A Study on the Effect of Heterogeneous Equity Mix on the Performance of Mixed Ownership Firms

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Abstract

This paper empirically tests the impact of heterogeneous equity mix on corporate performance using unbalanced dynamic panel data of China's A-share main board market from 2008-2019 and comparatively analyzes the differences in the impact of heterogeneous equity mix on different holding companies' performance and socioeconomic efficiency. The results show that a heterogeneous equity mix has no significant effect on the operating efficiency of enterprises, but has a significant positive effect on the operating efficiency and socioeconomic efficiency of enterprises. However, a heterogeneous equity mix does not promote the transformation of operation and governance mechanisms, resulting in no significant improvement in enterprise operating efficiency.

Keywords: heterogeneous equity mix, governance arrangements, allocative efficiency, firm performance

1. Introduction

Performance is a real problem faced by enterprises participating in the mixed ownership reform. Enterprise performance contains two different concepts of efficiency and effectiveness, efficiency reflects more the effectiveness of the way of doing things, and effectiveness reflects the results of doing things. In general, the two are in direct proportion to each other. However, due to poor management, there may be a phenomenon that haste makes waste or benefit but low efficiency. Improving enterprise efficiency and benefit is an inevitable requirement of enterprise mixed ownership reform. The heterogeneous shareholders' equity mixture not only affects the ability to obtain heterogeneous resources needed for enterprise development, but also affects the principal-agent relationship, governance efficiency, and behavioral preferences of decision-makers under the game of heterogeneous shareholders, etc. Some scholars believe that privatization is conducive to improving the performance of state-owned enterprises (Bortolotti et al., 2002; Jiang et al., 2018). So, is more heterogeneous shareholders better, and to what extent is the mix of heterogeneous equity most effective?

Research on the performance of mixed ownership reform of state-owned enterprises can be distinguished into two aspects: the self-performance and external performance of mixed ownership enterprises. First of all, Studies on the performance of mixed-ownership enterprises focus more on enterprise efficiency. Some scholars have analyzed the positive effects of the privatization of state-owned enterprises on enterprise efficiency from the aspects of enterprise output, profitability, net output value, total factor productivity, etc. (Yu, 2013; Jiang et al., 2018; Zhu, 2021). In the new normal of innovation-driven development, some scholars have studied the positive effect of state-owned enterprise reform on the efficiency of technological innovation of enterprises (Yin et al., 2018; Zhang et al., 2020). A few scholars try to describe the efficiency of mixed-ownership reform of state-owned enterprises more comprehensively. Faulkender et al. (2012) proved the advantages of state-owned enterprises in economic radiation rate, social efficiency, and innovation efficiency by constructing a multidimensional model for the efficiency evaluation of state-owned enterprises. Whether the mixed ownership reform affects the total factor productivity, innovation efficiency, or other aspects of efficiency, all these factors will eventually be applied and served in the business activities of the firm, which are reflected in the business efficiency and effectiveness of the firm. Secondly, there is also literature concerned about the external performance of mixed ownership reform of enterprises. Social responsibility requires that enterprises must focus on stakeholders and social perspectives to measure the economic and social value created by their behaviors

(Zhou et al., 2021). Scholars affirm the positive impact of privatization on social welfare from the aspects of product marginal cost, urban employment rate, and competitiveness (Ghosh et al., 2015; Naito, 2013; Wu et al., 2016), pointed out that state-owned enterprise reform should strike a balance between enterprise performance and social cost (Plumlee et al., 2015). As the basic unit of social and economic activities, it is the basic responsibility of enterprises to undertake social and economic responsibilities, and enterprises should achieve the unity of their own performance and social and economic efficiency. However, there is no relevant research to analyze the business efficiency, operational efficiency, and socio-economic efficiency of enterprises in an integrated manner, which is not conducive to the objective evaluation of the effectiveness of enterprise mixed ownership reform.

As an important part of the mixed ownership reform of state-owned enterprises, the ownership structure has been further studied in the relevant literature, mostly from the perspective of shareholding ratio, ownership concentration, and check degree. Participating shareholders can help reduce the cost of equity and improve the cash value of enterprises (Atting et al., 2008). When the enterprise efficiency is optimal, the state-owned equity is about 30% (Wang et al., 2019), and in the relationship between the enterprise property structure and the market, operation results under different reform schemes, the specific optimal cross-shareholding scheme of mixed-ownership enterprises should follow the principle of "one enterprise, one policy" (Yin et al., 2018). However, Gomez-Mejia et al. (2003) found through empirical tests that ownership concentration has little impact on enterprise value, while ownership structure has a greater impact on enterprise value. Beuselinck et al. (2017) believed that the ownership structure of state-owned capital and non-public capital was not clear in the mixed ownership reform of state-owned enterprises, and related rights protection was not in place. Therefore, starting from heterogeneous ownership structure, this paper focuses on studying the relationship between heterogeneous ownership mix degree and enterprise performance, which has practical reference value for comprehensively and objectively evaluating the effectiveness of enterprise mixed ownership reform, improving enterprise ownership structure, and enhancing enterprise value.

