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Productivity Improvement from the Mixed-Ownership Reform: A Financial Frictions Perspective

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Abstract: How to raise productivity level has become the core issue of ensuring China's sustained Economic Growth in the Future. The mixed-ownership has both the financing advantage of the SOEs and the competitive ability of the Private firms, which can improve the governance of the firms. This paper builds a model based on the financial frictions literature, and studies the process of the mixed-ownership reform. The main results include: 1. On average, the mixed-ownership reform enhances the performance of the firms; 2. The relationship between the share of state ownership—full privatization, state-ownership, or mixed-ownership—and the performance depends on both the productivity and the restriction of financing; 3. When production efficiency is low, privatization works best; when production efficiency is medium, partial privatization works best; when production efficiency is high, nationalization works best; 4. Our model explain the puzzle of state-owned equity ratio and performance.

Keywords: mixed-ownership; team; misallocation

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1. Introduction

The core problem of Chinese economic system reform is to deal with the relationship between government and market, so that the market plays a decisive role in resource allocation and better play the role of government. At present, the focus of Chinese structural reform and the major problem to be solved is to reasonably define the boundary between the government and the market, which is also the key to deal with the efficiency, fairness, harmonious and sustainable development [1]. How to deal with the relationship between government and market is also a worldwide problem. The key to judge whether the market plays a decisive role is whether fair competition has been carried out. This paper emphasizes that the policy design of structural reform needs to be considered. How to make the fair competition between enterprise teams play a full role in all markets?

As early as 1997, the government made it clear that 'public ownership as the main body, the common development of multi-ownership economy' is the basic economic system. But crossing the deep waters of state-owned enterprise reform is not an overnight feat. Over the next 16 years, the major tasks put forward by the Third Plenary Session of the Eighteenth Central Committee re-emphasized promoting mixed ownership reform. Why is the ownership reform of state-owned enterprises hot again? The problem may be that there is still a lack of consensus on the realization form of mixed ownership economy in theory. This paper draws on the research results of the two theories of cooperative team game and financial friction, and discusses the mixed reform of state-owned enterprises from the perspective of eliminating financial mismatch and improving the overall economic production efficiency through cooperative teams among enterprises with different ownerships. We try to answer: What is the key to developing a mixed ownership economy? What is the significance of developing mixed ownership economy for China's economic development and structural transformation?

The analysis framework of cooperative team trade-off choice in this paper is shown in Figure 1 (the literature review of cooperative team trade-off choice refers to [2]). After

the country takes the strategic transformation of "grasping the big and putting the small". Under the goal of "bigger and stronger". State-owned enterprises cultivate monopoly power and increase monopoly profits in order to maintain and increase value. So as in Figure 1, the model assumes: State-owned enterprise B production efficiency is low, but by virtue of its industry monopoly guarantee, can obtain external funds from financial institutions at low cost, relieve financing constraints, smooth out of difficulties. As shown in Figure 1, although private enterprise A has high production efficiency, it also faces strong financing constraints.

