate minority shareholders to participate in corporate governance by protecting their basic rights. For companies with serious agency problems, the government can appropriately set the minimum voting ratio of minority shareholders. Third, contrary to previous research that found CIO may generate monopoly power (Azar et al., 2018), this research did not find that CIIs collude with management or majority shareholders. However, the government should strengthen the management to prevent such occurrences. As the proportion of institutional investors in the Chinese stock market is still relatively low, policies that promote the development of institutional investors are encouraged.

We conclude by outlining related questions that are beyond the scope of this study. First, due to data availability, we did not differentiate between fair-priced transactions from those with tunneling purposes. Second, despite the positive findings in this study, it should be noted that our results did not specify the influence of CIO on tunneling by institutional investor types. Third, CIO plays multifaceted roles in corporate governance. Although we exploited two possible mechanisms of how CIO alleviates tunneling, other potential mechanisms, such as "voice mechanism" and "exit mechanism" remain under researched. These issues warrant future research.

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NOTE

Balance test after PSM is reported in an online Appendix at <https://kdocs.cn/l/cdWdIuy8zs3B>.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

AUTHORS' CONTRIBUTION

Yajie Bai: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Software; Validation; Writing – original draft;
Maoguo Wu: Data curation; Formal analysis; Investigation; Software; Validation; Writing – proofreading, and editing.