Is state-owned enterprise merging private enterprise “market choice” or “space crowding” ? —Based on the motives of equity transfer of mixed-ownership enterprises

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Is state-owned enterprise merging private enterprise "market choice" or "space crowding" ? —Based on the motives of equity transfer of mixed-ownership enterprises

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ABSTRACT

Many state-owned enterprises have mergers and acquisitions (M&A) with private enterprises, which has caused private enterprises to worry about their living space being squeezed. Based on 572 data records about equity transfers of Chinese listed companies extracted from CSMAR4.0 from 2013 to 2020, this paper categorized ownership structures into three categories: privatization of state-owned enterprises (Category 1), state-owned enterprises merging private enterprises (Category 2), and state-owned enterprises merging state-owned enterprises (Category 3). The categorical regression of ex-ante equity transfer motivation revealed that the motives for Category 1 conformed to the phenomenon of the "pretty girl gets married first" and "embezzlement view." Category In contrast, the motives for Category 2 conformed to the "fiscal revenue view." The categorical regression of ex-post equity transfer motivation showed that all three types significantly improved various efficiencies and represented an optimal allocation of resources. Moreover, it was revealed that the transfer of equity to state-owned enterprises by inefficient private firms in Category 2 also significantly improved enterprise efficiency. Thus, it can be considered as a rational behavior of market selection and never squeezed the space crowding. Further analysis showed that the efficiency improvement is due to the symbiotic development relationship rather than the antagonistic relationship between heterogeneous shareholders. Therefore, it is suggested to initiate market-oriented reform by actively developing ownership mixed-ownership economy and adhering to the "two unwavering" basic economic system.

1. Introduction

Unexpected macro-environmental changes took place in recent years, such as the global epidemic outbreak, the slowdown of China's economic growth, the tightening of environmental protection policies, and China-US trade frictions led some private enterprises in China to fall into difficulties in production and operation. Some of these enterprises even have to face the risk of pledged

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stocks bursting and capital breakage. In order to maintain local economic stability, guarantee employment and promote industrial upgrading, state-owned capital has increased its investment or relief efforts in listed companies, and the acquisition of control rights of listed companies is the mainstream way. For example, in the first half of 2020, Suning Appliance had over 130 billion Yuan of short-term debt maturing within one year, while cash on hand was only 24.8 billion Yuan. On June 2, 2021, Suning Tesco (stock code: 002024)'s controlling shareholder transferred 5.59% of its shares to Jiangsu Xinxin Retail Innovation Fund under the control of Jiangsu State assets at the price of 3.182 billion Yuan (transfer price 6.12 Yuan/share) [1]. On July 5, 2021, Suning Tesco transferred another 16.96% of its shares to Jiangsu Xinxin Retail Innovation Fund Phase II (limited partnership). Similar mergers and acquisitions (M&A) that took place in the recent past include: Helitai (stock code: 002217), the actual controller changed from Wen Kaifu to Fujian SASAC; Yiyatong (stock code: 002181), the actual controller changed from Zhou Guohui to Shenzhen SASAC; Tianwo Technology (stock code: 002564), the actual controller changed from Chen Yuzhong to Shanghai SASAC. All these private companies were taken over by state-owned capital due to various problems.

According to China's capital market statistics, from 2018 to 2021, the number of state-owned enterprises acquiring privately listed companies was 21, 40, 49, and 41, accounting for 20.19%, 24.24%, 21.03% and 18.47% of the change in control of listed companies during the same period [2]. This has caused strong reactions in society and triggered private entrepreneurs to worry about "the state advancing and the people retreating" and the "squeezed living space" [3]. This is because the concept of low efficiency of state-owned enterprises has been deeply rooted in the people's minds, thus subjectively concluding that merging state-owned enterprises with private enterprises is a counter-market economic behavior, a distortion of resource allocation, and even a drag on economic development.

However, the phenomenon of Chinese state-owned enterprises merging with privately listed companies has dampened the confidence of private business owners. With this phenomenon, it is prominent that private enterprises are afraid to invest, unwilling to invest, and unable to invest in businesses [4]. In 2020, China's total investment reached 51.8907 trillion Yuan, incrementing 2.9% year-on-year. More specifically, private investment came to 28.9264 trillion Yuan, with an increment of 1% year-on-year, a comparatively lower growth rate than the total investment growth rate [5]. In 2021, China's fixed asset investment reached 54.4547 trillion Yuan, incrementing 4.9% from the previous year. Concerning the fixed asset investment, private fixed asset investment came to 30.7659 trillion Yuan, with an increment of 7.0% of the prior year, two percent higher than the total fixed asset investment growth rate, indicating the confidence of private business owners has recovered [6]. However, due to the sporadic outbreaks of COVID-19, disrupted industrial chains and logistics, from January to May 2022, China's fixed asset investment came to 20.5964 trillion Yuan, incrementing 6.2% year-on-year. More specifically, private fixed asset investment reached 11.7128 trillion Yuan during this period, with an increment of 4.1% year-on-year. It was two percent lower than the total fixed assets investment growth rate, indicating that the confidence of private business owners has started declining again [7].

The Chinese government attaches great importance to the confidence of private entrepreneurs. In 2005, the State Council issued the *Several Opinions on Encouraging,* Supporting*, and Guiding the Development of Individual, Private, and Other Non-public Economies*, referred to as the "Old 36 Articles". In 2010, the State Council issued the *Several Opinions of The State Council on Encouraging and Guiding the Healthy Development of Private Investment*, referred to as the "New 36 Articles". In 2019, The State Council issued 28 articles of *Opinions on Creating a Better Development Environment and* Supporting *the Reform and Development of Private Enterprises*, reflecting the central government's firm strategic determination to support the development of privately-owned firms. On May 19, 2021, the National Development and Reform Commission also proposed to support the development of private enterprises from four aspects: investment space, financing intensity, participation in major national strategies, and good demonstration work. As indicated above, the Chinese government's policies and measures to support the development of private enterprises have always been consistent, stable, and firm. However, despite all these attempts, it is surprising to see private enterprises in China still feel their living space is being squeezed.

This leads us to examine the research question of whether, in the Chinese capital market, there are countless equity transfers. For example, what is the motivation of equity transfer: is it to improve the efficiency of enterprises or to reduce the financial burden of the government? Or major shareholders in order to obtain the transfer of control of private income? After the equity transfer, whether the

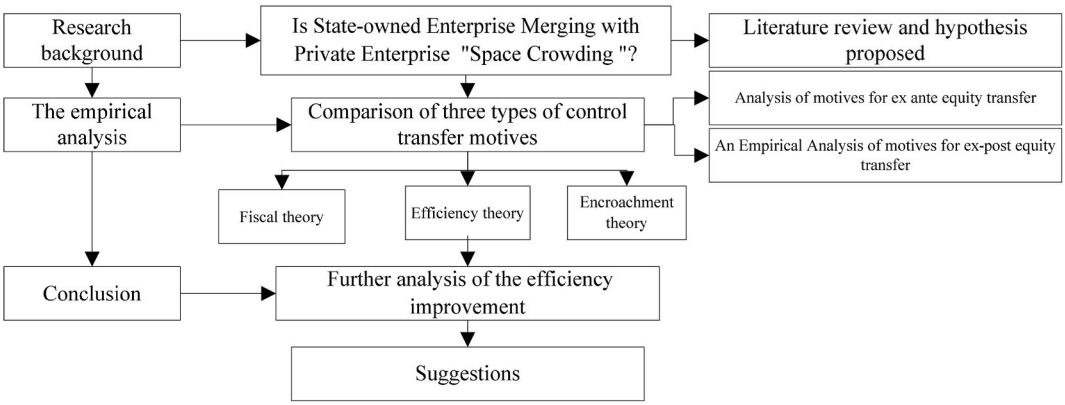

Fig. 1. Research framework used in this paper.

target is achieved? Especially in the context of the current mixed-ownership reform, compared with private enterprises, is state-owned enterprises merging with private enterprises squeezing the space for private enterprises? Who performs better in such M&A? We collected the latest equity transfer data from mixed-ownership enterprises in China to answer these intrusive research questions. The empirical analysis enabled us to criticize some negative and skeptical remarks about the private economy and provide practical implications about adhering to the market-oriented reform direction and the two unwavering basic economic systems. In summary, the research framework of this paper is shown in a nutshell in Fig. 1.

As shown in Fig. 1, first of all, we put forward the controversial research problem that the space of private enterprises is squeezed when state-owned enterprises merge with private enterprises. Then we reviewed the literature review carefully and proposed three research hypotheses on the motivation of equity transfer. The data were collected from mixed-ownership enterprises about their equity transfer modes and divided into three categories: the privatization of state-owned enterprises (Category 1), state-owned enterprises M&A with private enterprises (Category 2), the merger of state-owned enterprises (Category 3). We finally compared the motivation differences between these three types focusing on motivations before and after the equity transfer. Our findings indicate that all three types of equity transfer significantly improve the efficiency of the company. More specifically, as revealed in the second type, the efficiencies of private enterprises that initially had low efficiencies are improved after being acquired by state-owned enterprises. This indicates that such M&An allows private firms to allocate resources optimistically and that state-owned enterprises are not squeezing or crowding out private enterprises. Finally, we conclude the paper by delineating some policy suggestions from the findings.

2. Literature review and hypotheses development

Equity transfer is a common phenomenon in the capital market, and the Chinese market is no exception. In the Chinese market, various types of shareholders exist, including state-owned shares, private shares, foreign capital shares, legal person shares, employee shares, outstanding shares, and many more. The purpose of equity transfer between shareholders of different natures is different, among which state-owned shares may consider more social benefits. In contrast, private shareholders may consider more economic benefits, so studying the motives of equity transfer between heterogeneous shareholders in China is of great practical significance. Scholars generally adopt two methods of ex-ante and ex-post to study the motivations behind equity transfer. The so-called ex-ante analysis refers to the analysis based on the characteristics of the company before the equity transfer to judge the purpose of the equity transfer. The ex-post analysis is based on the performance of the company after the equity transfer to reverse the purpose of the equity transfer. However, regardless of the means of analysis, the motives of equity transfer are generally categorized as follows.