The main contributions of this study are as follows. First of all, this study carried out research from the perspective of a heterogeneous equity mix, which theoretically further supported the practical significance of mixed ownership reform in improving the national economy and maintaining the dominant position of a state-owned economy. Secondly, it is found that the higher the heterogeneity of equity mix, the better the enterprise operating efficiency and socioeconomic efficiency, but has no significant impact on the enterprise operating efficiency, which enriches the research on the impact of heterogeneity of equity mix on enterprise performance. Finally, this paper compares and analyzes the impact of heterogeneous equity mix on the operating efficiency and social and economic efficiency of different holding enterprises, which provides a theoretical reference for deepening the understanding of the impact of heterogeneous equity mix on enterprise performance.

2. Theoretical Analysis and Research Hypothesis

2.1 Heterogeneous Equity Mix and Firm Performance

The shareholding structure is the basis for influencing the distribution of corporate control and corporate governance. By setting a reasonable level of heterogeneous shareholder participation, it can stimulate corporate dynamics, strengthen corporate governance mechanisms and promote corporate performance. The shareholding structure acts to influence the resource input and governance characteristics of enterprise development. And it affects the efficiency of resource complementation among heterogeneous shareholders in mixed-ownership enterprises. On the one hand, the different objectives and interest claims of different ownership capital lead to conflicts of interest arising among heterogeneous shareholders affecting the degree of heterogeneous resource input; on the other hand, the arrangement of different shareholding structures can contribute to the formation of different nature of principal-agent relationships (Crowley & Bourke, 2018), which in turn affects the efficiency of corporate management and the utilization rate of heterogeneous resource integration. In mixed ownership firms, ownership diversification optimizes the firm's equity structure and equity checks and balances (Liu et al., 2015), but does the heterogeneous equity structure and equity checks and balances formed by the introduction of heterogeneous shareholders bring about simultaneous improvements in firm efficiency and effectiveness? In the case of management subordination to controlling shareholders, the relationship between equity concentration and firm value is more dependent on controlling shareholders (Chen et al., 2017). Therefore, this paper focuses on the impact of a heterogeneous equity mix on firm performance in terms of the nature of different controlling owners.

Shareholder heterogeneity is firstly reflected in the difference of required payoff rate among heterogeneous shareholders, the more state-owned shareholdings the lower the cost of capital, i.e., economic payoff rate,

required by the company (Lins et al., 2017); secondly, shareholder heterogeneity is reflected in the difference of resources carried by shareholders, e.g., state-owned shareholders can bring financing facilities such as bank loans, tax preferences, and non-marketable resources such as the introduction of high-level talents, policy information, etc. resources; non-state-owned shareholders can bring resources such as efficient operation and management, sensitive market acumen; again, shareholder heterogeneity promotes checks and balances among heterogeneous shareholders to monitor and reduce moral hazard due to principal-agent problems; finally, shareholding structure, especially when heterogeneous shareholders are involved in the firm, can have an impact on executive cognitive diversity (Kang et al., 2020). In state-controlled mixed-ownership firms, when the degree of heterogeneous equity mix is higher, state-controlled mixed-ownership firms will strive to achieve higher economic payoffs to satisfy or balance the interests of the introduced heterogeneous shareholders due to the relatively higher shareholding of non-state shareholders. Meanwhile, the higher the degree of heterogeneous equity ownership mix, the richer the resources carried by heterogeneous shareholders and the more diverse the cognition of executives, which not only helps to promote the effectiveness of supervision and checks and balances between non-state shareholders and state shareholders, shareholders and managers but also facilitates executives to make scientific decisions, ultimately improving the efficiency of enterprise operation and management and optimizing the investment of enterprise resources. While when the degree of mixed equity ownership is low, the number of heterogeneous subjects is small and the shareholding gap is large, state-owned shareholders are likely to take control of the company's management decisions by their strong control position, disregarding the interests of other shareholders or even abuse their control (Tian & Twite, 2011), resulting in the loss of enterprise economic efficiency and operational efficiency. From this, the following hypotheses H1 and H2 are formulated.

H1: In state-controlled firms, heterogeneous equity mix positively affects firm operating efficiency.

H2: In state-controlled firms, heterogeneous equity mix positively affects firm operating efficiency.