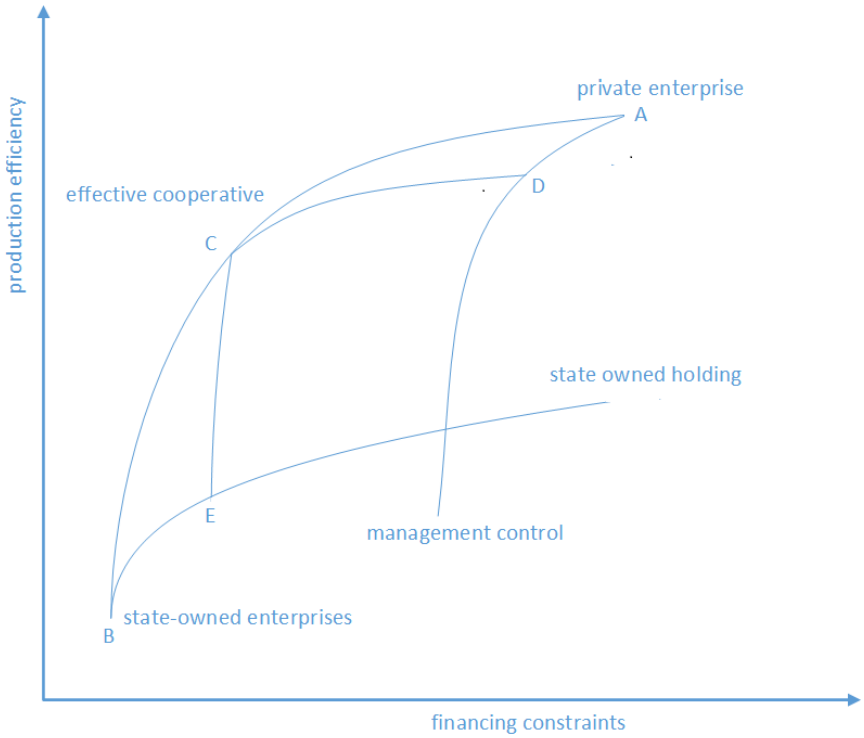


Figure 1. Analysis framework of cooperative team trade-off choice.

According to the financial friction theory, state-owned enterprises rely on monopoly to squeeze the competitive profits of private enterprises with high production efficiency, and gradually form interest groups, which has become a force that hinders the deepening of the reform of the production factor market. The substantive advancement of financial marketization reform is hindered, and the price of market reform lacking fair competition is increasing. Therefore, the government needs to reexamine the status and function of state-owned enterprises, plan the process of market reform, and promote a new round of enterprise and factor market reform as a whole. Otherwise, because the structural problems caused by monopoly profits are difficult to solve and economic efficiency is difficult to improve substantially, the results of previous reforms are exhausted by the low efficiency of the overall economy caused by the unbalanced economic structure.

Sustainable economic growth mainly through the following two ways to achieve. First, improve productivity, that is, to increase the ratio between the actual output and the maximum output under a fixed input; second, promote the optimal allocation of resources, namely the best combination of enterprise cooperation team to produce the 'optimal' product portfolio (for example, the effective cooperation C in Figure 1). Many studies have found that the key to improve the production efficiency of enterprise cooperation team is financial deepening. For example, in the literature of development economics, it is generally believed that financial deepening is the 'engine' of economic growth. Financial deepening increases the liquidity of resources and reduces transaction costs of investment, thereby enhancing technological progress and resulting in increased investment [3]. More importantly,

financial deepening improves resource allocation efficiency, thereby increasing productivity ([4–6]). Existing China literature emphasizes that financial deepening promotes technological progress and supports the positive effect of the first approach on economic growth ([7–9]). However, the existing literature lacks research on financial promotion of resource allocation efficiency, especially the promotion of enterprise cooperation teams.

To this end, based on the efficiency of finance in promoting resource allocation, this paper proposes that the current deepening of the reform of state-owned enterprises should start from exploring how to realize the cooperative team of enterprises with mixed ownership, and realize the cross shareholding and mutual integration of state-owned capital and non-state-owned capital such as private capital (as shown in various situations of C-D-E in Figure 1). The course of the reform of state-owned enterprises, as well as the research of scholars show that the reform of state-owned enterprises is difficult, find the breakthrough point of reform has become the key to the success of the reform. Ref. [10] believes that effectively promoting the reform of state-owned economy will inevitably encounter obstacles from old ideology and resistance from special vested interest groups, which is a very difficult task and the reform of state-owned enterprises has a long way to go. The enterprise cooperation team is helpful to eliminate the resistance of all parties and determine the decisive role of market regulation in resource allocation. It is conducive to revitalizing capital and effectively integrating the development and use of state-owned resources into economic construction; the capital advantage of state-owned enterprises and the flexible market mechanism advantage of private enterprises are combined to produce complementary governance effects.