The first is the "view of efficiency," which means absorbing equity in order to increase efficiency. For instance, Cho et al. [8] conducted an event study of 2824 domestic M&A cases disclosed on the Korean domestic stock exchange from 2002 to 2015. An independent sample test-test was used to compare the CAR of high-tech sectors to that of non-high-tech sectors and found that the disclosure of M&An information was more conducive to increasing the wealth of acquirer shareholders in high-tech sectors. Barros et al. [9] used an extensive panel data set from 41 countries covering 12 economic sectors between 2002 and 2020 and found that M&A deals have a positive impact on the environmental, social, and governance (ESG) score of firms. Based on a sample of 892 acquisitions from 42 countries from 1990 to 2008, Dai et al. [10] found that major shareholders transferred governance quality to investment companies, thus improving earnings management. According to the financial data analysis of 1362 Japanese listed companies from 1991 to 2009 in the NIKKEI NEEDS database, ownership transfer to private and foreign individuals has improved financial efficiency [11]. Abioye [12] studied the critical success factors of railroad privatization in Nigeria and revealed that the transfer of ownership and control from state-owned enterprises to private parties drives efficient and effective operations within enterprises, thereby increasing the productivity and profitability of state-owned enterprises.

However, on the contrary, some scholars argue that equity transfer may reduce enterprise efficiency. For example, Pazarskis et al. [13] used the bootstrap approach to evaluate the short-term operating income of 30 Greek-listed companies after the Greek sovereign debt crisis outbreak. The results showed that several financial measures failed to generate short-term operating benefits in the year before and after the merger event. An analysis of 24,263 M&A from 81 countries worldwide over 19 years found that the higher the number of M&A, the lower the abnormal returns [14]. Galariotis et al. [15] evaluated the M&A performance of 43 listed commercial banks in 8 countries using data envelope analysis (DEA method) and found that M&A would have a negative impact on the efficiency level of "strong" and "weak" banking systems regardless of whether banks participated in one or more M&A. A survey of 56 privatized state-owned enterprises in Egypt from September 2020 to January 2021 revealed that privatization improved the efficiency of internal corporate governance but led to greater difficulties in defending the interests of socially vulnerable groups [16]. During the COVID-19 pandemic, the privatization and marketization of the regional medical and social security system in Italy had serious negative consequences for employment and work [17]. Peña-Miguel and Cuadrado-Ballesteros [18] analyzed the privatization reforms of 25 European countries from 2003 to 2013 and found that privatization exacerbated income inequality. Paskelian et al. [19] collected 158 M&A data from 2009 to 2012 using the American SDC database and found that M&A would not bring substantial performance improvements.

Based on the data gathered from Chinese listed companies and employing the difference-in-differences (DID) method to examine the effect of cross-border M&An empirically, Yang et al. [20] found that M&A has a significant positive impact on the CSR of Chinese acquirers. Using the regression method, Wu et al. [21] empirically found a positive correlation between the accounting performance of the acquirer after M&A and that of the previous peer acquirer. Jin et al. [22] analyzed 32 M&A in China's real estate industry from 2000 to 2011 and found that the economic performance of the acquirers has improved. Chow and Fung [23] found that after the merger of Chinese airlines, production efficiency was improved. Kang and Kim [24] found that partially privatizing state-owned enterprises in China enhanced corporate governance. As indicated in the above review, prior literature shows whether equity

transfer can improve enterprise efficiency has not been well unified. Nevertheless, the previous studies indicate that China's state-owned enterprises mainly adopt the reform method of retaining large enterprises and abandoning small and medium-sized enterprises, and numerous scholars believe that such privatization of state-owned enterprises in China has achieved significant positive effects. Therefore, we hypothesize that.

H1. After the transfer of control of listed companies, the efficiency is getting higher and higher.

The second is the "fiscal revenue view," which states that the government transfers state shares to ease fiscal pressure by stopping subsidies to loss-making state-owned enterprises and reducing fiscal expenditures or selling state shares to obtain short-term fiscal revenue. As early as the 1980s, British state-owned enterprises lost as much as 3 billion pounds per year, and Mrs. Thatcher had to sell British oil, airline, steel, and gas companies one after another to reduce the severe domestic fiscal deficit. Following the same footsteps, other countries in Europe and the United States, the Soviet Union, and Eastern Europe also had to sell many state-owned enterprises to private enterprises, which directly led to the collapse of the Soviet Union. In the course of state-owned enterprise reform, China has also reduced its state-owned shares many times.

First, the Chinese government did this to achieve the three-year goal of extricating large and medium-sized state-owned enterprises from difficulties and reducing subsidies to small state-owned enterprises for losses. The Chinese government had to repeat the same thing for the second time when they wanted to separate government administration from enterprise management and establish a modern enterprise system. Influenced by the COVID-19 pandemic, India undertook massive privatization in sectors such as aviation, airports, banking, insurance, and oil and telecommunications to increase government revenues, which has resulted in widening the gap between rich and poor [25]. Malaysia's asset-light policy has allowed previously debt-burdened publicly owned water utilities to sell off their assets to a specially created federal government agency, PAAB, in return for debt cancellation and access to low or interest-free loans for CAPEX purposes [26]. Cuadrado-Ballesteros and Peña-Miguel [27] used data from 22 European countries from 1995 to 2013 and found that the privatization promoted by the European Union and the International Monetary Fund has improved the balance of fiscal revenue. Cai et al. [17] used data from the province-managing-county reform in China to identify the variation of local government fiscal stress and found that the fewer the zombie enterprises, the less pressure on local fiscal revenue. Therefore, we hypothesized that.

H2. The larger the local fiscal gap, the easier it is for state-owned enterprises to transfer control to private enterprises; or the higher the income tax rate, the more state-owned enterprises will merge and acquire private enterprises.

The third is the "embezzlement view." It refers to the motivation of major shareholders to infringe on the interests of minority shareholders by taking advantage of their control rights, that is, "tunneling behavior." Using data from Chinese listed companies, Liu [28] revealed that large shareholders tend to use control to obtain private gains rather than share gains with small and medium-sized shareholders through stock dividends. Based on the empirical analysis of 1354 M&A done by state-owned enterprises in 45 countries worldwide, Heugens et al. [29] found that the powerful governments are motivated to politically restrict private access to control the interests of shareholders based on laws and regulations. With the development of times, the way of digging the tunnel has also been innovated. In order to cater to investors, the controlling shareholders of Chinese listed companies have manipulated a lot of inefficient innovation activities within state-owned enterprises in order to raise the firm's stock price and reduce the financing cost of state-owned enterprises [30]. This kind of tunneling behavior has seriously damaged the efficiency of the companies.

Gu et al. [3] found that controlling shareholders reduce the efficiency of the real economy by creating conflicts with small and medium-sized shareholders. They further emphasized that the more severe the encroachment of controlling shareholders, the higher the deviation of labor investment from the level of economic fundamentals and the lower labor investment efficiency. This relationship is more pronounced in non-state enterprises with high expropriation risk and state-owned enterprises with decisive government intervention. This kind of tunneling behavior also increased the probability of equity transfer. In 2019, Kangmei Pharmaceutical (stock code: 600,518) illegally occupied the funds of listed companies up to 11.6 billion Yuan and will soon be bankrupt and delisted. Based on the above discussion, we hypothesized that.

H3. The more serious the benefit encroachment of major shareholders is, the more likely the transfer of control rights will occur.

To sum up, scholars have detailedly analyzed the motivations behind equity transfer, sufficient to prove the importance of controlling the market. With the policy of "grasping large and releasing small" in the reform of state-owned enterprises, more and more privatization events occurred. Many scholars have also studied the effect of the privatization of state-owned enterprises, and the conclusions are supported and opposed, but they are not unified. However, since the Third Plenary Session of the 18th CPC Central Committee proposed to "actively develop the mixed-ownership economy," no scholars have systematically examined the motivation of equity transfer of mixed-ownership enterprises. More specifically, scant scholarly attention has been paid to comparing the differences in motivation between when state-owned enterprises are merging with private enterprises and the private enterprises merging with state-owned enterprises. Further, there is no clear evidence to claim that when state-owned enterprises merge with private enterprises, it will space crowd the private enterprises.

3. Data source, variable definitions and model setting

3.1. Data source

Data for this paper is extracted from the equity transfer database of listed companies in Guotai 'an CSMAR4.0, from 2013 to 2020. A

total of 1190 data items was initially extracted. However, we had to delete 42 data items from the financial and insurance industry and 65 from the ST (special treatment). Further, since data about nine types of equity transfers were included in this database, we had to delete 74 data items about free transfers, 98 data items about debt offset, 52 data items about mergers and reorganizations, 61 data items about equity contributions, 72 data items about indirect changes, 54 data items about entrusted management or authorized operations, and 15 data items about other types. Thus, finally, in the end, 655 data items were retained, representing two transaction samples, namely transfer by agreement (paid) and auction., These two transaction samples were selected because these two trading methods are more in line with market trading principles. We also deleted 82 data items with a high density of missing values before the analysis. Finally, 572 data items about control transfers were retained for analysis from 2013 to 2020. Starting from 2013, data items from each year correspond to 79, 97, 55, 89, 57, 63, 55, and 77, respectively, so the sample distribution is relatively uniform. In this paper, all continuous variables are curtailed by 1% above and below.

The samples are calculated by looking at the parties involved in the transfer agreement. In the complex case of one company transferring to multiple companies and multiple companies transferring to multiple companies, we retained the samples to the maximum extent and conformed to the actual transaction situation. However, since there were problems in that the same listed company had multiple transaction data for the same year, which does not meet the requirements of panel data. Therefore, the mixed regression method is used for the empirical analysis.

