Study on the networked integration model and its efficiency of private company taking part in state-owned company mixed ownership reform

Zhiqiang Zhou¹, Xinyu Xu², Xilong Qu³, and Shun Li¹

Abstract
Based on the concept of sharing in the new era, following the goal orientation of ‘common progress of the people, sharing and win–win’, this article builds a networked integration model of private company taking part in state-owned company mixed ownership reform with industrial clusters as the core and integrating equity sharing, power sharing and benefit sharing from the three levels of capital structure, governance structure and distribution structure. Furthermore, 602 state-owned mixed company from 2007 to 2017 are taken as research samples to conduct an empirical study on the efficiency of networked integration model. The results show that the networked integration model can significantly improve the business performance of company. Equity sharing, power sharing and benefit sharing have obvious and positive effect on business performance. Compared with non-industrial clusters, the networked integration model under the condition of industrial clusters has more effect on promoting business performance. State-owned capital is the most critical factor affecting business performance in the overall sample and the non-industrial cluster sample, while private capital is the most critical factor affecting business performance in the industrial cluster sample.

Keywords
Private company, state-owned company mixed ownership reform, networked integration model, industry cluster, business performance

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Introduction
‘The 13th Five-year Plan’ calls for ‘We will actively prudently develop a mixed-ownership economy’, and the 19th National Congress of the Communist Party of China calls for ‘reinforcing state-owned company reform and promoting mixed-ownership economy’. To promote state-owned enterprises mixed ownership reform and promote the common development of all kinds of ownership economy is the main task of China’s current construction. Nowadays, the state-owned company mixed ownership reform (hereinafter referred to as mixed ownership reform) is in the developmental upsurge. Li¹ and Benner² put forward that developing mixed ownership can solve governance dilemma and improve enterprise efficiency. Hao and Gong³ put forward equity diversification can promote company value. Ma et al.⁴ also came to similar conclusions. Wang and Hu⁵ proposed two kinds of change of control rights, state-owned to private and private to state-owned can significantly

¹ School of Business, Hunan University of Science and Technology, Xiangtan, China
² Hunan Geely Automobile College, Xiangtan, China
³ Hunan University of Finance and Economics, Changsha, China

Corresponding authors:
Xinyu Xu, Hunan Geely Automobile College, Xiangtan 411100, China. Email: 741756048@qq.com
Xilong Qu, Hunan University of Finance and Economics, Changsha, China. Email: quxilong@126.com

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improve the business performance. Liu et al.\(^6\) put forward proper introduction of non-state-owned directors can improve performance. Zhong et al.\(^7\) proposed that process of mixed reform, private equity shareholders and state-owned controlling shareholders should reasonably allocate the mixed structure of all control rights and establish an effective check and balance mechanism to improve the efficiency of company management. Hao and Wang\(^8\) also came to similar conclusions. Lombardi and Schwabe\(^9\) put forward promoting sharing model in the company reform is scientific and feasible. Tan and Tian\(^10\) also came to the same conclusions. Li et al.\(^11\) put forward there are many conflicts and coordination problems in the process of mixed change. Interests distribution mechanism should be reconstructed. Benefit expression mechanism and benefit sharing mechanism should be strengthened to solve unequal distribution of interests. The studies on mixed ownership reform are abundant. But most of them are theoretical researches, empirical researches are scarce. This article believes that the essence of state-owned enterprises mixed ownership reform is to achieve a win–win cooperation between state-owned enterprises and private enterprises, to promote high-quality economic development, which is consistent with the meaning of ‘sharing economy’. So the article study the topic of equity sharing, power sharing and benefit sharing of state-owned enterprises mixed ownership reform from the perspective of sharing. We built a networked integration model of mixed ownership reform from the three levels of capital structure, governance structure and distribution structure. And we do an empirical research to verify its efficiency and influencing factors, and the fourth part is the conclusion and prospect.

**Construction of networked integration model of mixed ownership reform**

Since reform implementation, private company, as the core subject, has lack of motivation to participate. How to build a new mixed ownership model to promote private capital to take part in the mixed ownership reform has become an important focus. To overcome difficulty of lack of motivation for private company to take part in the mixed reform, stimulate enthusiasm of private companies’ participation, mixed ownership reform must be guided by socialism theories of China, follow idea of sharing development achievements and promote sharing model, take the ‘common progress of the people, sharing and win–win’ as the goal orientation, respect the resource endowment effect of both sides of capital, build industrial clusters with division of labor and collaboration, establish a benign dynamic relationship of mutual dependence, mutual coordination, mutual promotion and mutual restriction between private capital and state-owned capital to realize the capital coupling, governance coordination and benefit sharing of mixed state-owned company, so truly form a joint force for development. In conclusion, the corporation effective model of mixed ownership reform is to establish industrial clusters with division of labor and collaboration. Taking this as the core and based on the theory of integrated thinking, capital structure, governance structure, distribution structure and other subsystems should be integrated to construct a networked integration model (as shown in Figure 1).