Based on the general equilibrium theory of Moll (2014) [11] that heterogeneous producers face collateral restrictions, this paper constructs a mixed ownership reform model of state-owned enterprises and analyzes the performance of mixed ownership reform under the condition of financial friction. The contribution of this paper is reflected in the following three aspects.

1. This paper constructs a mixed ownership reform model of state-owned enterprises model illustrates the internal mechanism of mixed ownership reform, and provide theoretical support for the reform of state-owned enterprises in China.

2. Unlike Moll (2014) [11], this model not only considers capital mismatch caused by financial frictions, which affects overall production efficiency, but also further studies the mutual integration of heterogeneous producers and the impact of cooperative teams on production efficiency.

3. This paper solves the structural imbalance and improves the production efficiency of the whole society through the enterprise cooperation team. Ref. [12] used a similar model to reveal the mystery of China's economic growth. Their models explain the structural imbalance in the process of economic operation, which leads to foreign trade imbalance and high foreign exchange reserves. However, their model does not consider solving the problem of structural imbalance and improving the efficiency of social production through enterprise cooperation teams.

This paper is organized as follows. The second part is the literature review; the third part introduces the theoretical model; the fourth part discusses the mixed reform of state-owned enterprises under financial friction; finally, summary and policy recommendations.

2. Literature Review on Financial Constraints, Capital Mismatch and Productivity

Resource misallocation affects production efficiency ([13–15]). From the macroeconomic point of view, the improvement of capital allocation efficiency is undoubtedly crucial. For example, [16] derived a non-parametric analysis framework that can measure the source of economic growth, and used provincial data as samples to measure the source of China's economic growth. The output growth rate can be decomposed into four parts: efficiency change contribution, technological progress contribution, labor contribution and capital contribution. Total factor productivity refers to the sum of efficiency change and technological progress, the results show that the contribution share of total factor productivity, labor

and capital to China's economic growth is 20.7%, 3.3% and 76.0%, respectively, without considering the impact of the international financial crisis from 1978 to 2010. From the sub-sources of economic growth, capital contributes the most to China's economic growth. Only when capital allocation is more reasonable and effective, production efficiency will continue to rise; if the efficiency of capital allocation is ignored, it will lead to idle and waste of resources, and then lead to low production efficiency.

The key to improving the optimal allocation of resources is financial deepening. A large number of China literature focuses on how financial deepening promotes technological progress. For example, [7] used provincial panel data to study how productivity changes in various regions of China are affected by the process of financial deepening, and found that there is a significantly positive relationship between financial deepening and productivity growth. Refs. [8,9] found that financial development is the direct cause of technological innovation, and technological innovation is the direct cause of conspicuousness promoting economic growth.

Recent studies have gradually focused on the impact of financial misallocation on corporate capital return. For example, [17] research shows that the same factors of production in an economy there is a huge difference in returns, resources are not always optimal allocation. They believe that there are serious misallocation of resources in countries with imperfect markets. Refs. [18–20] provide a good summary of the privatization of state-owned enterprises. It is generally believed that privatization is effective, and private companies will almost always become more efficient and more profitable. These empirical studies mainly focus on the privatization of state-owned enterprises in Russia and Eastern European countries. Research has also gradually noticed China's financial misallocation. Although the results obtained by selecting samples from different periods and using different methods are different, based on most empirical studies, there are two major consensus.

2.1. Resource Mismatch Exists in China's Economy; The Reform of State-Owned Enterprises Is the Key to Improve Production Efficiency

After the transformation of 'grasping big and putting small', State-owned enterprises in the market did not experience the fierce competition faced by private enterprises, production efficiency has not been truly improved. Ref. [21] used data from more than 10,000 companies in 120 cities in China from 2002 to 2004, found systematic capital allocation distortions in China, which led to very unequal marginal returns to capital among different ownership, regions and sectors. Ref. [22] used the data of the third industrial census in 1995 to test various factors affecting the technical efficiency of enterprises, and found that non-state-owned enterprises had higher technical efficiency than state-owned enterprises. Ref. [23] used the data of the second national basic unit census in 2001 to examine the new development trends of state-owned enterprises. The results show that: first, state-owned enterprises have a significant negative effect on efficiency, and private enterprises, joint-stock enterprises and 'three-capital' have a positive correlation with efficiency. Second, for the different capital equity of the restructured enterprises, individual capital has the most obvious positive correlation effect, while national capital shows a very obvious negative correlation effect. Third, the scale efficiency of joint-stock companies is significantly less than the joint-stock cooperative enterprises, which is the result of more negative effects of state-owned property rights offset the positive role of scale efficiency.