3.2. Variable definitions

3.2.1. Dependent variables

(1) Type of equity transfer.

Mixed-ownership enterprises are enterprises that contain both public and non-public economic components. In this paper, the top 10 shareholders of listed companies, including state-owned shares, are defined as mixed-ownership enterprises. This is because the shares held by small and medium-sized retail investors are private equity, which belongs to the non-public economy. Mixed-ownership enterprises were further divided into state-owned holding mixed-ownership enterprises and private holding mixed-ownership enterprises by looking at the nature of the actual controller. The nature of the actual controller is divided according to the ultimate controller chart disclosed in the annual report of the listed companies.

In this paper, equity transfer is divided into three categories according to the ultimate controller. The ultimate controller is a state-owned enterprise, which becomes a private enterprise after equity transfer is called privatization of state-owned enterprises (Category 1). If the ultimate controller is a private enterprise, the ultimate controller becomes a state-owned enterprise after equity transfer is called state-owned enterprises M&A private enterprises (Category 2). Category Suppose the ultimate controller is a state-owned enterprise after equity transfer. In that case, the ultimate controller is still a state-owned enterprise, a state-owned enterprise merging state-owned enterprises (Category 3). For each Category, we selected data items 253, 155, and 164, respectively, accounting for 44.23%, 27.1%, and 28.67% of the composition in the final sample., As the sample composition indicates, it is clear that the objects of equity transfer of mixed-ownership enterprises are mainly state-owned enterprises.

(2) The ownership attribute of the transferee is measured by whether the transferee is a state-owned enterprise (i.e., 1 = yes and 0 = no). Accordingly, there were 319 and 253 enterprises in the sample, accounting for 55.77% and 44.23% of the sample composition, indicating that the transferee of a mixed-ownership enterprise is mainly a state-owned enterprise.

3.2.2. Independent variables

The first “view of efficiency” is measured using traditional financial performance indicators, such as total assets, net profit margin, return on equity, and total asset turnover. The second “fiscal revenue view” is measured using the logarithm of income tax rates and fiscal gaps, with fiscal data from the China Statistical Yearbook. The third is the “embezzlement view ". The main feature of modern companies is the centralized shareholding structure, and the conflict of interest between major and minority shareholders becomes the “second type” agency problem. The channel of benefit encroachment of major shareholders is relatively secret and difficult to measure and can only be estimated. In China, major shareholders generally illegally occupy non-operating funds, mainly through the occupation of funds from related parties, which are generally recorded in the accounting items of “other receivables”. Therefore, we defined other receivables/total assets*100% as capital occupation 1, and defined (accounts receivable + prepayments + other receivables - accounts payable - advances received - other payables)/total assets * 100% as capital occupation 2. In addition, earnings management refers to the behavior in which enterprises maximize the self-interest of managers or the market value of enterprises by choosing accounting policies based on following accounting standards. Because Chinese listed companies often control the return on equity (ROE) at (0,1%) in order to avoid special treatment or delisting or control ROE at (6%, 7%) in order to obtain listing qualification conditions or refinancing qualification. Therefore, the ROE in (0,1%) or (6%, 7%) is defined as earnings management and assigned as 1, and the other is defined as 0 in the range.

3.2.3. Control variables

Different types of equity transfer get different benefits. For example, horizontal M&A gain advantages of scale economy and monopoly, whereas vertical M&A reduce transaction costs. In contrast, mixed M&A brings advantages such as risk diversification and scope economy. However, no matter what kind of M&A, the various characteristics of the M&A need to be considered in this paper.

Therefore, the equity transfer and structure characteristics are included as control variables. The characteristics of equity transfer evaluate whether it belongs to the same jurisdiction and transaction scale, and the characteristics of equity structure focus on the separation degree of two rights and the ability of equity checks and balances. In addition, it is decided to consider the size and marketization level of the company as control variables as well.

1 Characteristics of equity transfer

Equity transfer evaluates whether the company belongs to the same jurisdiction and transaction scale. Most scholars believe that the economic, legal, and political system in China have an important influence on corporate behavior, especially under the premise of fiscal decentralization and political championships between the central and local governments. Local governments tend to merge and reorganize enterprises within their jurisdictions. So we consider the jurisdictional scope of equity transfers as a control variable. If it is in the same province or municipality, it may be the equity transfer behavior led by local governments. Only the transfer of equity between enterprises in different provinces or municipalities directly falls under the central government is a self-selective act of the market. Only the equity transfer between enterprises in different provinces and municipalities falls under the Central Government, and it is the self-selection behavior of the market. Judging by the level of provinces and municipalities directly under the central government, yes = 1, no = 0. We also use "relative transaction size" to measure the difficulty of equity transfer and the importance of the transaction.

3.3. Characteristics of equity structure

The characteristics of equity structure focus on the separation degree of two rights and the ability of equity checks and balances. Based on the theory of ultimate control rights, major shareholders can use a small amount of cash flow rights to obtain more control rights with the help of the pyramid of equity structure and thus have the motivation to infringe on the interests of minority shareholders. In the process of equity transfer, major shareholders can use the advantage of voting to manipulate the process of equity transfer to smoothly implement the transfer behavior. Thus, the ultimate equity characteristics are measured by the separation degree of two rights.

Although the largest shareholder is motivated to infringe on minority shareholders by taking advantage of the separation of two rights, minority shareholders can also take countermeasures. The second largest shareholder holding more than or equal to 5% is defined as active shareholders who are motivated to supervise the major shareholders, which reflects the checks and balances of minority shareholders. The settings of the other control variables and the dummy variables are shown in Table 1.

3.4. Descriptive statistical analysis

Table 2 shows the descriptive statistics of each indicator. It can be seen from Table 2 that the mean value of the transfer type is 1.84, and the median value is 2. The mean value of whether the transferee is a state-owned enterprise is 0.56, and the median value is 1, indicating that the transferee is mainly a state-owned enterprise.

As indicated, the efficiency of the transferred listed companies is very low, among which the total assets net profit margin is weak (0.05), the return on equity loss (−0.05), and the total assets turnover is less than once a year (0.64). The average income tax rate was 11%, close to the World Bank survey data (11.1%)[1]; the average fiscal gap was 6.13%, indicating a significant tax burden on Chinese enterprises and a high fiscal gap for local governments. The mean value of earnings management is 0.41, and the median value is 0, indicating that the earnings management problem of the transferred company is relatively severe. Capital occupation 1 suggests that other accounts receivable have a high proportion of total assets (mean 9.34, median 2.94). However, capital occupation 2 indicates that the payable is more than receivable (mean 0.41, median-0.34), and the company may have capital turnover difficulties.

The mean value of the separation degree of the two rights is 5.56, and the median is 0. The mean value of the second largest shareholder is 0.42, and the median value is 0, indicating that the majority of the second largest shareholder does not hold more than 5%, so it is not an active shareholder and may have the problem of "one dominant shareholder." The mean value of total assets at the end of the period is 20.96, the minimum value is 16.22, and the maximum value is 25.3, indicating that the distribution of assets is relatively concentrated. The mean value of the marketization level is 7.21, and the fluctuation degree is also large, indicating that the marketization difference level is large.

3.5. Model setting

According to the above analysis, we should verify the relationship between the three modes of M&A and the three motivations of equity transfer. There are $3 \times 3 = 9$ combinations; 9 models must be established for verification, respectively. In addition, each transfer motivation has 3 or 2 or 3 indicators, indicating a complete empirical analysis requires $9 \times 3 \times 2 \times 3 = 162$ times of regression. There are too many empirical results, and this modeling method cuts off the correlation between the three M&A modes. It cannot directly compare the differences between the three M&A modes under the same motivation of equity transfer. Based on this, dichotomous

[1] Global corporate tax rate ranking, guess where China ranks? [EB/OL], http://www.sohu.com/a/209423303_2605122017-12-09.

Table 1
Indicators, codes, and calculation formulas.

Indicator categories	Symbols	Classification indicators	Individual indicators	Individual symbols	Calculation formulas	Refer to literature
Dependent variables	Y	Transfer type		type	It is divided into state-owned enterprise privatization (Category 1), state-owned enterprises acquiring private enterprises (Category 2), and state-owned enterprises acquiring state-owned enterprises (Category 3), Assign values 1, 2, 3 respectively	
		Whether the transferee is a state-owned enterprise		yes	Yes = 1, No = 0	
Independent variables	X_1	View of efficiency	Total assets net profit margin	roa	Net profit/Total assets balance	[31,32]
			Return on equity	roe	Net profit/Shareholders' equity balance	
			Total assets turnover	turn	Operating income/Total assets ending balance	
		Fiscal revenue view	Income tax rate	tax	Income tax expense/Total profit	[33,34]
			Fiscal gap logarithm	lnco	ln fiscal gap = ln (local finance general budget expenditure-local finance general budget expenditure)	
		Embezzlement view	Earnings management	em	Define ROE at (0,1%) or (6%, 7%) as earnings management, assign a value of 1, and otherwise 0	[35–37]
			Capital occupation 1	occ1	Other receivables/Total assets of * 100%	
			Capital occupation 2	occ2	(Accounts receivable + prepayments + other receivables-accounts payables-advance receivables-other payables)/Total assets * 100%	
Control variables	X_2	Equity transfer characteristics	Under the same jurisdiction	prov	According to the "province", "municipality" level judgment, 1 = yes, 0 = no	[38,39]
			Transaction scale	jygm	Total transaction price/Total assets * 100%	
		Equity structure characteristics	The separation degree of two rights	sepr	Proportion of control rights owned by the actual controller - Proportion of cash rights owned by the actual controller	
			Equity checks and balances	seco	Whether the second largest shareholder holds shares greater than or equal to 5%, 1 = yes, 0 = no	
		company size	End-of-term total assets	asset	Take the log number of the total assets	
		Marketization level	mark	Data are from the marketability indexes compiled by Fan Gang and Wang Xiaolu for 1997–2018, and the marketability indexes for 2019–2020 are extrapolated using the geometric mean method		[40]
Dummy variables	D	Area	area	area1 = east, area2 = central, and area2 = west, construct 2 regional dummy variables, taking the east as the benchmark		
		Year	year	Build 7 year dummy variables, based on 2013		

Table 2
Descriptive statistics of key indicators.