![Networked integration model of mixed ownership reform](image-url)

**Figure 1.** Networked integration model of mixed ownership reform.
level of distribution structure, it emphasizes the sharing of interests and realizes the sharing of interests. The specific analysis is as follows.

**Core system of industrial cluster**

Industrial cluster, in essence, means to unite a number of high-quality company to jointly build industrial chain alliance and enhance the competitiveness of the overall industrial chain through technology, information, talent, capital and other resources sharing and complementary advantages. With industrial clusters as the core, the purpose is to better gather and share resources, so that state-owned company and private company can better divide the work and cooperate, and it plays a synergistic role. Mixed ownership reform and core system of industrial clusters (as shown in Figure 2). On the one hand, resource concentration and sharing should be strengthened. State-owned companies have advantages in capital, market, policy and technology, but there are also problems such as the absence of owners, insider control, strong administrative control and so on. On the whole, enterprise capital operation efficiency is low. There are a lot of dare to change, dare to innovate, good at business entrepreneurial talents in the corporation team with a keen response to changing market conditions. The enterprise management mode and operation mechanism are flexible, but due to limited development funds and support policy, entrepreneurs cannot give full play. By building industrial clusters, the resources of both sides should be organically integrated, and shared and effectively used to form cluster resource competitiveness. On the other hand, strengthen enterprise division of labor and cooperation. Dominated by state-owned capital, make full use of policies, investment and financing advantages of state-owned company to build industry clusters operating platform. Both division of labor cooperation work together. Building industrial clusters in key sectors and forming an advantageous industrial chain to promote high-quality development of both state-owned and private companies.

**Equity sharing subsystem**

Equity sharing is to attract diversified capital to take part in mixed ownership reform, and realize diversified capital utility through the cross-shareholding of diversified capital, so as to achieve capital coupling and realize complementary advantages. The primary level of mixed ownership reform is equity participation and the construction of equity sharing subsystem, aiming to establish a mutual promotion and mutual restriction of the benign dynamic relationship of property right between state capital and external capital, especially private capital, so as to achieve capital coupling.

State-owned companies are faced with huge challenges of transformation and upgrading due to their dominate disadvantages, weak innovation ability and poor efficiency. Therefore, we should promote mixed ownership reform, attract external capital, especially private capital, and improve equity structure. Private companies have small assets. State-owned company allows private company to take part in stock market. Private companies worry that the share capital will be diluted by state policies. Therefore, the interests will be damaged. To be specific, promoting mixed ownership reform is not to implement privatization of state-owned company but to strongly support its development. The dominant player is still state capital. Under the principle of ‘state-owned dominance’, external capital, especially private capital, should be actively introduced. However, the mixed ownership reform is not simply ‘mixed’. Different state-owned company functions need to be defined and different implementation plans need to be set. In the functional fields related to national strategic security and national core interests, the reform should be promoted carefully and the status of sole state-owned capital or controlling shares should be insisted. In the public welfare or public service company, the form of wholly state-owned or absolute holding of state capital should be taken and the social benefits should be put in the first place. In general competition areas with high degree of competition and marketization, the shareholding ratio can be appropriately liberalized, so that private capital shares are in a larger proportion or in a controlling position.
**Power sharing subsystem**

Power sharing is to ensure that the multiple shareholders taking part in the reform can obtain the power guarantee, seek the equal legal person status with state-owned company, improve the governance structure, eliminate administrative intervention, aim to achieve governance synergy and realize power sharing. The purpose of constructing power sharing subsystem is to establish the power balance mechanism between state-owned shareholders, external shareholders, especially private shareholders, and strive to achieve governance synergy.

Private companies require share power. In fact, private company is seeking equal status as legal persons with state-owned company. To achieve this goal, the corporate governance structure can be improved and administrative intervention can be excluded is the decisive factor affecting the success of the reform. Private company should have certain power to take part in mixed ownership reform. Without the power to participate passively, some private companies will have worries. Check and balance ensure that their own interests are not damaged. They can make suggestions on wrong management decisions and avoid serious governance problems. Therefore, on the basis of equity sharing, power sharing should be implemented from the perspective of governance structure to standardize corporate governance.

To be specific, the power balance mechanism can enable the multi-power subject to decentralize power balance. Taking part shareholders restrict and supervise the power of controlling shareholders, which can be mainly divided into two aspects: management power and control power. The first one is management sharing. Mixed ownership reform want to be able to have management control on major issues of the company and express their suggestions and comments on the development of enterprise management decision-making. Senior executives in private company possess professional management knowledge and rich practical experience, have a high degree of sensitivity and insight to the market and grasp opportunities to make decisive decisions. Taking part in mixed ownership reform, private company needs to improve management system, introduce the system and mechanism of private company, improve governance structure and realize management rights’ sharing. Second one is the sharing of control rights, which is also an important aspect of governance synergy in mixed ownership reform. To balance the interest demands of multiple interest subjects and fully protect the interests of all parties, the principle of check and balance should be followed to improve the governance structure.