After the restructuring of state-owned enterprises, the economic benefits of enterprises have increased significantly, mainly from the reduction of agency costs and the improvement of incentive mechanisms, which is manifested in the decrease of management cost rate. Based on the data of all state-owned enterprises and non-state-owned enterprises above designated size from 1998 to 2003, [24] studied the effect of the reform of state-owned enterprises and found that the economic benefits of enterprises after the reform were significantly improved, mainly due to the reduction of agency costs, which was reflected in the decrease of management cost rate. The restructuring has brought certain social costs, but it

is not very large compared with international experience. The restructuring of state-owned holding has better social benefits, while the restructuring of non-state-owned holding has better economic benefits, and the restructuring effect is continuous. Ref. [25] found that the enhancement of enterprise incentive mechanism under mixed ownership is an important reason for improving profitability.

2.2. Increasing the Efficiency of Financing Allocation and the Proportion of Non-Public Economy Are Beneficial to Economic Growth

The existence of factor mobility barriers and resource misallocation factors not only affects the short-term total output of the economy and its output ratio, but also affects the long-term output combination of the economy (production frontier). Ref. [26] found that eliminating mismatch factors could increase China's GDP growth by an average of 0.9 percentage points per year. Ref. [14] used a monopolistic competition model and corporate data, speculated that if manufacturing firms in China could allocate resources to high-productivity firms like US firms, then TFP could increase by 30–50 per cent. Ref. [27] used China's manufacturing firm data for 1998–2006 to decompose the TFP growth rate, arguing that if the entry and exit of enterprises are free and resources flow from inefficient state-owned enterprises to efficient private enterprises, such resource replacement will further improve the TFP of Chinese enterprises.

Ref. [28] based on the micro data of China Industrial Enterprises Database from 1998 to 2009, used OP (Olley, G. S., and A. Pakes; 1996) [29] and LP (Levinsohn, J. and A. Petrin; 2003) [30] methods to calculate the total factor productivity at the enterprise level, and discussed the transformation of economic structure from the perspective of resource allocation efficiency. The micro-data study finds that the efficiency of enterprises with different ownership types varies greatly. Even under the background of 'grasping the big and putting the small' and resource tilt, the performance of state-owned enterprises is still unsatisfactory, and the investment efficiency is 43 % lower than that of private enterprises. Consistent with our hypothesis, the study finds that the source of productivity growth in manufacturing industry is more the growth of enterprises, and the space for its growth is shrinking. It is urgent to rely on the improvement of resource allocation efficiency to promote growth.

State-owned enterprise reform can promote TFP growth and exert external spillover effects on other enterprises by increasing capital marginal output, improving capital dynamic allocation efficiency. Ref. [31] Using the data of industrial enterprises in China from 1999 to 2007, this paper studies the relationship between ownership structure and return on capital. The empirical results show that the return on capital of state-owned enterprises is much lower than that of other ownership types of enterprises, and the return on capital of private enterprises is the highest. Ref. [32] examined the impact of state-owned enterprise reform on production efficiency and innovation efficiency by using difference method. Reforming state-owned enterprises into state-owned enterprises with dominant state capital is beneficial to improve production efficiency rather than innovation efficiency. Transforming state-owned enterprises into non-state-owned enterprises is not only beneficial to improve production efficiency, but also helpful to improve innovation efficiency. Ref. [33] use the ownership structure and economic operation data of China's provincial industrial sector to build a panel model. The empirical research shows that the decrease of the proportion of state-owned economy and the increase of the proportion of non-public economy will reduce the proportion of regional deposit-loan gap in deposits, thereby improving the efficiency of capital use and economic growth. Ref. [34] numerical simulation results show that 5% of state-owned enterprises reform each year, economic growth can increase by about 0.33 percentage points.