Indicators	Variable	N	mean	p50	SD	Min	Max	Skewness	Kurtosis
Transfer type	type	572	1.84	2	0.84	1	3	0.3	1.48
Whether the transferee is a state-owned enterprise	yes	572	0.56	1	0.5	0	1	−0.23	1.05
Total assets net profit margin	roa	572	0.05	0	1.08	−0.07	25.87	23.8	568.36
Return on equity	roe	572	−0.05	0.01	2.43	−51.6	25.87	−14.57	376.99
Total assets turnover	turn	572	0.64	0.48	0.64	0	7.09	3.86	29.11
Income tax rate	tax	572	0.11	0.01	0.36	−3.23	4.17	2.36	65.19
Fiscal gap logarithm	lnco	572	6.13	6.01	0.86	4.25	8.44	0.48	2.88
Earnings management	em	572	0.41	0	0.49	0	1	0.37	1.14
Capital occupation 1	occ1	572	9.34	2.94	28.02	0	314.25	8.94	93.85
Capital occupation 2	occ2	572	0.41	−0.36	48.56	−460.6	348.84	0.49	35.77
Under the same jurisdiction	prov	572	0.43	0	0.5	0	1	0.28	1.08
Transaction scale	jygm	572	17.03	13.9	14.22	0	70	1.28	4.66
The separation degree of two rights	sepr	572	5.56	0	7.75	0	36.75	1.37	4.16
The second largest shareholder	seco	572	0.42	0	0.49	0	1	0.3	1.09
End-of-term total assets	asset	572	20.96	20.87	1.11	16.22	25.3	0.31	4.75
Marketization level	mark	572	7.21	7.32	1.9	0.3	10.54	−0.37	2.6

classification and a multi-classification logistic regression model are adopted.

Set the dependent variable as y. If the value is 1, the event occurs, if the value is 0, the event does not occur, There are n independent variables $x_1, x_2, \cdots x_n$. p represents the probability of an event will occur, $1-p$ represents the probability of an event will not occur. The

logistic regression model of dichotomies is as follows:

$$p = \frac{\exp\left(\beta_0 + \sum_{i=1}^{n} \beta_i x_i\right)}{1 + \exp\left(\beta_0 + \sum_{i=1}^{n} \beta_i x_i\right)} \tag{1}$$

$$1 - p = \frac{1}{1 + \exp\left(\beta_0 + \sum_{i=1}^{n} \beta_i x_i\right)} \tag{2}$$

Formula (1) and Formula (2) can compare with:

$$\frac{p}{1-p} = \exp\left(\beta_0 + \sum_{i=1}^{n} \beta_i x_i\right) \tag{3}$$

When other explanatory variables are held constant, the i^{th} independent variable x_i changes by one unit, if $\beta_i > 0$, the advantage of the dichotomous regression model is that it can directly calculate the event ratio $OR = \frac{p}{1-p} = \exp(\beta_i x_i) > 1$. It indicates that the probability of a numerator event over a denominator event is greater than 1; conversely, it is less than 1.

For example, if the target of the equity transfer is a state-owned enterprise, the value of 1 is for state-owned enterprises, and 0 is for non-state-owned enterprises, and a dichotomous regression model is established as follows:

$$\frac{p}{1-p} = \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta D) \tag{4}$$

In Formula (4), x_1 represents three types of equity transfer motives, x_2 represents various control variables, D represents various dummy variables (See Table 2 for the variable code). If $\beta_1 > 0$, this means that the probability of equity transfer to state-owned enterprises than to private enterprises is greater than 1. On the contrary, if it is less than 1, we can directly compare the probability of various M&A modes under the same equity transfer motivation.

When there are more than two categories of classification, a multivariate logistic regression model is needed, which is a multiple binary logistic regression model to describe the magnitude of the role of each category concerning the reference category. Set the k Category to be the reference category , we can make a regression equation for each of the $k-1$ categories, so there are $k-1$ logistic regression model parameters, and the model is as follows:

$$\ln\left(\frac{p_i}{1-p_k}\right) = \beta_0 + \sum_{i=1}^{n} \beta_i x_i \tag{5}$$

For example, based on the privatization of state-owned enterprises (Category 1), $\frac{p_i}{1-p_1} = \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta D)$, $i = 2$ represents the categorical regression results of state-owned enterprises merging private enterprises (type = 2), $i = 3$ represents the categorical regression results of state-owned enterprises merging with state-owned enterprises (type = 3).

If $i = 2$, the coefficient calculated by categorical regression $\beta_1 > 0$, indicates that under the same conditions, the probability of equity transfer is higher than that of state-owned enterprises merging with private enterprises (type = 2). Conversely, the probability of equity transfer is lower than that of privatization of state-owned enterprises (Category 1). In this way, we can directly compare the

Table 3
Multi-classification regression results of ex-ante equity transfer motives.

Column number	(1)	(2)	(3))	(4)	(5)	(6)	(7)	(9)
	type = 2							
Transfer motive	roa	roe	Turn	tax	lnco	Em	occ1	occ2
	−2.099	−0.419	−0.221	0.808*	−0.0927	0.146	−0.00581	−0.00259
	(-0.33)	(-1.27)	(-1.16)	(1.98)	(-0.48)	(0.61)	(-0.69)	(-0.80)
_cons	−13.4***	−13.7***	−13.4***	−12.7***	−13.2***	−13.2***	−12.6***	−13.4***
	(-4.76)	(-4.99)	(-4.93)	(-4.59)	(-4.65)	(-4.83)	(-4.37)	(-4.84)
	type = 3							
Transfer motive	roa	roe	Turn	tax	lnco	Em	occ1	occ2
	−15.71*	−0.883**	0.0239	0.0306	0.239	−0.0711	−0.00293	−0.007*
	(-2.23)	(-2.64)	(0.15)	(0.08)	(1.32)	(-0.29)	(-0.34)	(-2.24)
_cons	−12.9***	−12.2***	−11.2***	−11.1***	−12.3***	−11.2***	−10.8***	−11.9***
	(-4.74)	(-4.66)	(-4.39)	(-4.31)	(-4.51)	(-4.38)	(-4.14)	(-4.59)
pseudo R-sq	0.186	0.193	0.183	0.185	0.184	0.182	0.182	0.186
ll	−499.4	−495	−501.2	−500.2	−500.5	−501.7	−501.8	−499.3
chi2	228.6	237.4	224.9	226.8	226.2	223.8	223.7	228.8

Note: Table 3, Table 4, Table 6, and Table 7 () represent the z-statistic; *p < 0.05, * *p < 0.01, * * *p < 0.001, this is the full-text expression. In order to save the length of the paper, the regression results of control variables in Table 3, Table 4, Table 6, and Table 7 have been deleted. The complete table can be obtained from the author.

differences in the probability of various types of M&An under different motivations. Therefore, this paper adopts the categorical regression model for empirical analysis.

4. Empirical analysis

The following is an analysis of both ex-ante and ex-post equity transfer motives.

4.1. Analysis of motives for ex-ante equity transfer

4.1.1. Multi-classification regression of ex-ante equity transfer motives

Taking the privatization of state-owned enterprises (Category 1) as the benchmark, a multi-classification regression approach is used to empirically validate the motives for ex-ante equity transfer. In Table 3, columns (1)–(3) test the view of efficiency, columns (4)–(5) test the fiscal revenue view, and columns (6)–(8) test the embezzlement view.

Table 3 shows that in the column of transfer motives, only the tax coefficient of column (4) in type = 2 passed the significance test, and the coefficient is 0.808, indicating that with the increase of tax, the probability of Category 1 being transferred to Category 2 is increasing (OR = EXP (0.808) = 2.243. This further indicates that the probability of equity transfer in Category 2 is 2.243 times than that of equity transfer in Category 1), that is, the higher the income tax rate is, the more likely state-owned enterprises will acquire private enterprises, the motivation is "fiscal revenue view," which conforms to hypothesis 2. However, the coefficients in the transfer motives column in the other columns did not pass the significance test, indicating that hypotheses 1 and 3 were not verified.

In the transfer motives column, in type = 3, the coefficients of ROA in column (1) and ROE in column (2) passed the significance test, and the coefficients were −15.71 and −0.883, respectively. EXP (−15.71) = 0 and EXP (-0.883) = 0.414; that is, the probability of equity transfer to Category 3 is 0 and 0.414 times the probability of equity transfer to Category 1, which means that the probability of transferring Category 3 to Category 1 is decreasing. In other words, the higher the efficiency is, the more likely privatization of state-owned enterprises (Category 1) event will occur. This implies that the state-owned enterprises are privatized by efficient state-owned enterprises rather than inefficient ones, opposing hypothesis H1 but consistent with the phenomenon of "pretty girl marries first." The occ2 of column (8) passed the significance test, and the coefficient was −0.00676, corresponding OR value = EXP (−0.00676) = 0.993, indicating that the probability of equity transfer to Category 3 is 0.993 times more likely than the probability of equity transfer to Category 1, that is, the more severe occ2 is, the more likely privatization of state-owned enterprises (Category 1) event will occur, which conforms to hypothesis H3. In addition, the coefficients in the transfer motives column in the other columns did not pass the significance test, indicating that hypothesis H2 was not verified either.

4.1.2. Dichotomous regression of ex-ante equity transfer motives

Taking the transferee as a state-owned enterprise as the benchmark, logistics dichotomy was used for the empirical analysis, and the results are shown in Table 4. In Table 4, columns (1)–(3) test the view of efficiency, columns (4)–(5) test the fiscal revenue view, and columns (6)–(8) test the embezzlement view.