**Benefit sharing subsystem**

Benefit sharing is to satisfy the interest demands of multiple subjects, enable them to obtain their own deserved interests and promote long-term cooperation and development of multiple subjects. The purpose of constructing the interest sharing subsystem is to establish a balanced mechanism for the distribution of interests between state-owned capital and external capital, especially private capital, so as to meet the needs of multiple subjects.

Equity sharing is the basis of giving play to multiple capital utility and realizing capital coupling. Power sharing is the core, and multi-shareholder power balance to achieve governance synergy. Benefit sharing is the key, and multiple subjects can obtain their own interests. On the one hand, state-owned capital worries that private capital has the benefit to transfer or causes the state-owned capital to lose with suspicion, so the enthusiasm for reform is low. On the other hand, private capital worries that state-owned capital will be short of contract spirit and encroach on their deserved interests, so private capital lacks the motivation to participate. Both sides are concerned about unbalanced interest sharing. It can be seen that the implementation of interest sharing is the common pursuit of both sides, and an indispensable and important part of the promotion of mixed ownership reform.

Specifically, profit sharing is mainly reflected in dividend distribution, executive compensation and executive shareholding. First one is dividend distribution. Dividend distribution is a crucial process of benefit sharing, which mainly related to capital holdings. According to the enterprise actual development situation, corporate dividend distribution plan and implementation data should be determined. On the one hand, it ensures that the enterprise can obtain funds for long-term development. On the other hand, it ensures that diversified capital can obtain deserved benefits and attract more potential investors. Second one is executive compensation. Executive compensation accounts for the majority of interest distribution. As the core human capital of an enterprise, senior executives have a high value of human capital, which reflects the principle of fairness of the enterprise. On the one hand, internal fairness and the contribution of different positions should be consistent with their deserved returns. On the other hand, external fairness and the same industry in the same region of the same size of company with the same type of position level should be roughly the same. Third one is executive ownership. As an incentive mechanism and an aspect of profit distribution, executive stock ownership has crucial effect on business governance. Management shareholding enables the management to consider company development from a strategic perspective. If management is difficult to be motivated, it may bring greater losses to the enterprise.

**Hypothesis development**

*Equity sharing and state-owned mixed company performance*

Multiple capital cross-shareholdings can significantly promote business performance. State-owned companies cannot effectively exert their advantages of resource dependence and property right and promote the
The majority shareholder of state-owned enterprise has a monopoly, often does bad to company efficiency because major shareholders encroach on the interests of minority shareholders. Research shows the ownership balance has a positive effect on enterprise performance, and non-state-owned shareholders appoint directors to play an intermediary effect between the ownership balance and enterprise performance. Many major shareholders have positive governance efficiency, and the ownership balance has significant supervision and balance effect on controlling shareholders, which is helpful to improve enterprise value. Therefore, the design of a scientific and reasonable cross-shareholding scheme promote endogenous companies’ capacity, strengthen mixed ownership reform.

**Hypothesis 1:** Equity sharing plays an essential role in state-owned mixed company performance.

**Power sharing and state-owned mixed company performance**

Private capital takes part in mixed ownership reform. Equity participation is fundamental, but just a simple equity mix is difficult to really stimulate private entrepreneurship. Therefore, private capital should also master certain control right and speech right, not only to achieve formal capital mix (shape mix) but also to realize the optimization of corporate governance structure (spirit mix) after the mix, so intensify the vitality and governance efficiency. Studies show that private benefits of control of controlling shareholders are negatively correlated with business performance. Compared with central holding state-owned company, local holding have stronger motivation of private benefits of control. For all mixed ownership enterprises, the ultimate control of state-owned capital does not have a significant impact on corporate innovation in an average sense. For small-scale mixed ownership enterprises, the ultimate control of non-state-owned capital is more conducive to innovation, thereby improving corporate performance. Control rights of controlling shareholder have a negative ‘occupation effect’, which is stronger than the ‘incentive effect’ of ownership. Power disposition will significantly affect the level of performance. Major shareholder control will conflict with equity incentive. And state-owned companies are more obvious than other types of companies, so the design of governance should be balanced between the two. Mixed ownership reform must establish power balance mechanism of enterprise governance and give play to the governance effect of private company’ power participation.