3. Theoretical Model of Enterprises under Financial Friction

Based on the model of Moll (2014) [11], the enterprise model under financial friction is first constructed, and on this basis, the mixed ownership reform model is constructed.

Firstly, the basic assumptions of the model of enterprises under financial friction are briefly described, including preferences (A), production technology (B), constraints (C) and entrepreneur behavior (D). Subsequently, in the fourth part, we explain the process of state-owned enterprises mixed reform.

(A) preference. In a continuous time, each enterprise can be marked by productivity (z) and wealth (a). Suppose production efficiency obeys Markov process. At the moment t, the economic state follows the joint distribution $g_t(a, z)$, the consumption of entrepreneurs is $c(t)$. The entrepreneur exists as an individual here, and the greater the consumption, the greater the utility, then entrepreneurs have preferences:

$$E_0 \int_0^{\infty} e^{-\rho t} \log c(t) dt \tag{1}$$

where E_0 is the expectation that they face uncertainty. ρ is the discount rate. productivity (z) is a stand-in term for a variety of factors such as entrepreneurial ability, an idea for a new product, an investment "opportunity", but also demand side factor such as idiosyncratic demand shocks [11].

(B) Production technology. In the literature, technological innovation either enhances capital formation (Moll, 2014) [11] or increases human capital (Song et al., 2011) [12]. This model adopts Hicks-neutral Cobb-Douglas production function. This form of technological progress makes the efficiency of capital and labor increase synchronously, which is in line with the production situation of developing countries. Each entrepreneur owns a private firm which uses unit k capital and unit l labor for production, the production function of enterprises is:

$$y = f(z, k, l) = z k^a l^{1-a}, \ a \in (0, 1) \tag{2}$$

(C) Constraint conditions. Entrepreneurs hire workers in the competitive labor market by wage $w(t)$ and hire capital by rent $R(t)$ in the competitive capital market. Rent equals user cost of capital: $R(t) = r(t) + \delta$, where $r(t)$ is interest rate and δ is depreciation rate. Entrepreneur wealth is $a(t)$, the evolution equation of wealth is:

$$\dot{a} = f(z, k, l) - wl - (r + \delta)k + ra - c \tag{3}$$

That is, the change in wealth equals output minus the cost of labor and capital, plus the interest income of wealth minus consumption.

Under financial frictions, entrepreneurs face mortgage constraints as follows:

$$k \leq \lambda(z) a, \lambda(z) \geq 1, \lambda'(z) \geq 0, \forall z \tag{4}$$

Moll (2014) [11] assumes a special case, lending constraints have nothing to do with productivity: $k \leq \lambda a$, $\lambda \geq 1$, For example, the constraint can be motivated as arising from a finite execution problem. Consider an entrepreneur with wealth a who rents k units of capital. The entrepreneur can steal a fraction $1/\lambda$ of the rented-in capital. As a penalty, he will lose his wealth. In equilibrium, the financial intermediary rents in capital to the point where the individual has an incentive to steal the rented-in capital, which implies the collateral constraint. We assume that $\lambda(z)$ at different productivity levels measures the allocation efficiency of different capital markets, where $\lambda(z) = \infty$ corresponds to a perfect capital market, in the case of $\lambda(z) = 1$, the capital market is completely closed. So $\lambda(z)$ capture the degree of financial friction, and can give a system of financial development explanation.