Heterogeneous shareholders can bring diverse perspectives, mindsets, physical capital, and social resources to a company, which are crucial to increase operational effectiveness and efficiency in today's dynamic and changing market environment. Effective checks and balances and supervision among heterogeneous shareholders can avoid inequalities as well as inefficient behaviors introduced by these capitals. In non-state-controlled mixed-ownership enterprises, supervision and checks and balances among heterogeneous shareholders will be more effective because there is no fuzzy principal-agent relationship brought about by the absence of owners, e.g., the higher the degree of heterogeneous shareholding mix in non-state-controlled enterprises, the stronger the ability of state-owned shareholders to constrain non-state-owned shareholders' short-term revenue goals to focus on long-term business goals. At the same time, the pursuit of economic efficiency and effectiveness by non-state shareholder holdings correspondingly constrains state-owned shareholders from assuming some of their non-economic social responsibilities. However, the conflict of interest caused by the differences in social roles, utility goals, and behavioral capabilities of heterogeneous shareholders (Hutchinson et al., 2015) can easily lead to competing interests among shareholders, which in turn can undermine corporate efficiency, such as the reality of shareholder heterogeneity can cause some investors to chase short-term gains and trap the company in a difficult situation (Mccahery et al., 2016). Conflicts of interest do not necessarily lead to excessive checks and balances and loss of performance. Based on individual rational constraints, heterogeneous shareholders will rationally make the best use of multiple resources to avoid and reduce conflicts and other uneconomic behaviors. For example, non-state-controlled shareholders commit to the social efficiency goals of state-owned shareholders to obtain the advantages of state-owned shareholders in R&D capabilities; state-owned shareholders obtain political connections for non-state-controlled enterprises under imperfect market mechanisms to solve the problems of difficult financing and low access to resources faced in their development; respectively, based on their utility, the more resources heterogeneous shareholders invest that fit with the development of the enterprise; The mixed ownership reform makes more types of stakeholders participate in corporate governance, which may be more helpful to play a positive role of stakeholders on enterprise performance, and the maximization of heterogeneous shareholders' utility will eventually translate into the improvement of non-state-controlled enterprises' performance. As a result, the following hypotheses H3 and H4 are formulated.

H3: When the controlling shareholder is a non-state shareholder, the degree of equity ownership mix positively affects the efficiency of the firm's operations.

H4: When the controlling shareholder is a non-state shareholder, the degree of equity ownership mix positively affects the operating efficiency of the firm.

2.2 Reform Efficiency of Different Actual Controllers and Mixed-Ownership Enterprises

Economic responsibilities, including earning profits, paying taxes, protecting employees' interests, and achieving sustainable development, are the most basic social responsibilities of enterprises. State-controlled enterprises are expected to take on more social responsibilities, including economic and non-economic responsibilities, which, to a certain extent, lead to an "imbalance of righteousness and profit" (Bruton et al., 2015) due to the excessive balance of non-economic social responsibilities. However, the fulfillment of social responsibility at different levels and from different perspectives depends on the firm's resource conditions. The status of heterogeneous shareholders and their accompanying resources under different shareholding structures can affect the efficiency goals of the firm (Boateng & Huang, 2017). The state-owned property rights attributes of state-controlled enterprises lead the enterprises to take up issues such as increasing employment, charitable donations, and caring for the disadvantaged that should be solved at the government level, which has a certain impact on the economic efficiency of the state-controlled enterprises themselves, while heterogeneous non-controlling shareholders have natural profit-seeking characteristics, and the heterogeneous equity mix will help the enterprises tilt towards their operational efficiency. On the contrary, the introduction of state-owned equity in private enterprises is conducive to promoting the fulfillment of social responsibility as strategic thinking for the sustainable development of enterprises (Mazouz & Zhao, 2019), along with the growth and development as well as the growth stage of private enterprises to achieve long-term development as well as the need for self-fulfillment, they begin to fulfill social responsibility and turn to social benefits (Jiang et al., 2018). The heterogeneous equity mix enables state-owned shareholders to better monitor and assist non-state-controlled enterprises to better fulfill their socioeconomic responsibilities, improve their socioeconomic efficiency, and achieve sustainable development. In China, although private enterprises are not exactly equivalent to non-state-controlled mixed-ownership enterprises, they have similar interest goals compared to state-controlled enterprises, and heterogeneous equity mixing provides more resources and a better environment for non-state-controlled enterprises to better achieve socioeconomic efficiency.

H5: Heterogeneous equity mix has a higher impact on the operating efficiency of state-controlled enterprises compared to non-state-controlled enterprises.