**Hypothesis 2:** Power sharing plays an essential role in state-owned mixed company performance.

**Profit sharing and state-owned mixed company performance**

Multi-subject interest sharing will greatly strengthen the incentive role of company. Profit and dividend distribution can solve the problem of blind investment and repeated construction of company, deepen and improve state-owned company reform. Research shows that both internal and external equity of executive compensation of public companies in Shannxi province play an essential role in efficiency. There is a non-linear inverted u-shaped relationship between executive compensation and operating performance of securities companies, and effectiveness of compensation incentive can be judged according to the position of executive compensation in the inverted u-shaped curve. Employee stock ownership plays an essential role in business performance. The research shows relationship between management holding and business performance appears a cubic curve, and its trend is first rising, then declining and then rising, which is mainly adjusted by the effect of interest convergence and entrenchment between management and external shareholders. Other scholars believe that inverted u-shaped relationship between them, which has the regulating effect of market competition. Through the implementation of employee compensation and equity incentive systems, a community of interests between investors and laborers is formed to maximize the value of the enterprise and maximize the wealth of the stakeholders. When the intensity of market competition increases, the benefit synergy effect of management sharing also increases. When the market becomes more monopolistic, the entrenchment effect of management sharing is intensified.

**Hypothesis 3:** Profit sharing plays an essential role in state-owned mixed company performance.

**Comparison of industrial clusters and non-industrial clusters**

Industrial clusters have competitive advantages, which can effectively improve business performance and promote enterprise development. Industrial clusters have competitive advantages such as production cost, market competition and regional innovation ability. Their competitive advantages come from the integration ability of industrial clusters on resources and the division of labor among company. The external environment, development scale and innovation capacity of industrial clusters will play an essential role in business performance of company and can promote the sustainable development. The cluster network structure promotes the flow and diffusion of knowledge and technology across regions, thereby improving the overall cluster performance. In addition, the input of innovation factors and the degree of government participation in industrial clusters also play an essential role in
business performance. The government should timely adjust knowledge spillovers among enterprises in industrial clusters, make full use of the advantages of knowledge spillovers and limit its blocking effect on technological standard innovation. As an organizational form, industrial clusters can not only effectively promote regional development but also play an essential role in business performance. Through promoting supply-side reforms in industrial clusters, we can achieve multi-industry integration and development, promote new formats, improve industrial structure adjustment and innovation upgrade capabilities and achieve a sustainable shared economy.

Industrial clusters have multiple competitive advantages, which will significantly promote the business performance of company and thus promote the development of regional cooperation.

Hypothesis 4: Compared with the non-industrial cluster model, the industrial cluster model plays a more essential role in business performance.

Empirical study on the efficiency of networked integration model and its influencing factors

Data sources

Data are mainly from Guo Taian database, Ruisi database and the annual report of listed companies. After screening, the balance panel data of 602 state-owned mixed-ownership companies (the state-owned capital holds the major shares) in 22 provinces with complete data from 2007 to 2017 are adopted. Six thousand six hundred twenty-two valid observations are obtained.

Research methods

Structural equation model (SEM) study relationship between equity sharing, management right sharing, control right sharing, dividend distribution, executive compensation, executive shareholding and operating performance of state-owned mixed-ownership company. SEM includes measurement model and structural model.

This article mainly introduces the partial least square method (PLS-SEM) algorithm with two latent variables.

Step 1: Get the estimation of latent variable through repeated iterations. The specific steps are as follows:

Order

\[
L_{Xn} = f_1 \sum_h (\omega_h x_{hn}) \quad (1) \\
L_{Yn} = f_2 \sum_k (\omega_k y_{kn}) \quad (2)
\]

Here \( f_1 \) and \( f_2 \) are normalized operators, so the following equation can be concluded.

\[
f_1 = \pm \left\{ \frac{1}{N} \sum_n \left[ \sum_h (\omega_h x_{hn}) \right]^2 \right\}^{-1/2}
\]

This equation can be concluded in a similar way \( f_2 \) is also concluded.

According to the weight relation selected, the following equation can be concluded

\[
L_{Yn} = \sum_h (\omega_h x_{hn}) + d_n
\]

\[
Y_{kn} = \omega_k L_{Xn} + d_{hn}, \quad k = 1, 2, 3 \quad (4)
\]

Next iteration:

Take the initial weight, \( \omega_k^{(1)} = 1 \), when \( k = k_0 \), \( \omega_k^{(1)} = 0 \), when \( k \neq k_0 \), \( 1 \leq k_0 \leq 3 \).

Substitute \( \omega_k^{(1)} \) into equation (5), obtain \( L_{Yn}^{(2)} \). Substitute \( L_{Yn}^{(2)} \) into equation (3), obtain \( \omega_h^{(2)} \).

Substitute \( \omega_h^{(2)} \) into equation (4), obtain \( L_{Xn}^{(2)} \). Substitute \( L_{Xn}^{(2)} \) into equation (4), obtain \( \omega_k^{(2)} \). If the loop termination condition is satisfied, then stop. Otherwise, go to the second step to continue the iteration.