(D) Entrepreneur behavior. Based on the above assumptions, the entrepreneur utility optimization problem is as follows:

$$\max_c E_0 \int_0^{\infty} e^{-\rho t} \log c(t) dt$$

$$\text{s.t. } \dot{a} = f(z, k, l) - wl - (r + \delta)k + ra - c$$

The enterprise production optimization problem is expressed as Equation (5)

$$\Pi(a,z) = \max_{k,l}\{f(z,k,l) - wl - (r+\delta)k, k \le \lambda(z)a\} \tag{5}$$

Because capital is restricted by collateral (4), the profit of an enterprise depends on its wealth a. Since the production and savings/consumption decisions are made separately, budget constraints (3) can now be rewritten as:

$$\dot{a} = \Pi(a,z) + ra - c \tag{6}$$

This means that entrepreneurs solve a static profit maximization problem in each period, and then decide to allocate these profits plus interest income ra between consumption and savings.

Lemma 1. *Enterprises demand for factors and profits are linear functions of wealth, and the productivity of enterprises involved in production has a minimum critical value* $\underline{z}$.

$$k(a,z) = \begin{cases} \lambda(z)a, & z \ge \underline{z} \\ 0, & z < \underline{z} \end{cases}$$

$$l(a,z) = \left(\frac{1-\alpha}{w}\right)^{\frac{1}{\alpha}} z^{\frac{1}{\alpha}} k(a,z)$$

$$\Pi(a,z) = \max\left\{z^{\frac{1}{\alpha}}\pi - (r+\delta), 0\right\}\lambda(z)a,\ \pi = \alpha\left(\frac{1-\alpha}{w}\right)^{\frac{1-\alpha}{\alpha}}$$

Productivity threshold satisfies: $\underline{z}^{\frac{1}{\alpha}}\pi = (r+\delta)$.

Proof of Lemma 1. First, the optimization problem is expressed as follows:

$$\Pi(a,z) = \max_{k,l}\left\{zk^{\alpha}l^{1-\alpha} - wl - (r+\delta)k \quad \text{s.t.} \quad k \le \lambda(z)a\right\}$$

So the Lagrange function is expressed as:

$$L(k,l,\mu) = \max_{k,l}\left\{zk^{\alpha}l^{1-\alpha} - wl - (r+\delta)k + \mu(\lambda(z)a - k)\right\}$$

Solving first order conditions: $\frac{\partial L}{\partial l} = 0$, get $l(a,z) = \left(\frac{1-\alpha}{w}\right)^{\frac{1}{\alpha}} z^{\frac{1}{\alpha}} k(a,z)$.
Substituting the optimal labor demand, the optimization problem becomes:

$$\max_{k}\left\{\left(z\left(\left(\frac{1-\alpha}{w}\right)^{\frac{1}{\alpha}} z^{\frac{1}{\alpha}}\right)^{1-\alpha} - w\left(\frac{1-\alpha}{w}\right)^{\frac{1}{\alpha}} z^{\frac{1}{\alpha}} - (r+\delta)\right)k + \mu(\lambda(z)a - k)\right\}$$

$f(z,k,l) = zk^{a}l^{1-a}$ is about capital and labor scale returns unchanged, profit and capital is linear relationship, so there are $k(a,z) = \begin{cases} \lambda(z)a, & z \ge \underline{z} \\ 0, & z < \underline{z} \end{cases}$, Therefore, we can get: $\Pi(a,z) = \max\left\{z^{\frac{1}{\alpha}}\pi - (r+\delta), 0\right\}\lambda(z)a,\ \pi = \alpha\left(\frac{1-\alpha}{w}\right)^{\frac{1-\alpha}{\alpha}}$. When there is no difference between the choice of production and non-production, then $\Pi(a,z) = 0$, the productivity threshold $\underline{z}$ can meet $\underline{z}^{\frac{1}{\alpha}}\pi = (r+\delta)$. □

The return on capital is a function of productivity (see Theorem 1 below).