H6: The heterogeneous degree of equity mix has a higher impact on the socioeconomic efficiency of non-state-controlled mixed-ownership enterprises compared to state-controlled enterprises.

3. Research Design

3.1 Research Samples and Data Sources

This paper selected non-financial listed companies in Shanghai and Shenzhen from 2008 to 2019 as the research object, and the data were organized as follows: (1) ST companies were excluded because the financial status of such companies is unstable. (2) The nature of shareholders was divided into five categories: state-owned shares, private shares, foreign shares, natural person shares, and other shares according to the type of shareholders of the companies, and the cumulative shareholdings of different categories of shareholders in the top ten shareholders of each company were collected and collated manually. (3) Excluding companies with missing variable data. An unbalanced panel data including 1481 listed companies was obtained by sorting the data.

The industrial value added required in this paper is calculated from the relevant indicators obtained from the CSMAR database; the indicator of heterogeneous equity mix is calculated from the cumulative shareholdings of different classes of shareholders among the top ten shareholders of each company in the company's annual report; all other indicators in this paper are obtained from the CSMAR database. The data processing statistical analysis software used in this study is Stata 17.0.

3.2 Research Variables

3.2.1 Dependent Variable

Business efficiency. Enterprises are profit-oriented economic organizations, and business efficiency is the resultant response to business activities. This paper draws on relevant studies to measure the business efficiency of enterprises by taking the natural logarithm of their average pre-tax profits.

Enterprise operating efficiency. Enterprise efficiency is mainly reflected in input-output ratio and allocation efficiency, which integrally reflect the production capacity and management ability of the enterprise in the process of operation, and the combination of the two ultimately affects the profitability of the enterprise. Therefore, drawing on relevant studies, this paper selects the return on net assets index, which reflects the profitability of the enterprise, as a proxy variable for enterprise operating efficiency.

Corporate socioeconomic efficiency. Socioeconomic responsibility is the most basic social responsibility of enterprises, and this paper measures corporate social efficiency based on their fulfillment of socioeconomic responsibility. The industrial value-added growth rate helps to comprehensively measure the economic and social value and growth potential of state-owned enterprises, and the industrial value-added growth rate of state-owned and state-controlled enterprises can be used as a core explanatory variable for social efficiency. Drawing on related studies, this paper adopts the industrial value-added growth rate as a proxy variable for the social efficiency of enterprises.

3.2.2 Independent Variable

Heterogeneous equity mix. The arrangement of different equity structures within a firm reflects the power structure of shareholders, as well as the differences in managers' financial and human capital accumulation. Therefore, a measure based on a heterogeneous shareholding structure is important for studying the relationship between ownership arrangements and corporate performance within an enterprise. This paper introduces the variable of heterogeneous shareholding mix to measure to some extent the dispersion of capital reflecting different ownership, using the inverse of the squared sum of the shareholding ratios of shareholders of different nature categories among the top ten shareholders in an enterprise.

Nature of controlling shareholders. The difference in controlling shareholders reflects the difference in control, and the difference in the form of control also leads to the diversity of corporate governance theories and governance rules, while the effectiveness of corporate governance is a direct factor affecting corporate efficiency. In this paper, state-controlled enterprises take the value of 1, and non-state-controlled enterprises take the value of 0.

3.2.3 Control Variables

To control other influencing factors, the following control variables are set in this paper. 1) Enterprise size. The size of the enterprise affects the fulfillment of social responsibility and thus the financial performance of the enterprise, in addition to the different operational risks faced by enterprises of different sizes, which affect the return of the enterprise. The size of a company includes the impact on the social efficiency of the company and the efficiency of the company itself based on the financial evaluation. In measuring firm size, the logarithm of total assets is taken as a proxy variable for firm size, drawing on relevant studies (Cao et al., 2019). 2) Two positions in one. Whether the chairman and general manager have two positions in one directly affect the strength of the distribution of control within the firm, the effectiveness of the supervision and check mechanism within the firm, and the choice of objectives and operational efficiency of the firm, which in turn has an impact on the social efficiency and economic efficiency of the firm. In this paper, the value of 1 is taken when the general manager is the same person as the chairman of the board, otherwise the value is 0. 3) Financial leverage. Financial leverage affects the degree of incentive for operators to implement surplus management (Dhole et al, 2016). In addition, consumer satisfaction is affected by the level of corporate debt and affects firm value through market mechanisms (Malshe & Agarwal, 2015). Therefore, financial leverage may affect the firm's own efficiency and social efficiency, and this paper uses total gearing as a proxy variable for financial leverage. 4) Industry competitiveness. The degree of industry competition may also affect the fulfillment of corporate social responsibility, and different degrees of industry competition may affect the profit and social welfare level of enterprises. Therefore, the degree of industry competition may also affect the social efficiency of enterprises and the efficiency of enterprises themselves. Drawing on relevant studies, the Herfindahl index is used to measure the degree of industry competition in this paper.