Step 2: The latent variable estimates \( L_{Xn} \) and \( L_{Yn} \) obtained from the first step are calculated through regression with the corresponding index observation values respectively, obtain

\[
X_{hn} = p_{h} L_{Xn} + \mu_{hn} \quad (5)
\]

\[
Y_{kn} = p_{k} L_{Yn} + \mu_{kn} \quad (6)
\]

\( \mu \) is the residual and \( P \) is the regression coefficient in equation. Regression equation between \( L_{Xn} \) and \( L_{Yn} \) is as follows

\[
L_{Yn} = b_1 L_{Xn} + e \quad (7)
\]

\( e \) is the residual and \( b_1 \) is the regression coefficient in equation.

Step 3: Find the mean and give the original relation.

\[
L_{Xn} = f_1 \sum_k (\omega_k x_{kh}) \quad L_{Yn} = f_2 \sum_k (\omega_k y_{kn}) \quad (8)
\]

Therefore, the intercept terms in formula (5)–(7) are \( p_{hx} = x_{hx} - p_{h} L_{Xn} \), \( p_{ky} = y_{kh} - p_{k} L_{Yn} \), \( b_0 = L_{Yn} h - b_1 L_{Xn} \), respectively. So far, the whole model is solved.

Model design

According to the hypothesis analysis and variable design, on the basis of fully understanding the SEM, which is as shown in Figure 3.

In this model, the variables are divided into potential variables and observation variables. Seven indicators including operating performance, equity share, management share,
control share, dividend distribution, executive compensation and executive shareholding are taken as potential variables. Each potential variable is measured by multiple observation variables.

Performance (Business performance) – return on total assets (ROA): Net profit/(average of total closing balance and opening balance of assets). Return on equity (ROE): Net profit/(average of total closing balance and opening balance of shareholders’ equity).

Esharing (Equity sharing) – ownership ratio of state-owned capital (Sowner): represented by ownership amount of state-owned capital/total share capital of the company. Ownership ratio of private capital (Powner): represented by ownership ratio of private capital/total equity of the company. External capital shareholding ratio (Oowner): represented by the amount of external capital shareholding/total capital stock of company. Actual controller’ shareholding ratio (Cowner): represented by ownership proportion of a listed company owned by actual controller.

Msharing (Management rights sharing) – state-owned shareholder management (Smanage): whether chairman and general manager are one person and state-owned shareholder is manager, yes = 1, no = 0. External shareholder management right (Omanage): succession source of chairman and general manager, internal = 1, external = 2. Management right of private shareholders (Pmanage): whether the chairman and general manager are held by private shareholders, yes = 1, no = 0. Top 10 shareholder management (Cmanage): whether the top 10 shareholders are related, yes = 1, no = 0, not sure = 2.

Csharing (Control rights sharing) – relative control of state-owned shareholders (Scontrol): shareholding of state-owned capital/the largest shareholder. Relative control of private shareholders (Ccontrol): private capital shareholding/state-owned capital shareholding. External shareholders’ relative control (Ocontrol): external capital shareholding/state-owned capital shareholding. Actual controller’ control (Pcontrol): the ratio of the actual controller to control of listed company.

Dsharing (Dividend sharing) – share delivery ratio (Sstock): the ratio sent per share, if 2 shares are sent for every 10 shares, the share delivery ratio will be 0.2. Conversion ratio (Tstock): the conversion ratio per share, if 3 shares are sent for every 10 shares, the conversion ratio will be 0.3. Dividend payout (Dstock): allocation base × dividend payout ratio (before tax) or value directly disclosed in the announcement.

Ssharing (Executive compensation) – total compensation of top three board members (Sboard): total compensation of top three board members. Total compensation of top

Figure 3. Structural equation model diagram.
three supervisors (Sboard): total compensation of top three supervisors. Total compensation of top three executives (Sboard): total compensation of top three executives.

Osharing (Managerial ownership) – board shareholding ratio (Cboard): total shareholding of board members/total capital stock of company. Shareholding ratio of board of supervisors (Ccontrol): total shareholding of board of supervisors/total capital stock of company. Senior management shareholding ratio (Cmanage): total shareholding of senior management/total capital stock of company.

Results and conclusions

By establishing SEM, efficiency and influencing factors of networked integration model are analysed. First, we analyse empirically on overall sample to study whether network integration model has obvious positive effect on improving business performance, and if so, further analyse its key factors. Then, we conduct empirical analysis on the samples of industrial clusters and non-industrial clusters, study efficiency difference of the networked integration model, and further analyse key factors in these two samples. Therefore, we find that networked integration model in which mixed ownership reform with industrial clusters as core is the most efficient.

Overall sample empirical analysis

To analyse whether equity sharing, power sharing and interest sharing play an essential role in operating performance of company or not, determine suitability of model and then propose corresponding countermeasures. The fitting degree is divided into overall model, measuring model and structure model. The test and interpretation of the measurement model and the structural model can only be carried out when the overall model fitting degree test is acceptable. After processing the data input AMOS23.0 software using the least squares estimation method for model test and analysis, estimates of parameters can be calculated after specific parameter test and model modification of structural equation theory. Results of overall model fitting degree, structure model parameter estimation and measurement model parameter estimation are shown in Tables 1, 2 and 3, respectively.