Because among the transfer motives, only the ROE of column (2) passed the significance test with a coefficient of 0.798, corresponding OR = exp (0.798) = 2.22, indicating that the higher the ROE efficiency, the probability of being transferred to a private enterprise is 2.22 times higher than the probability of being transferred to a state-owned enterprise. This further indicates that state-owned enterprises with good efficiency have more potential to be privatized than those with low efficiency. It is consistent with the phenomenon of "pretty girl marries first," which is the same as the results in Table 3. However, contrary to hypothesis H1, hypotheses H2 and H3 are not verified.

In conclusion, the empirical analysis of ex-ante equity transfer motives found that the more efficient the state-owned enterprises are, the more likely they are to be privatized, which aligns with the "beautiful women marry first" phenomenon. However, it is contrary to hypothesis H1, which is related to the transfer of benefits from internal controllers of state-owned enterprises to private companies. As the findings indicate, the more serious the encroachment, the more likely privatization of state-owned enterprises (Category 1) will occur, which is consistent with hypothesis H3. Therefore, we can conclude that the privatization of state-owned enterprises is motivated by the "embezzlement view." It was further revealed that the higher the income tax rate is, state-owned enterprises are more likely to merge with private enterprises (Category 2), which conforms to the "fiscal revenue view" of hypothesis H2.

Table 4
Dichotomous regression results of ex-ante equity transfer motives.

Column number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Transfer motive	roa	roe	Turn	tax	lnco	em	occ1	occ2
	8.239	0.798**	0.0761	0.345	0.111	0.0644	−0.0047	−0.0050
	(1.4)	(2.9)	(0.5)	(1.12)	(0.71)	(0.32)	(-0.71)	(-1.9)
_cons	−12.2***	−12.3***	−11.4***	−11.0***	−12.0***	−11.4***	−10.9***	−11.7***
	(-5.29)	(-5.4)	(-5.13)	(-4.93)	(-5.05)	(-5.11)	(-4.75)	(-5.17)
pseudo	0.167	0.186	0.164	0.165	0.165	0.164	0.165	0.169
ll	−327.1	−319.8	−328.2	−327.7	−328.1	−328.3	−328	−326.2
chi2	131.1	145.7	129	130	129.2	128.8	129.3	132.9

4.2. An empirical analysis of motives for ex-post equity transfer

This paper uses the same panel data to calculate various ex-post indicators of transfer motives to verify the effect of mixed-ownership enterprises after equity transfer. The indicators, calculation formula, and statistics are shown in Table 5.

Table 5 shows that the mean value of each indicator of "view of efficiency" is positive, among which droa3 is 1.14 and droa2 is 1.14 and passed the Chi-squared test. Further, droe3 equals 2.58, and droe2 is 2.48 and passed Chi-squared test. However, dturn3 equals 1.55, and dturn2 is 0.97, neither of which passed the Chi-squared test. However, the mean value of these indicators is all greater than 0, indicating that financial performances are improving no matter which kind of transfer type after the equity transfer. Moreover, it was revealed that the ROA and ROE are significantly improved. Thus, it can be inferred that equity transfer improves enterprise efficiency, which may conform to hypothesis H1 about "View of efficiency."

Table 5 shows that dtax3 in "fiscal revenue view" is 1.59 and has passed the Chi-squared test., However, dtax2 is 0.8 and has not passed the Chi-squared test. Further, dlnco3 equals −1.21 and has also failed the Chi-squared test. On the contrary, dlnco2 is-0.82 and has passed the Chi-squared test. This indicates that the income tax rate is increasing and the log of fiscal gap is decreasing, so it can be inferred that the purpose of equity transfer is to increase tax revenue and reduce the fiscal gap, which may be consistent with hypothesis H2 of "Fiscal revenue view." The categorical regression is carried out below.

4.2.1. Multi-classification regression of motives for ex-post equity transfer

Taking the privatization of state-owned enterprises (Category 1) as the benchmark, the multi-classification regression method is adopted to demonstrate the efficiency changes after the mixed-ownership enterprise equity transfer. The results are shown in Table 6. In Table (6), columns (1)–(6) test the view of efficiency, and columns (7)–(10) test the fiscal revenue view.

Considering the type = 2, the droe3, droe2, dturn3, and dturn2 coefficients in the efficiency change column (3)–(6) are significantly positive and are 0.45, 0.87, 0.175, and 0.30, respectively. Further, the corresponding OR values are 1.57, 2.39, 1.19, and 1.35, respectively, indicating that the larger the droe3, droe2, dturn3, and dturn2, the higher the probability of state-owned enterprises merging with private enterprises (Category 2). In other words, the better the predicted future efficiency of enterprises, the more likely that state-owned enterprises merge with private enterprises will occur, which is consistent with the "view of efficiency" of hypothesis H1. None of the coefficients of the other indicators in the efficiency change column pass the significance test, and thus the fiscal revenue view is not verified.

Considering the type = 3, the coefficients of droe3 in column (3) and droe2 in column (4) of the efficiency change column are significantly positive and are 0.41 and 0.81, respectively. Further, the corresponding OR values are 1.51 and 2.25, indicating that higher droe3 and droe2 raise the probability of state-owned enterprises merging with state-owned enterprises (Category 3). In other words, the higher the predicted future efficiency of enterprises, the more likely the event of state-owned enterprises merging with state-owned enterprises will occur, confirming H1's "view of efficiency." The coefficients of the other indicators in the efficiency change column fail the significance test, and thus the fiscal revenue view is not verified.

4.2.2. Dichotomous regression of motives for ex-post equity transfer

Taking the transferee as a state-owned enterprise, Table 7 reports the dichotomous regression results for different transferees. In Table 7, columns (1)–(6) test the view of efficiency, and columns (7)–(10) test the fiscal revenue view.

Table 5
Ex-post transfer motives indicators and descriptive statistics.

	indicator	calculation formula	symbol	mean	sd	Skewness	kurtosis	Chisq
View of efficiency	Changes in ROA	∑3 years after transfer roa-∑3 years before transfer roa	droa3	1.14	27.22	23.75	566.57	12.338***
		∑2 years after transfer roa-∑2 years before transfer roa	droa2	1.14	27.14	23.79	567.94	6.749**
	Changes in ROE	∑3 years after transfer roe-∑3 years before transfer roe	droe3	2.58	25.92	−11.26	266.24	6.074***
		∑2 years after transfer roe-∑2 years before transfer roe	droe2	2.48	25.9	−12.62	316.76	14.32***
	Changes in total asset turnover	∑3 years after transfer turn-∑3 years before transfer turn	dturn3	1.55	10.77	−1.87	34.4	0.79
		∑2 years after transfer turn-∑2 years before transfer turn	dturn2	0.97	5.69	−3.08	36.78	1.029
Fiscal revenue view	Changes in the income tax rate	∑3 years after transfer tax-∑3 years before transfer tax	dtax3	1.59	12.93	−8.46	157.51	0.045*
		∑2 years after transfer tax-∑2 years before transfer tax	dtax2	0.8	6.23	−2.18	31.34	0.45
	Changes in fiscal gap	∑3 years after transfer lnco-∑3 years before transfer lnco	dlnco3	−1.21	14.79	4.4	45.52	3.47
		∑2 years after transfer lnco-∑2 years before transfer lnco	dlnco2	−0.82	14.21	10.47	165.27	6.302**

Note: Considering the difficulty of measuring the "embezzlement view" indicators, the changes in performance before and after em, occ1, and occ2 are not considered here.

Table 6
Multicategorical regression results for the efficiency changes of different equity transfer types.

Column number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	type = 2									
indicator	droa3	droa2	droe3	droe2	dturn3	dturn2	dtax3	dtax2	dlnco3	dlnco2
Efficiency change	0.24	0.27	0.45**	0.87**	0.175*	0.30*	0.06	0.18	−0.01	0.02
	(1.20)	(1.00)	(2.90)	(3.20)	(2.00)	(2.20)	(0.90)	(1.20)	(-1.00)	(0.80)
cons	−15***	−15***	−15***	−15***	−13***	−13***	−13***	−13***	−13***	−14***
	(-5.23)	(-5.24)	(-5.29)	(-5.35)	(-4.89)	(-4.91)	(-4.89)	(-4.88)	(-4.77)	(-4.92)
	type = 3									
metric	droa3	droa2	droe3	droe2	dturn3	dturn2	dtax3	dtax2	dlnco3	dlnco2
Efficiency change	−0.86	−2.17	0.41**	0.81**	0.11	0.20	0.07	0.15	−0.01	0.04
	(-0.47)	(-0.74)	(2.80)	(3.10)	(1.50)	(1.70)	(1.10)	(1.10)	(-0.93)	(1.60)
cons	−12***	−12***	−13***	−13***	−12***	−12***	−11***	−11***	−11***	−12***
	(-4.42)	(-4.41)	(-4.73)	(-4.82)	(-4.48)	(-4.49)	(-4.41)	(-4.40)	(-4.37)	(-4.55)
pseudo R-sq	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ll	−499.0	−498.70	−493.70	−489.80	−499.50	−498.70	−501.50	−501.20	−501.30	−500.20
chi2	229.20	229.90	239.90	247.70	228.40	229.90	224.40	224.90	224.70	226.80

As indicated, the coefficients of droe3, droe2, dturn3, and dturn2 in the efficiency change column (3)–(6) are significantly negative and are −0.48, −0.91, −0.13, and −0.25, respectively. The corresponding OR values are 0.62, 0.40, 0.88, and 0.78, indicating that the higher the coefficients of droe3, droe2, dturn3, and dturn2, the lower the probability of transferring equity to private enterprises. In other words, it implies that the better the predicted future efficiency of the enterprise, the easier it is to transfer equity to the state-owned enterprise, which aligns with H1's "view of efficiency." However, none of the coefficients of the other indicators in the efficiency change column passed the significance test, and thus the fiscal revenue view was not verified.