Table 1. List of main variables

Name	Variables	Definition
Socioeconomic efficiency	in value	(Corporate profit + employee remuneration and benefits + VAT and business tax)$_{i,t}$ - (Corporate profit + employee remuneration and benefits + VAT and business tax)$_{i,t-1}$)/(Corporate profit + employee remuneration and benefits + VAT and business tax)$_{i,t-1}$
	income	Operating income growth rate
Enterprise operating efficiency	roe	Net income / ((Shareholders' equity at the beginning of the year + Shareholders' equity at the end of the year)/2)
	roa	Net profit / ((Total assets at the beginning of the year + Total assets at the end of the year)/2)
Enterprise operating benefit	prof	Ln(net profit before tax)
	Or	Ln (net operating profit)

Heterogeneous equity mix	mixed	$1/\sum_{i=1}^{n} x_i^2$ (n represents the number of the top ten shareholders, and x_i represents the shareholding proportion of class i shareholders)
Nature of property right	property	State holding value is 1, otherwise it is 0
Ceocha	dual	If the chairman and manager are the same person, the value is 1. Otherwise, the value is 0
Firm size	size	Ln (annual total assets)
Asset-liability ratio	debt	Current assets/Current liabilities
Degree of industry competition	HI	$\sum_{i=1}^{n} x_i^2$ (n represents the number of industries and x_i represents the proportion of revenue of different industries in operating revenue)

3.2.4 Model Setting

A model was constructed based on theoretical analysis to analyze the effect of heterogeneous equity mix, on the efficiency of mixed ownership reform with different beneficial owners:

$$\text{effect}_{i,t} = \alpha_0 + \alpha_1 effect_{i,t-1} + \alpha_2 mixed_{i,t} + \alpha_3 HI_{i,t} + \alpha_4 debt_{i,t} + \alpha_5 size_{i,t} + \alpha_6 dual_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Based on theoretical analysis, the following model is constructed to analyze the difference in the efficiency of different effective controllers on the reform of mixed ownership enterprises

$$\text{effect}_{i,t} = \beta_0 + \beta_1 effect_{i,t-1} + \beta_2 mixed_{i,t} + \beta_3 mixed_{i,t}*property_{i,t} + \alpha_4 HI_{i,t} + \alpha_5 debt_{i,t} + \alpha_6 size_{i,t}$$
$$+\alpha_7 dual_{i,t} + \mu_{i,t} \qquad (2)$$

This model $\text{effect}_{i,t}$ denotes the performance of mixed ownership reform, which contains three aspects: business efficiency, business operation efficiency, and socio-economic efficiency of enterprises. To comprehensively measure the impact on the efficiency of mixed ownership reform, company size (size), debt level (debt), industry competitiveness (HI), and two-job integration (dual) are selected based on existing research results to control for their possible impact on the efficiency of mixed ownership reform, respectively.

4. Empirical Results and Analysis

4.1 Descriptive Statistics

Table 2. The descriptive statistics of the main variables

	prof		roe		invalue		mixed	
	state-owned	non-state-owned	state-owned	non-state-owned	state-owned	non-state-owned	state-owned	non-state-owned
min	10.68	10.93	-14.76	-8.43	-1.84	-7.59	0.94	1.45
mean	19.11	19.01	1.32	0.17	1.08	9.29	6.48	11.62
max	24.24	22.51	13.20	34.18	225	173	28.82	94
sd	0.068	0.107	27.95	2.11	2.51	20.5	4.89	11.53
n	742	739	742	739	742	739	742	739
t	0.800***		1.159		0.156**		5.144**	

Note. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, as follows.

Table 2 presents descriptive statistics for the main variables of the study in groups and compares the differences between the means of the variables using the "independent samples t-test". The results show that: 1) the differences in the means of economic efficiency and socioeconomic efficiency are significantly higher in state-controlled enterprises compared to non-state-controlled enterprises, while the differences in the means of economic efficiency are not significant; 2) the heterogeneous equity mix is lower in state-controlled enterprises compared to non-state-controlled enterprises. Table 3 shows the correlation test of the main research variables, and the preliminary judgment from the test results is that there is a positive relationship between the degree of heterogeneous equity mix and enterprise operating efficiency and socioeconomic efficiency, respectively; there is no significant relationship between the degree of heterogeneous equity mix and enterprise economic efficiency, and the above evidence tentatively indicates that the degree of heterogeneous equity mix has a positive impact on enterprise operating efficiency and socioeconomic efficiency, while there is no significant impact on enterprise operating efficiency. However, more rigorous conclusions are needed for further regression analysis.