Table 1. The overall model fitting degree.

| Fit index | GFI  | RMR  | RMSEA | AGFI  | NFI  | CFI  | AIC    |
|-----------|------|------|-------|-------|------|------|--------|
| Statistics| 0.847| 0.493| 0.094 | 0.823 | 0.906| 0.937| 874.91 |
| Judging criterion | >0.8 | <0.5 | <0.1 | >0.8 | >0.9 | >0.9 | The smaller the better |

GFI: goodness-of-fit index; RMR: root mean square residual; RMSEA: root mean square error of approximation; AGFI: adjusted goodness-of-fit index; CFI: comparative fit index.

Table 2. Structural model: estimation of parameters between potential variables.

| Variable relationships | Path coefficient | p     | Test results |
|------------------------|------------------|-------|--------------|
| Equity sharing → business performance | 0.159 | 0.039** | Positive |
| Management rights sharing → business performance | 0.115 | 0.083* | Positive |
| Control rights sharing → business performance | 0.148 | 0.000*** | Positive |
| Dividend sharing → business performance | 0.021 | 0.000*** | Positive |
| Executive compensation → business performance | 0.038 | 0.002*** | Positive |
| Managerial ownership → business performance | 0.046 | 0.000*** | Positive |

***Mean significant at the significance level of 1%.
**Mean significant at the significance level of 5%.
*Mean significant at the significance level of 10%.

GFI is the goodness-of-fit index, and RMR is the root mean square residual. RMSEA is the root mean square error of approximation. AGFI is the adjusted goodness-of-fit index and normed fit index (NFI) value is used to compare the $\chi^2$ value gap between a proposed model and the nullity model. The comparative fit index (CFI) is an improved NFI index. AIC is used to compare the degree of simplification of two quantitative models with different potential variables. The fitting indexes in Table 1 are all within the judgment criteria, which indicate that overall fitting degree of the theoretical model in this study is relatively good.

In Table 2, networked integration model has obvious positive effect on governance efficiency. Concerning capital structure, equity sharing has obvious positive influence on business performance, with an influence coefficient of 0.159. Concerning governance structure, both management rights sharing and control rights sharing have obvious positive effect on business performance, with an influence coefficient of 0.115 and 0.148, respectively. Concerning distribution structure, dividend sharing, executive compensation and managerial ownership all have obvious positive effect on business performance, and their influence coefficients are 0.021, 0.038 and 0.046, respectively. The research results fully show that it is very effective to
enhance business performance and build a network integration model of equity sharing, power sharing and benefit sharing. Only by combining three levels can we achieve better reform results.

In Table 3, coefficient between observed variable and corresponding potential variable of model reaches a significant level, which can fully reflect the corresponding potential variable. Conclusions can be found.

Firstly, concerning capital structure, shareholding ratio of state-owned capital, private capital, external capital and actual controllers all have positive effect on business performance, influence coefficient is 1, 0.975, 0.548 and 0.846, respectively. The influence degree is in the order from high to low: state-owned capital > private capital > actual controllers > external capital. Therefore, on the whole, the principle of ‘leading by state-owned company’ in mixed ownership reform must be clarified. Different regions and industries may have different empirical results due to the actual situation. In addition, principle of ‘leading by state-owned company’ is not absolute ‘single-large shareholder’, and external capital should be fully introduced to form a diversified shareholding structure and obtain win–win.

Secondly, concerning governance structure, it is embodied in two aspects: management rights sharing and control rights sharing. In terms of management rights sharing, the influence coefficients of state-owned shareholders’ management right, external shareholders’ management right, private shareholders’ management right and top 10 shareholders’ management right on business performance are 1, 0.663, 0.959 and 0.356, respectively. In terms of control rights sharing, the influence coefficients of state-owned shareholders’ relative control right, private shareholders’ relative control right, external shareholders’ control right and actual controllers’ control right on business performance are respectively 1.899, 0.643, 0.012 and 1, which shows that under the principle of ‘leading by state-owned company’, the participation of external capital should be actively introduced. The power balance mechanism should be established in terms of management right and control right, and the governance structure should be improved, which is conducive to truly achieving win–win results.

Thirdly, from the perspective of distribution structure, it is embodied in dividend sharing, executive compensation and managerial ownership. In terms of dividend sharing, the influence coefficients of share delivery ratio, the conversion ratio and dividend payout on business performance are 0.976, 0.982 and 1 respectively. In terms of executive compensation, the influence coefficients of total compensation of top three board members, supervisors and executives on business performance are 1.140, 0.872 and 1, respectively. In terms of managerial ownership, the influence coefficients of shareholding ratio of board, supervisors and executives on business performance are 1.081, 0.580 and 1, respectively. So, promoting distribution mechanism of corporate interests, balancing interests of multiple subjects and transforming it into a community of corporate interests is crucial to realize risk sharing, benefit sharing and win–win cooperation.