In addition, concerning the control variables, as shown in Table 3, Table 4, Table 6, and Table 7, the coefficients under the same jurisdiction (prov) and enterprise size (asset) are significantly positive. Further, the OR value is greater than 1, indicating that the higher the same jurisdiction and enterprise size, the higher the probability of the transfer into Category 2 and Category 3. In other words, it implies that the higher the probability of the transferee being a state-owned enterprise with the same jurisdiction, the local governments may have considered the scale effect of state-owned enterprises for M&A [41,42]. This is because after the Third Plenary Session of the 18th Central Committee, "bigger, stronger and better" has become the goal of state-owned enterprises reform. M&A and restructuring among enterprises are the most effective means to quickly enlarge the scale of state-owned enterprises.

In Tables 3 and 6, for type = 3, the coefficient of transaction size (jygm) passed the significance test and was positive, indicating a significant increase in the probability of state-owned enterprises when merging with state-owned enterprises (Category 3). This is because under the current severe anti-corruption situation and the lifelong accountability system for project responsibilities, in order to avoid the crime of loss of state-owned assets, it is vital to preserve the value of state-owned enterprise assets. The findings further indicate that the greater the share of state-owned equity transfer transactions, the safer the "meat rots in the pot" type of transfer to state-owned enterprises, so the probability of Category 3 was improved. Concerning the coefficients of the separation degree of two rights (sepr), the second largest shareholder is identified as an active shareholder (seco). The marketization index (mark) is negative, indicating that the OR values are less than 1, significantly reducing the probability of Category 2 and Category 3 transfers. The findings are consistent with the Third Plenary Session of the 18th CPC Central Committee, where it was highlighted that under the centralized ownership structure and the active supervision of the second largest shareholder, the market prioritized transferring equity to private enterprises in resource allocation.

In summary, the ex-ante analysis reveals that the higher the income tax rate is, the more likely it is for state-owned enterprises to merge with private enterprises (Category 2), consistent with the "fiscal revenue view" of hypothesis H2. The higher the efficiency, the more serious the encroachment and the more likely the privatization of state-owned enterprises (Category 1), which is the opposite of hypothesis H1. However, it is consistent with the "pretty girl marries first" phenomenon and the "embezzlement view" of hypothesis H3 [43,44]. Post-analysis found that if the efficiency of enterprises is getting better after the transfer of control, the events of privatization of state-owned enterprises (Category 1), state-owned enterprises merging enterprises (Category 2), state-owned enterprises merging with state-owned enterprises (Category 3) and transfer to state-owned enterprises are more likely to occur, which conforms to

Table 7
Results of dichotomy regression on efficiency changes of different recipients.

Column number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	droa3	droa2	droe3	droe2	dturn3	dturn2	dtax3	dtax2	dlnco3	dlnco2
Efficiency change	−0.18	−0.20	−0.48***	−0.91***	−0.13*	−0.25*	0.06	0.15	−0.01	0.03
	(-1.09)	(-0.97)	(-3.37)	(-3.51)	(-2.14)	(-2.40)	(1.10)	(1.19)	(-1.80)	(1.37)
cons	−12.2***	−12.2***	−12.9***	−13.2***	−11.6***	−11.7***	−11.5***	−11.5***	−11.3***	−11.8***
	(-5.34)	(-5.35)	(-5.56)	(-5.65)	(-5.24)	(-5.26)	(-5.15)	(-5.14)	(-5.08)	(-5.27)
pseudo R-sq	0.17	0.17	0.19	0.20	0.17	0.17	0.17	0.17	0.17	0.17
ll	−326.60	−326.50	−317.80	−313.60	−325.90	−325.10	−327.80	−327.60	−326.60	−326.80
chi2	132.20	132.40	149.80	158.10	133.50	135.10	129.80	130.20	132.10	131.70

the “view of efficiency” of hypothesis H1.

4.3. Robustness test

In the model testing, the authors take full account of robustness issues, and the main approach is to choose different indicators to measure the control transfer motive.

For example, the view of efficiency selects three indicators: ROA, ROE, and total assets turnover; the embezzlement view chooses three indicators to portray earnings management, capital occupation 1 and capital occupation 2, etc. The aim is to use different indicators to describe the three types of equity transfer motives comprehensively, avoid omissions, and maintain the conclusions' robustness. In addition, based on the three classifications of types of equity transfers, a dichotomous classification was made again to ensure the robustness of the results. The trichotomous and dichotomous regression results are relatively close, indicating consistent conclusions. In addition, the authors then used ANOVA to test the robustness of the results, that is, to evaluate whether the mean differences between the three equity transfer types are significant, and the results are shown in Table 8. Skewness and Kurtosis values are equal to 0 in Table 8, indicating that the indicator follows the normal distribution. However, the calculated results of each indicator are not all close to 0, indicating that some indicators do not follow the normal distribution, and the non-parametric test method must be used to test their mean values. However, if the indicators follow the normal distribution, the parametric testing should be adopted for mean tests. In order to facilitate the analysis, the results of the parametric testing (F) and non-parametric testings (Rank Sum) should be reported at the same time.

It can be seen from Table 8 that in the view of efficiency, the p-values of ROA and ROE are 0.001 and 0.001, respectively, less than 0.05, indicating that there are significant differences in ROA and ROE of these three types of equity transfer. Concerning the ROA value, the mean value of privatization of state-owned enterprises is 0.06, the mean value of state-owned enterprises merging private enterprises is 0.04, and the mean value of state-owned enterprises merging state-owned enterprises is 0.05. This indicates that the ROA value of privatization of state-owned enterprises is the highest, and the reason for equity transfer of privatization of state-owned enterprises conforms to the phenomenon of “pretty girl marries first.” Concerning the mean values of ROE, privatization of state-owned enterprises is the highest (0.17), followed by state-owned enterprises merging with state-owned enterprises (0.01), and the worst is state-owned enterprises merging with private enterprises (−0.26). This not only proves once again that the reason for the privatization of state-owned enterprises is the “pretty girl marries first,” phenomenon. It also proves that when state-owned enterprises merge with private enterprises with poor performance, their performance will decrease. If the significance level is 0.10, that is, under 90% reliability ， there is also a significant difference in turn because of efficiency (see Rank Sum, p-value is 0.07), and the mean value of privatization of state-owned enterprises is 0.77, the highest, followed by the mean value of state-owned enterprises merging with state-owned enterprises (0.7). The lowest is the mean value of state-owned enterprises merging with private enterprises (0.6). These findings once again prove that state-owned enterprises with high efficiency are privatized, and private enterprises with low efficiency

Table 8
ANOVA tests focused on various motives behind the three types of equity transfer.

variable	Transfer type	mean	p50	Sd	skewness	kurtosis	N	Rank Sum	F
roa	1	0.06	0	0.01	−0.25	2.5	253	9.05	8.5
	2	0.04	0	0.01	−0.18	2.09	155	(0.001)	(0.001)
	3	0.05	0	0.01	−0.5	2.26	164		
roe	1	0.17	0.01	0.03	−0.43	3.15	253	8.72	9.39
	2	−0.26	0.01	0.03	−0.55	2.62	155	(0.001)	(0.001)
	3	0.01	0.02	0.03	−1	3.82	164		
turn	1	0.77	0.48	0.58	3.8	28.34	253	5.31	0.27
	2	0.6	0.45	1.93	16.2	293.74	155	(0.07)	(0.7657)
	3	0.7	0.68	0.5	2	6.32	164		
tax	1	0.1	0	0.3	−3.9	41.5	253	6.89	4.09
	2	0.12	0.1	0.4	−3.8	47.6	155	(0.03)	(0.0172)
	3	0.13	0	0.5	6.7	56.5	164		
lnco	1	6.43	5.99	0.62	0.24	2.19	253	21.09	13.03
	2	6.22	6.13	0.77	0.14	1.98	155	(0)	(0)
	3	5.84	5.92	0.49	0.11	2.14	164		
em	1	0.45	0	0.5	0.2	1.04	253	4.989	2.51
	2	0.4	0	0.49	0.41	1.17	155	(0.0825)	(0.0824)
	3	0.33	0	0.41	1.5	3.25	164		
occ1	1	9.59	2.85	6.05	1.14	2.86	253	5.284	7.73
	2	9.25	3.17	5.98	0.97	2.58	155	(0.001)	(0.001)
	3	8.1	2.25	4.37	1.43	4.07	164		
occ2	1	0.51	−0.61	19.52	−0.17	2.33	253	6.092	7.01
	2	0.32	−0.58	20.76	−0.14	1.97	155	(0.001)	(0.001)
	3	0.18	0.66	13.6	0.4	2.2	164		

Note: The first row of Rank Sum and F in Table 8 is the value of the statistics, and the second row in parentheses is the probability value p. According to the p-value judgment criterion of the hypothesis testing, at the level of significance of α ， if p-value is less than α, it shows that there is a significant difference in the mean values; otherwise, there is no difference in the mean values.

are merged with state-owned enterprises with good performance, which is consistent with the previous empirical results.

In the fiscal revenue view, the p-values of tax and lnco in Table 8 are 0.03 and 0, both less than 0.05, indicating a significant difference. The comparison of the mean values of tax, from high to low: state-owned enterprises merging with state-owned enterprises (0.13), state-owned enterprises merging with private enterprises (0.12), and privatization of state-owned enterprises (0.1), indicates that state-owned enterprises tend to keep the high-tax state-owned enterprises and transfer out the state-owned enterprises with low tax revenue. As indicated, the mean values of lnco are also in descending order: privatization of state-owned enterprises (6.43), state-owned enterprises merging with private enterprises (6.22), and state-owned enterprises merging with state-owned enterprises (5.84). These values imply that the larger the local fiscal gap, the more likely it is to transfer state-owned enterprises to private enterprises, which is basically consistent with the above analysis.