4.2 Correlation Analysis

Table 3. Correlation test of key variables

variables	prof	roe	invalue	mixed
prof	1			
roe	0.0552	1		
	(0.0914)			
invalue	0.9352	0.0379	1	
	(0.0958)	(0.7884)		
mixed	0.0093***	-0.0208	0.0118***	1
	(0.0001)	(0.5243)	(0.0058)	

Note. *, ** and *** are represent the significance level of 10%, 5%, 1% respectively.

4.3 Analysis of Regression Results

4.3.1 Analysis of Baseline Regression Results

The results of the sub-sample test based on model (1) are presented in Table 4. Columns (1) and (3) in Table 4 show the regression results on the operating efficiency and operating effectiveness of state-controlled enterprises, respectively. The coefficient of mixed in column (1) is positive but not significant, i.e., heterogeneous equity mix does not have a significant effect on the operating efficiency of state-controlled enterprises, and hypothesis H1 does not pass the test. in the second column, the regression coefficient of mixed is significantly positive at the 1% level, i.e., heterogeneous equity mix has a significant positive effect on the operating efficiency of state-controlled enterprises, which is consistent with hypothesis H2 and (4) columns show the regression results on the operating efficiency and operating effectiveness of non-state-controlled enterprises, respectively. In column (2) the coefficient of mixed is negative but not significant, and hypothesis H3 does not hold. In column (4) the coefficient of mixed is significantly positive at the 1% level, indicating that heterogeneous equity mix has a significant positive effect on the operating efficiency of non-state-controlled enterprises, and hypothesis H4 holds. In summary, it can be shown that a heterogeneous equity mix significantly enhances the operating efficiency of mixed ownership enterprises, but it does not damage the operating efficiency of enterprises but also has not yet significantly enhanced the effect. The heterogeneous equity mixture does not realize the conversion of operating mechanisms and the improvement of corporate governance after the equity mixture, which leads to the failure to improve the production and operation efficiency and management ability of enterprises, and finally shows an insignificant impact on the operating efficiency of enterprises; however, the heterogeneous equity mixture helps to bring into play the complementary advantages of heterogeneous resources, increase and improve the input of enterprise resources, and improve the operating efficiency of enterprises.

Table 5 shows the results of the test based on model (2). The coefficient of mix*property in column (1) is significantly greater than zero at the 5% level, indicating that the effect of heterogeneous equity mix on SOEs' operating efficiency is greater than that of Non-SOEs, and hypothesis H5 is tested. The reason is that, based on the theory of resource dependence and complementary advantages, the marginal contribution of state-owned shareholder resources to non-state-controlled enterprises' efficiency is smaller than the marginal contribution of non-state-owned shareholder resources to state-controlled enterprises' efficiency, i.e., compared with state-controlled resources, the enhancement effect of heterogeneous non-state-owned shareholder resources on enterprises' operating efficiency is significantly higher than that of heterogeneous state-owned shareholder resources on enterprises' efficiency. In column (2) of Table 5, the coefficient of mixed*property is significantly smaller than zero at the 1% level, indicating that the effect of heterogeneous equity mix on the socioeconomic efficiency of non-state-controlled enterprises is greater than that of state-controlled enterprises after controlling for other influencing factors, and hypothesis H5 is verified. In summary analysis, along with the mixed ownership reform, the mixture of heterogeneous property rights not only optimizes the allocation efficiency of social resources, but also helps enterprises to further realize factor- and investment-driven economic development, facilitates the enhancement of socioeconomic efficiency and creates an incremental national economy with the help of mixed ownership enterprises, and heterogeneous equity mixture helps to enhance the capital stock of state-owned economy to a greater extent during the period of rapid development of non-state-owned economy and Maintain the control of the state-owned economy and its dominant position in the national economy.

Table 4. Heterogeneous equity mix, operating efficiency and operating effectiveness

	roe			prof	
variable	State-owned Holdings (1)	Non-State Holding (2)	variable	State-owned Holdings (3)	Non-State Holding (4)
roe(-1)	0.0171	-0.2031	prof(-1)	0.3562***	0.3419***
	(1.39)	(-1.17)		(24.47)	115.64
mixed	0.3105	-0.0014	mixed	0.2410***	0.0536***
	(0.59)	(-0.05)		(6.61)	(14.12)
HI	-0.0857	-0.4221	HI	0.9910	-0.0469***
	(-0.02)	(-0.38)		(0.1)	(-20.48)
dual	-1.12335	-0.8401**	dual	-2.01**	-0.7170
	(-1.28)	(-2.97)		(-2.27)	(-1.64)
size	-1.1822	-0.0590	size	9.16	0.0232***
	(-0.28)	(-0.14)		1.51	(2.07)
debt	-9.2752***	-2.3459	debt	-8.33***	-0.0556***
	(-11.81)	(-1.21)		(-6.88)	(-15.73)
AR(2)	0.257	0.157	AR(2)	0.408	0.416
Hansen	0.510	0.365	Hansen	0.612	0.597