### Table 3. Measurement model: parameter estimation between potential variables and observed variables.

| Potential variables   | Observed variables | Parameter estimation | Standard error | p    |
|-----------------------|--------------------|----------------------|----------------|------|
| Business performance  | ROA                | 1                    |                |      |
|                       | ROE                | 3.681                | 0.213          | ***  |
| Equity sharing        | Sowner             | 1                    |                |      |
|                       | Powner             | 0.975                | 0.016          | ***  |
|                       | Oowner             | 0.548                | 0.023          | ***  |
|                       | Cowner             | 0.846                | 0.02           | ***  |
| Management rights sharing | Smanage         | 1                    |                |      |
|                       | Omanage            | 0.663                | 0.752          | ***  |
|                       | Pmanage            | 0.959                | 0.189          | ***  |
|                       | Cmanage            | 0.356                | 0.193          | ***  |
| Control rights sharing| Scontrol           | 1.899                | 0.084          | ***  |
|                       | Ccontrol           | 0.643                | 0.112          | ***  |
|                       | Ocontrol           | 0.012                | 0.093          | ***  |
| Dividend sharing      | Sstock             | 0.976                | 0.059          | ***  |
|                       | Tstock             | 0.982                | 0.048          |      |
|                       | Dstock             | 1                    |                |      |
| Executive compensation| Sboard             | 1.140                | 0.054          | ***  |
|                       | Scontrol           | 0.872                | 0.173          | ***  |
|                       | Smanage            | 1                    |                |      |
| Managerial ownership  | Cboard             | 1.081                | 0.017          | ***  |
|                       | Ccontrol           | 0.580                | 0.023          | ***  |
|                       | Cmanage            | 1                    |                |      |

ROA: return on total assets; ROE: return on equity.

***Significant at the significance level of 1%.
Comparative analysis of industrial clusters and non-industrial clusters

To research and verify whether the network integration model with industrial cluster as the core can significantly promote the performance of state-owned mixed company or not, and then put forward targeted policy suggestions. Set the dummy variable for whether belong to industrial cluster, which 1 means it belongs to industrial cluster, while 0 means it doesn’t belong to industrial cluster. The total sample is divided into industrial cluster and non-industrial cluster sample, conduct empirical analysis and comparison to verify whether the positive impact on business performance of networked integration model of industrial cluster samples is more apparent than non-industrial cluster samples or not. The two groups of samples are empirically tested using SEM. After parameter test and model modification, the estimated values of various parameters are calculated. Structural model results are listed in Tables 4 and 5, and measurement model results are listed in Table 6.

In Tables 5 and 6, no matter it is industrial cluster samples or non-industrial cluster samples, networked integration model have obvious positive effect on governance efficiency. In terms of capital structure, equity sharing has obvious positive effect on business performance. Influence coefficients of industrial cluster samples and non-industrial cluster samples are 0.267 and 0.136, respectively. Therefore, equity sharing of industrial cluster samples has more obvious positive effect on business performance than that of non-industrial cluster samples. Concerning governance structure, both management rights sharing and control rights sharing have obvious positive effect on business performance, and the positive impact is more obvious in the samples of industrial clusters. A similar conclusion is reached for the distribution structure.

In Table 6, there are differences between the parameter estimation results of industrial cluster samples and non-industrial cluster samples, but the overall estimation results are basically consistent. From Table 5, conclusions can be found.

Firstly, concerning capital structure, influence degree under industrial cluster sample is in the order from high to low: private capital > external capital > state-owned capital > actual controllers. However, influence degree under non-industrial cluster sample is in the order from high to low: private capital > state-owned capital > external capital > actual controllers. Thus, private capital in industrial clusters has more significant positive impact on promoting state-owned enterprise business performance. The
positive effect on company’s performance. However, state-owned capital has always been supported by the state, so its resource sensitivity and utilization are not as good as private capital.

Secondly, from the perspective of governance structure, in terms of management rights sharing, the parameter estimation results of industrial cluster samples and non-industrial cluster samples are basically the same, but the positive impact of industrial cluster samples is more obvious than that of non-industrial cluster samples. In terms of control rights sharing, the influence degree under industrial cluster sample is in the order from high to low: relative control rights of state capital > relative control rights of external capital > control rights of actual controller. However, the influence degree under non-industrial cluster sample is in the order from high to low: relative control rights of state capital > relative control rights of private capital > control rights of actual controller > relative control rights of external capital. In the industrial cluster, the private capital gains the right of control and speech, and the power is guaranteed. But in the non-industrial cluster, state-owned capital is in dominant position. Private capital power cannot obtain the definite safeguard, and worry still exists. There is also a crisis of trust between the two sides, which prevents them from operating harmoniously, thus governance efficiency is not rising as fast as in industrial clusters.