In Table 8, the p-values of occ1 and occ2 in the embezzlement view are less than 0.05, indicating that occ1 and occ2 of these three types of control rights transfer have significant differences. Further, the findings reveal that the highest mean of the indicators corresponds to the privatization of state-owned enterprises (9.59 and 0.51). In contrast, state-owned enterprises merging with state-owned enterprises have the smallest mean of the corresponding indicators (8.1 and 0.18). In other words, these findings imply that the more severe the encroachment of majority shareholders on the interests of small and medium-sized shareholders within state-owned enterprises, the easier it is to cede state-owned control, which is consistent with the previous empirical results. In conclusion, the findings of ANOVA tests are consistent with the previous categorical regression results, so the robustness of the model is confirmed.

5. Results and discussion

It can be seen from the ex-ante analysis that the highly efficient mixed-ownership enterprises transferred their state-owned equity to private enterprises, while the less efficient private enterprises transferred their equity to state-owned enterprises. However, from the ex-post analysis, it was revealed that no matter which transfers to whom, it significantly improved the efficiency of the enterprise. It also suggests that when the enterprise's future efficiency is improving, the more likely it is for state-owned enterprises to merge with private enterprises (Category 2), state-owned enterprises to merge with state-owned enterprises (Category 3), or to transfer to state-owned enterprises. This indicates that the efficiency of inefficient private enterprises is improved after the equity transfer to state-owned enterprises. Isn't this exactly the optimal allocation of resources in the market economy that we expect? Why is there so much criticism in society or the media about state-owned enterprises merging with private enterprises, and why do they regard them as a flood and even cause private entrepreneurs to worry about "the state advancing and the people retreating" and "being squeezed out of living space?"

The following section presents a further analysis to justify the reasons for the efficiency of equity transfer in mixed-ownership enterprises. Because there are three types of transfers in mixed-ownership enterprises: privatization of state-owned enterprises (Category 1), state-owned enterprises merging with private enterprises (Category 2), and state-owned enterprises merging with state-owned enterprises (Category 3), findings reveal that Category 1 and 3 are more appealing to the public. However, Category 2 is considered controversial, which is considered to be a kind of squeeze on the living space of private enterprises and a retrogression of the market economy. Therefore, the following section focuses on the mechanism and reasons for the efficiency improvement in state-owned enterprises when merging with private enterprises (Category 2) and briefly analyzes the causes of efficiency improvement for categories 1 and 3.

5.1. Further analysis of reasons for improving the efficiency of state-owned enterprises when merging with private enterprises

5.1.1. Mechanism analysis of state-owned enterprises when merging with private enterprises

The goal of mixed-ownership reform is to realize the effective integration of state-owned capital and non-state-owned capital. This paper empirically finds that the efficiency of private enterprises with low efficiency is improved after being acquired by state-owned enterprises, indicating that the optimal allocation of resources is realized, and the mechanism establishes the symbiotic relationship between heterogeneous shareholders. This paper suggests that the resource-based theory can explain the symbiotic relationship among heterogeneous shareholders. The resource-based theory holds that different enterprises have different tangible and intangible resources, which constitute the unique competitive advantage of enterprises. After the M&An of private enterprises, state-owned enterprises will surely bring new shareholder resources, introducing new financial and non-financial resources (i.e., new social capital, human capital, technical resources, and many more).

In China's mixed-ownership enterprises, the driving path of their symbiotic development is that private enterprises are forced to mix with state-owned shareholders after they fall into development difficulties. After the world financial crisis in 2008, Chinese enterprises faced international and domestic pressure for their development, especially private enterprises with small scale and lower ability to resist risks, urgently need to increase foreign aid to fight risks jointly. The investigation found that the private enterprises acquired by state-owned capital face the direct risk of equity pledge and forced stock liquidation, and have deep hidden dangers such as insolvency and overdue bank loans [45,46]. After private enterprises join the state-owned platform, they can make use of the capital and technology advantages of state-owned enterprises and then take advantage of their management flexibility, which can not only relieve their debt pressure and solve the risk of equity pledge but also enable private enterprises to replenish capital, expand and reproduce, and continue to operate. Therefore, state-owned enterprises have established symbiotic development relationships after merging with private enterprises [47].

5.1.2. Analysis of the reasons for the efficiency improvement of state-owned enterprises when merging with private enterprises

First, from the perspective of M&A motivation, state-owned enterprises merging with private enterprises is a rational choice.

Table 3 shows that the motivation of state-owned enterprises when merging with private enterprises (Category 2) is the "fiscal revenue view," that is, the higher the income tax rate (tax), the more likely it is to happen that state-owned enterprises merge with private enterprises. Table 6 shows that the higher the predicted future efficiency of the enterprises (coefficients of droe3, droe2, dturn3, and dturn2 are significantly positive), the more likely the occurrence of state-owned enterprises merging with private enterprises (Category 2) will take place, which aligns with the "view of efficiency.", The analysis of the impact of income tax rate and efficiency changes on when state-owned enterprises merging with private enterprises is shown in Table 9.

From the results of the Chi-squared test in Table 9, at a 95% confidence level, tax, droe3, droe2, dturn3, and dturn2 are significantly different, and the mean values show that the indicators of state-owned enterprises merging with private enterprises (Category 2) are: 0.1, 0.2, 0.2, 0.3, 0.2, which are the highest among the three categories. The indicators for the privatization of state-owned enterprises (Category 1) are the lowest: 0.1, −0.5, −0.4, 0.1, and 0, and state-owned enterprises merging state-owned enterprises (Category 3) are in the middle. These values confirm the conclusions presented in Tables 3 and 6, that is, the enterprises with high-income tax rates and good future efficiency potentials are more likely to go for state-owned enterprises merging with private enterprises, which conforms to H2's "fiscal revenue view" and H1's "view of efficiency". This is because, after the world financial crisis in 2008, China's economic growth also faced downward pressure. This is still there with the recent COVID-19 outbreak, inverse globalization and populism, and the frequent changes in trade frictions from time to time. Therefore, to tolerate these rapid environmental changes, the Chinese government's new development strategy of "three deleveraging, one reduction, and one subsidy" focuses on strict implementation of environmental supervision. Due to this, many enterprises are facing great difficulties in their development. And, of course, both state-owned enterprises and private enterprises cannot escape the pain of transition from high-speed growth to high-quality development. Private enterprises taken over by the state-owned capital have to face many problems [48].

Equity pledge is faced with store-bursting, insolvency, and even the deep-hidden trouble of dragging down banks' joint and several liabilities. After private enterprises join the state-owned assets platform, they can relieve their debt pressure and resolve the risk of equity pledges. Further, such initiatives enable private enterprises to replenish funds, expand reproduction and continue to operate. State-owned enterprises merging with private enterprises can also avoid social unrest and the unemployment of workers, and social stability problems caused by the bankruptcy of private enterprises. Therefore, the acquisition of private enterprises by state-owned enterprises is rational and does not engage in space crowding of private enterprises. However, state-owned enterprises should not just "pickle it up in the basket is vegetables." They need to select private enterprises with higher tax revenue and better integration efficiency for merging in the future, which will help increase local financial revenue and contribute to the long-term development of enterprises after integration, thus realizing the optimal allocation of resources.

Second, from the perspective of heterogeneous shareholder symbiosis, M&A reduce the encroachment of major shareholders' interests.

In the pyramid equity structure, the major shareholders gain a greater corporate control right with less cash flow rights and realize the separation of the two rights. After state-owned enterprises merge with private enterprises, if the control right of the ultimate shareholder changes, the separation of the control right and the cash flow right will be reduced, and the encroachment of the interests of major shareholders will be reduced. The type = 2, as defined in this paper, is an enterprise with a change of control, which will reduce the interest encroachment behavior of major shareholders. We defined kz = 0 if the separation degree of the two rights is lower than the median and kz = 1 if the separation degree of the two rights is higher than the median. Then, considering the case of type = 2, we tested the relationship between the separation degree of the two rights and the "embezzlement view," as shown in Table 10.

Table 10 shows that, except for no significant difference in the chi-square test of em, the groups occ1 (8.6) and occ2 (3.7) with high separation degree of the two rights (kz = 1) are significantly larger than the groups occ1 (5.8) and occ2 (−0.7) with low separation degree of the two rights, so after state-owned enterprises merging with private enterprises, it will directly reduce the separation degree of two rights of control and cash flow rights, thus reducing the encroachment of interests of major shareholders, which also indicates

Table 9
Comparison of income tax rate and efficiency changes among different transfer types.

Transfer type	Variable	sample	mean	median	standard error	minimum	Maximum	skewness	kurtosis	chi-square
1	Tax	253	0.1	0	0.3	−2.5	0.9	−3.9	41.5	7.387**
2	Tax	155	0.1	0.1	0.4	−3.2	2.1	−3.8	47.6	
3	Tax	164	0.1	0	0.5	−1.1	4.2	6.7	56.5	
1	droe_3	253	−0.5	0	3.4	−50.2	4.5	−12.3	176	12.338***
2	droe_3	155	0.2	0	2.2	−6.7	25.9	10.5	127.7	
3	droe_3	164	0.1	0	0.6	−2.6	3.1	2	17.7	
1	droe_2	253	−0.4	0	3.3	−50.2	4.6	−13.8	208.6	6.75**
2	droe_2	155	0.2	0	2.1	−0.4	25.9	12	148.2	
3	droe_2	164	0.1	0	0.5	−2.3	3.1	3.1	23.5	
1	dturn_3	253	0.1	0.1	2	−11.9	10.8	−2.4	27.7	6.075**
2	dturn_3	155	0.3	0.1	0.9	−1	6.6	3.3	19.2	
3	dturn_3	164	0.2	0.1	1.3	−5.3	6.6	1.1	12.3	
1	dturn_2	253	0	0	1.2	−7.8	5.7	−3.5	29.6	14.32***
2	dturn_2	155	0.2	0.1	0.6	−1	3.5	2.6	13.9	
3	dturn_2	164	0.1	0.1	0.8	−4.3	3.7	0.4	13.5	

the establishment of a symbiotic development relationship between heterogeneous shareholders, resulting in the phenomenon of improved efficiency after state-owned enterprises merging with private enterprises, thus increasing the efficiency of resource allocation [49,50].