Note. 1) ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively; 2) contents in parentheses are t(z) statistics; 3) AR(2), Hansen tests all show their p-values, requiring that all p-values are greater than 0.05; (-1) after the variable indicates that the variable is lagged by one period. Same below.

Table 5. Differences in the impact of heterogeneous equity mix

(1)		(2)	
variable	prof	variable	invalue
prof(-1)	-0.275**	invalue(-1)	0.0055***
	(2.75)		(40.20)
mixed	0.008***	mixed	0.150***
	(2.39)		(6.74)
property	-0.3460	property	1.99
	(-0.78)		(1.61)
mix*property	0.0038**	mix*property	-0.0745***
	(-2.1)		(-5.86)
HI	-0.0400	HI	-7.6**
	(-0.16)		(-3.19)
dual	-0.1238	dual	-1.65**
	(-0.83)		(-3.19)
size	1.6722***	size	3.86***
	(2.99)		(4.08)
debt	-0.2824**	debt	-0.918**
	(-1.9)		(-2.41)
AR(2)	0.279	AR(2)	0.314
Hansen	0.842	Hansen	0.701

4.4 Robustness Test

To ensure the reliability of the research findings, the author selected relevant proxy variables for re-regression. Operating income reflects the contribution of enterprises to the volume of social economy and radiation efficiency. Therefore, this paper intends to choose the growth rate of operating income (income) to replace the growth rate of industrial value added (invalue) as a variable to measure the socioeconomic efficiency of enterprises. Total net asset margin (roa) is chosen to replace return on net assets (roe) as the variable to measure the operational efficiency of enterprises, and the logarithm of operating net profit (opr) is chosen to replace logarithm of net profit (prof) to measure the operational efficiency of enterprises. In this paper, the sample is divided into two groups, state-controlled and non-state-controlled, and the regressions are conducted separately based on model (1). The results in Table 6 show that in the regression of business efficiency, the coefficients of heterogeneous equity mix (mixed) in both groups are significantly positive at the 1% level, indicating that heterogeneous equity mix does have a positive effect on business efficiency, which is consistent with the findings of the previous tests of hypotheses H2 and H4; in the regression of business efficiency, the coefficients

of the heterogeneous equity mixture (mixed) in both groups are not significant, indicating that the heterogeneous equity mixture has no significant effect on the operating efficiency of enterprises, which is consistent with the previous tests on hypotheses H1 and H3, that is, from the perspective of corporate governance, the heterogeneous equity mixture does not play a role in improving the production and operation efficiency and management ability of enterprises, and the increase of the heterogeneous equity mixture neither promotes nor harms the efficiency of enterprises themselves. Table 7 shows the results of the tests based on model (2). In the regressions on the operating efficiency of enterprises, the regression coefficients of mixed*property are all significantly positive at the 10% level, indicating that heterogeneous equity mix has a stronger effect on the operating efficiency of state-controlled enterprises; in the regressions on socioeconomic efficiency, the regression coefficients of mixed*property are significantly negative at the 1% level, indicating that heterogeneous equity mix has a stronger effect on the operating efficiency of state-controlled enterprises. In the regression on socioeconomic efficiency, the regression coefficient of mixed*property is significantly negative at the 1% level, indicating that the effect of heterogeneous equity mix on the socioeconomic efficiency of state-controlled enterprises is weaker than that on non-state-controlled enterprises, and the test results are consistent with the conclusions of the previous hypothesis test. To ensure the selectability of alternative variables, this paper conducted correlation tests on all the explanatory variables, as shown in Table 8, the correlation coefficients of variables invalue and income, variables roe and roa, and variables opr and prof are 0.7633, 0.6128, and 0.9973 respectively and all are significantly greater than zero at the 1% level, indicating that the selection of alternative variables is feasible and the robustness test is reliable.