Thirdly, from the perspective of distribution structure, there are differences in the incentive effect of benefit sharing on the board of directors, board of supervisors and senior executives, but the results of parameter estimation are basically consistent with the overall sample. The differences between clusters of industrial and non-industrial are not obvious. The order from high to low is: the board of directors > senior executives > board of supervisors.

Conclusions and prospect

Based on constructing the theory of network integration model, 602 state-owned companies with mixed ownership in 22 provinces from 2007 to 2017 (the state is in a controlling position and both public capital and private capital participate in) are taken as the research sample to conduct an empirical analysis of network integration model efficiency and influencing factors. This article conducts empirical analysis and comparison of overall samples and industrial cluster and non-industrial cluster samples, the following conclusions are drawn.

Firstly, the networked integration model in mixed ownership reform can obviously promote business performance and improve the efficiency of enterprise governance. Equity sharing, power sharing and benefit sharing have significant positive effect on company’s performance. The first step of mixed ownership reform is equity share, then the pursuit of power sharing to obtain the substantive operation and management rights. The influence degree is in the order from high to low: control rights sharing > management rights sharing > speaking rights sharing. The dividend distribution, executive compensation and executive shareholdings have a significant positive impact. Thus, we should pay attention to the check and balance among board of directors, supervisors and senior executives, encourage and restrict each other, and the three complement each other and advance together.

Secondly, in the overall sample, the key factor affecting business performance is state-owned capital, followed by private capital. The principle of ‘leading by state-owned company’ should first be clarified in mixed ownership reform. Based on this, external capital, especially private capital, should be introduced actively to form diversified ownership structure and power balance mechanism. In terms of benefit sharing, dividend distribution, executive compensation and managerial ownership, all have significant positive effects. It is necessary to improve the corporate benefit distribution mechanism, balance the interests of multiple subjects and transform it into a corporate interest community, so as to realize risk sharing, benefit sharing and win–win cooperation.

Thirdly, compared with non-industrial cluster samples, the networked integration model in mixed ownership reform plays a more significant role in industrial cluster samples. Through empirical comparative analysis, whether it is equity sharing, power sharing or benefit sharing, the samples of industrial clusters have a more significant positive impact than those of non-industrial clusters. Among them, the positive impact of industrial cluster samples is more obvious than the overall samples, so to give full play to the integrated network model, industrial cluster as the core of the integrated network model should be established, and the advantage of state-owned capital and private capital should be combined to form the industrial clusters with Chinese characteristics, to cluster resources and talents and form the Chinese brand cohesion to better promote the development of win–win situation.

Fourth, there are significant differences between industrial cluster samples and non-industrial cluster samples in the key factors affecting business performance. Capital structure and governance structure, the private capital and the external capital in industrial cluster sample are important, while state-owned capital in non-industrial cluster sample play a more critical role. Under the market environment, among the samples of industrial clusters, private capital and external capital are highly sensitive to resources and talents, have a better understanding of the enterprise actuality and are good at seizing fleeting opportunities to make decisive decisions and seize opportunities. The incentive effect of benefit sharing on the board of directors, board of supervisors and senior executives varies, but results of parameter estimation are basically consistent with
the overall sample. The differences between industrial clusters and non-industrial clusters are not obvious. Its order from high to low is: the board of directors > senior executives > board of supervisors.

For the mixed ownership reform, many scholars have conducted extensive research. However, this article explores the mixed ownership reform model with Chinese characteristics from the new perspective of sharing economy. It is of great significance not only in theory but also in reality. Firstly, theoretical significance. This article explores the mixed ownership reform model with Chinese characteristics under the background of sharing economy and uses the data of listed companies to make the research content and results of the article more convincing. It provides new theoretical basis for mixed ownership reform research. Secondly, practical significance. With the advancement of mixed ownership reform, it has encountered resistance in all aspects, such as private enterprises have insufficient motivation to participate in. It is of great significance to solve the problem of wait-and-see and hesitate in private enterprises in the mixed ownership reform. So it is necessary to deeply analyse the reasons for the lack of motivation of private enterprises and build a new mixed ownership reform model to promote the development of sharing economy, deepen the state-owned enterprises reform, and promote the mixed ownership reform.

However, this article also has certain limitations. First, the indicators can be more precise, and the indicator system can be adjusted appropriately according to the needs of the model, so that the model fits better and the results are more convincing; second, the data come from databases and enterprise’s annual report, the authenticity of the data in a part of the enterprise’s annual report needs to be examined. In the future, we can further study the influencing factors of the moderating role and intermediary effect in the networked integration model, propose corresponding policy programs, use the model to further carry out policy simulation, and evaluate its improvement effects, so as to provide a reference for the government to promote policy.

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ORCID iD
Shun Li https://orcid.org/0000-0001-7482-7164

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