5.2. Further analysis of the efficiency improvement of the privatization of state-owned enterprises

The essence of the privatization of state-owned enterprises is the government will control the surplus claims of state-owned enterprises transferred to the private business owners. The characteristics of such equity transfer conform to the "pretty girl marries first" phenomenon. That is, the government transferred high quality state-owned enterprises to private enterprises on a priority basis. The ex-post feature further claims that the private business owner taking over the business for production and management does improve the enterprise's efficiency [51].

First, the state-owned enterprises taken over by private enterprises are of good quality. According to the previous analysis, the "pretty girl marries first" phenomenon shows that private enterprises take over the more efficient state-owned enterprises. It is also easy to understand that the private business owner, as a rational economic man, is impossible to be a savior to take over the mess of state-owned enterprises. Instead, he will only look at state-owned enterprises that have profitability advantages in the future, their market, or their technology. For example, Gree Electric itself, being a leading player in the home appliance industry, Zhuhai SASAC decided to cede 15% of the equity for mixed-ownership reform, attracting the coveted Hillhouse capital and Hopu investment. Finally, the Zhuhai government transferred 15% of the equity to Zhuhai Mingjun (December 13, 2019), making it realized that a pretty girl getting married would only trigger a rush of marriages from all sides.

Second, private enterprises have the incentive to manage their businesses well. Because after the privatization of state-owned enterprises, private business owners become actual controllers, and there is neither the vacancy of state-owned shares nor the first kind of principal-agent problem. Therefore, for any raw material purchase and project investment, the private enterprise owner's money will be used, and thus he is motivated to run the enterprise well.

Third, there is a consensus that private enterprises have more flexible management mechanisms and can better adapt to the fierce competition in the market economy. The points mentioned above are the main reasons for the increased efficiency of state-owned enterprises after the privatization [52,53].

5.3. Further analysis of efficiency improvement of state-owned enterprises merging with state-owned enterprises

The reasons for the efficiency improvement of state-owned enterprises merging with state-owned enterprises should be analyzed under the background of China's state-owned enterprise reform. At the Third Plenary Session of the 18th CPC Central Committee, it was proposed to actively develop the mixed-ownership economy. One of the reform goals of SASAC is to increase the proportion of asset securitization of central enterprises. The second is to vigorously promote the M&An of central enterprises, and reduce the number of central enterprises to less than 100. M&An of central enterprises can be done mainly in the following ways.

1. *Horizontal reorganization:* It is suitable for merging with a central enterprise with serious product homogeneities, such as the merger of Baowu, the merger of the North and South Ship, and other "strong combinations." After the merger of CSR and CNR to form CRRC, it became the No.1 in the world's rail transportation industry. Or else, it is good to g for "strong and weak reorganization," such as the merger of China Putian and CETC, to avoid vicious competition among enterprises in the same industry. Such an initiative will directly expand the scale of enterprises through M&A and improve the international competitiveness of the central enterprise.
2. *Vertical reorganization:* It focuses on integrating the central enterprise with the companies in the upstream and downstream of the industrial chain, such as the coal and power integration reorganization of China Shenhua and China Guodian. CGRC reorganized CNCRC to become the world's largest agricultural reserve group. This vertical reorganization is conducive to transforming and upgrading the industrial chain and realizing synergistic effects.
3. *Specialized reorganization:* The three telecom operators have built their communication towers in various places, causing severe, repeated investment. China Tower has integrated the towers of the three telecom operators, reduced the repeated construction of 568,000 towers, saved 100.3 billion Yuan of investment, saved 27,700 of land, and optimized the state capital and resource allocation layout.

Table 10
The Relationship between the separation degree of two rights and the "embezzlement view".

Kz	variable	N	Mean	p50	Sd	min	max	skewness	kurtosis	Chisq
The separation degree of two rights	variable	sample	Mean	Median	standard error	minimum	maximum	skewness	kurtosis	chi-square
0	Em	114	0.6	1	0.5	0	1	−0.4	1.1	0.274
1	Em	41	0.3	0	0.4	0	1	1	2.1	
0	occ1	114	5.8	2.5	10.7	0	75.1	4.9	31.1	4*
1	occ1	41	8.6	4.1	10.4	0.1	34.6	1.5	4.3	
0	occ2	114	−0.7	−4.2	20.8	−101	49.9	−0.5	7.1	12.228***
1	occ2	41	3.7	−1.3	28	−42.2	65.6	0.6	3.3	

As revealed, these kinds of mergers and reorganizations between central enterprises avoid homogeneous competition, bring into play the synergistic effect of the industrial chains, and optimize the layout structure of state-owned capital. Further, such initiatives can indeed improve the efficiency of resource allocation, and thus we can conclude that the efficiency improves after any equity transfer.

6. Conclusion and contributions

All three types of control transfer in mixed-ownership enterprises have improved various efficiencies. This paper uses Guotai'an CSMAR4.0 equity transfer data and finds that the motivation Category 1 for ex-ante equity transfer conforms to the "pretty girl marries first" phenomenon and the "embezzlement view" after using categorical regression. The 2 Category is "fiscal revenue view". And no matter what kind of equity transfer type, as shown in Table 5, the mean of each indicator is positive, so it can be inferred that the motivation of equity transfer may conform to the "view of efficiency" and "fiscal revenue view." The analysis of the motivation of ex-post control transfer shows that the three control transfer methods have improved various efficiencies, all in line with the "view of efficiency."

Furthermore, state-owned enterprises merging with private enterprises is a rational behavior of market self-selection. The empirical analysis also finds that ex-ante inefficient private enterprises transfer equity to state-owned enterprises and significantly improve enterprise efficiency. This optimal allocation of resources indicates that the state-owned enterprises merging with private enterprises is a rational act of market self-selection and does not create a "space squeeze" effect on private enterprises. Therefore, it should not be seen as a flooding beast. The efficiency improvement is because after private enterprises fall into development difficulties, they actively seek to mix with state-owned enterprises, forcing heterogeneous shareholders to establish a symbiotic development relationship rather than an antagonistic one. The conclusion reveals that M&A with privately listed companies by state-owned enterprises does not squeeze the living space of private enterprises, nor is it "the state advancing and the people retreating." Therefore, we should eliminate these noises, actively develop the mixed-ownership economy, and adhere to the "two unwavering" basic economic systems.

6.1. Theoretical contributions

The possible innovation of this paper is the uniqueness of the research perspective. At present, the literature almost ignores the equity transfer behavior of mixed-ownership enterprises in China. Empirical research shows that improved efficiency is the main reason for mixed-ownership enterprise equity transfer, both for state-owned enterprises and private enterprise leading mergers. The property rights transfer between different enterprises is the rational choice of the market economy. As the findings indicate, there is no question of "the state retreating and the people advancing" or "the state advancing and the people retreating." Also, such M&An initiatives do not squeeze private enterprises' living space, so they unswervingly promote mixed-ownership reform. Mixed-ownership China's experience and practice of reforming state-owned enterprises for more than 40 years show that property rights reform is the foundation and main line of state-owned enterprise reform and one of the reasons why China's economy has achieved great success. The core of the mixed-ownership reform is to establish a modern enterprise system with "clear property rights, clear authority and responsibility, separation of government and enterprises, and scientific management." More specifically, clear property rights are fundamental because mixed-ownership reform primarily integrates capital with different property rights between state-owned (private) enterprises. It inevitably involves the circulation, reorganization, cooperation, and protection of property rights. No perfect property rights system will be difficult to achieve the reform goal. So, this article has a certain reference value to the property right theory focusing on Chinese characteristics.

6.2. Practical contributions

First, the proportion of the property rights structure of mixed-ownership enterprises should be aligned with the requirements of market competition. Neither the fear of loss of state-owned assets nor the emphasis on the total withdrawal of state-owned capital in the competitive field should not prevent state-owned enterprises from merging with private companies.

Secondly, the property rights incentive and restraint mechanism of mixed-ownership enterprises should be improved. Further, the "rights, responsibilities, and benefits" between different property rights subjects should be run in strict accordance with the requirements of the company law and the principles of capitalism. Following the principle of voluntary shareholding of employees, risk sharing, and benefit sharing, support enterprises should implement the employee shareholding system to stimulate employees' enthusiasm and enterprise vitality.

Third, adhering to the "two unwavering" basic economic systems is vital. The empirical study shows that the improvement in the efficiency of private enterprises after transferring inefficient equity to state-owned enterprises is due to the symbiotic development relationship between the state capital and private capital. So we cannot treat state-owned and private capital with the opposite view of "this ebbs and flows" and "there is no other." Instead, we should adhere to the "two unswervingly" basic economic systems. With public ownership as the main body, a variety of ownership economy common development is visible in China's basic economic system. We must unswervingly consolidate and develop the public sector of the economy and encourage, support, and guide the development of the non-public economy. This is an important achievement of China's reform and provides avenues for Chinese enterprises to be competitive and forge ahead in the new era.

6.3. Limitations and future prospects

There are two shortcomings in this paper. First, this paper uses the resource-based view theory to explain the reasons for the efficiency improvement of state-owned enterprises when merging with private enterprises. However, it does not build a mathematical model for theoretical derivation, which is an apparent defect and also provides the direction of future research. Second, due to the limitations in accessing reliable data, only the sample of equity transfer of listed companies with mixed-ownership structures is selected in this paper. Equity transfer of China's large-scale non-listed companies with mixed-ownership structure is omitted. Therefore, future research could expand the sample size, or an excellent case can be selected for dynamic tracking and horizontal comparison, which can better explore the internal mechanisms of state-owned enterprises merging with private enterprises and vice versa.

Author contribution statement

DONG Mei-sheng; Zhang Ying; Kayhan Tajeddini, Ph. D; Rana Yassir Hussain, Ph. D: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of competing interest

All the authors declare that there exists no potential conflict of interest in this study.

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