Table 6. Heterogeneous equity mix, operating efficiency, and operating effectiveness test

	roa			opr	
variables	State-Owned Holdings(1)	Non-State Holding(2)	variables	State-owned Holdings(3)	Non-State Holding(4)
roa(-1)	-0.3136***	-0.5100**	opr(-1)	0.3562***	0.3419***
	(-5.55)	(-2.79)		(24.47)	115.64
mixed	-0.2683	0.0004	mixed	0.0241***	0.0536***
	(-1.44)	(0.2)		(6.61)	(14.12)
HI	-2.2251	0.1099	HI	0.9910	-0.0469***
	(-0.97)	(0.55)		(0.1)	(-20.48)
dual	0.1209	-1.8401	dual	-0.2010**	-0.7170
	(0.13)	(-2.97)		(-2.27)	(-1.64)
size	-1.1822	-0.0590	size	0.0916	0.0232***
	(-1.37)	(-0.14)		1.51	(2.07)
debt	-0.5679**	-2.3459	debt	-0.0833***	-0.0556***
	(-2.24)	(-1.21)		-6.88	(-15.73)
AR(2)	0.378	0.205	AR(2)	0.302	0.271
Hansen	0.053	0.065	Hansen	0.584	0.601

Table 7. Test for differences in the impact of heterogeneous equity mix

	opr		income
opr(-1)	0.3173***	income(-1)	0.3284***
	(14.49)		(78.6)
mixed	0.0022***	mixed	0.0415***
	(3.47)		(3.86)
property	-0.0754***	property	-0.3368*
	(-4.48)		(-2.44)
mixed*property	0.0086*	mixed*property	-0.021***
	(1.77)		(-7.67)
HI	-0.754***	HI	-0.388
	(-4.48)		(-1.03)
dual	-0.0864*	dual	-0.0918**
	-1.77		(-3.33)
size	0.0209***	size	2.85***
	(3.22)		(13.13)
debt	-0.0901**	debt	0.0065
	(-2.53)		(0.66)
AR(2)	0.326	AR(2)	0.330
Hansen	0.510	Hansen	0.924

Table 8. Correlation of alternative variables

variables	1	2	3	4	5	6
invalue	1					
income	0.7633***	1				
	(0.0000)					
roe	0.0037	0.0160	1			
	(0.9014)	(0.5887)				
roa	0.0070	0.0076	0.2949***	1		
	(0.8126)	(0.7972)	(0.0000)			
prof	0.9777***	0.7745***	0.0148	0.0162	1	
	(0.0000)	(0.0000)	(0.6161)	(0.5845)		
opr	0.9777***	0.7745***	0.0148	0.0162	0.9973***	1
	(0.0000)	(0.0000)	(0.6161)	(0.5845)	(0.0000)	

5. Research Conclusions and Implications

This paper empirically investigates and analyzes the impact of heterogeneous equity mix degree on the socioeconomic efficiency and own operational efficiency of mixed ownership enterprises, and the relationship between heterogeneous equity mix degree and the own operational efficiency of mixed ownership enterprises, using A-share listed companies from 2008 to 2019 as samples. The results of the study show that: 1) the higher the degree of heterogeneous equity mix, the better the operational efficiency and socioeconomic efficiency of enterprises, and enterprises should further introduce heterogeneous shareholders and increase the shareholding ratio of heterogeneous shareholders to give full play to the positive effect of heterogeneous and complementary resources on the operational efficiency of enterprises and the optimization of social resource allocation efficiency on the socioeconomic efficiency of enterprises; 2) heterogeneous equity mix has not completed the transformation of governance mechanism, and has not promoted the improvement of enterprise management and production and operation efficiency; 3) the impact of heterogeneous equity mixing on the operating efficiency of state-controlled mixed ownership enterprises is greater than that of non-state-controlled enterprises, and the impact on the social efficiency of non-state-controlled enterprises is greater than that of state-controlled enterprises. It shows that heterogeneous equity mixing plays a positive guiding role in enhancing the improvement of the operating efficiency of state-owned enterprises as well as the social efficiency of non-state-controlled enterprises.

The implications of the findings of this paper are: 1) to promote mixed ownership reform in depth and give full play to the role of heterogeneous equity mixing in promoting enterprise development and the national economy; 2) to improve the mechanism conversion and governance arrangements after heterogeneous equity mixing to achieve innovation-driven transformation of enterprise production methods and management modes and to provide a good and efficient internal environment for improving enterprise operating efficiency; 3) reasonably determine the list of industries or enterprises that should be absolutely and relatively controlled by the state; for the state-controlled enterprises in the list, maximizing the participation of heterogeneous shareholders helps maintain the control of the state-owned economy; for the state-controlled enterprises outside the list, part of the socio-economic responsibilities previously borne by state-controlled enterprises can be transferred to non-state-controlled enterprises by having them controlled by non-state-owned shareholders, which is conducive to both This is conducive to maximizing the "public interest" and avoiding the "imbalance of righteousness and profit" of state-controlled enterprises.

Acknowledgments

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