Theorem 1. *Capital return rate* $\mathcal{R}(z)$ *is the function of productivity:*

$$\mathcal{R}(z) \equiv \Pi(a,z)/a = \max\left\{z^{\frac{1}{\alpha}}\pi - (r+\delta), 0\right\}\lambda(z), \quad \pi = \alpha\left(\frac{1-\alpha}{w}\right)^{\frac{1-\alpha}{\alpha}}.$$

Lemma 2. *The optimal savings strategy is a function of wealth:*

$$\dot{a} = s(z)a,\ s(z) = \max\left\{z^{\frac{1}{\alpha}}\pi - (r+\delta), 0\right\}\lambda(z) + r - \rho, \quad \pi = \alpha\left(\frac{1-\alpha}{w}\right)^{\frac{1-\alpha}{\alpha}}.$$

Proof of Lemma 2. First, we know $\dot{a} = f(z,k,l) - wl - (r+\delta)k + ra - c$. Because the enterprise's production and savings/consumption decisions are carried out in a separate way, so $\dot{a} = \Pi(a,z) + ra - c$. Entrepreneurs solve a static profit maximization problem in each period, and then they decide to allocate these profits (plus interest income Ra) between consumption and savings.

The utility maximization problem is:

$$\begin{aligned} &\max_c E_0 \textstyle\int_0^\infty e^{-\rho t}\log c(t)dt \\ &s.t.\ \ \dot{a} = A(z,t) - c \end{aligned}$$

where $A(z,t) = \max\left\{z^{\frac{1}{\alpha}}\pi(t) - (r(t)+\delta), 0\right\}\lambda(z) + r(t)$.

Then, the Bellman equation of the above problem is:

$$\rho V(a,z,t) = \max_c\left\{\log c + \frac{1}{dt}E[dV(a,z,t)] \ \text{ s.t. } \ da = [A(z,t) - c]dt\right\}$$

Conjecture and proof $V(a,z,t) = BV(z,t) + B\log a$.

According to our guess, we can get $E[dV(a,z,t)] = \frac{B}{a}da + BE[dV(z,t)]$, The Bellman equation is rewritten as:

$$\rho BV(z,t) + \rho B\log a = \max_c\left\{\log c + \frac{1}{dt}\left(\frac{B}{a}da + BE[dV(z,t)]\right)\right\}$$

According to the definition of wealth dynamics, we can get:

$$\rho BV(z,t) + \rho B\log a = \max_c\left\{\log c + \frac{1}{dt}\frac{B}{a}[A(z,t) - c]dt + \frac{1}{dt}BE[dV(z,t)]\right\}$$

$c = a/B$ is obtained from the first-order condition. Then, the above equation is expressed as:

$$\rho BV(z,t) + \rho B\log a = \log a - \log B + \frac{B}{a}A(z,t) - 1 + \frac{1}{dt}BE[dV(z,t)]$$

Obviously, that means $\rho B = 1$, so $B = 1/\rho$. So we get $c = \rho a$, then we get $\dot{a} = [A(z,t) - \rho]a$. At this time, the value function can be expressed as: $V(a,z,t) = [V(z,t) + \log a]/\rho$, where $V(z,t)$ satisfies:

$$\rho V(z,t) = \rho\log\rho - \rho + A(z,t) + \frac{1}{dt}E[dV(z,t)].$$

□

From Lemma 2, the growth rate of wealth is a function of productivity (see Theorem 2 below). According to the expression of wealth growth rate, the same productivity has the same wealth growth rate under the same loan constraints.

Theorem 2. *The growth rate of wealth $\mathcal{A}(z)$ is a function of productivity:*

$$\mathcal{A}(z) \equiv \frac{\dot{a}}{a} = \max\left\{z^{\frac{1}{\alpha}}\pi - (r+\delta), 0\right\}\lambda(z) + r - \rho, \quad \pi = \alpha\left(\frac{1-\alpha}{w}\right)^{\frac{1-\alpha}{\alpha}}.$$

It can be seen from Theorems 1 and 2 that the rate of return on capital $\mathcal{R}(z)$ and the growth rate of wealth $\mathcal{A}(z)$ are determined by productivity z and borrowing constraints $\lambda(z)$. If enterprises have the same productivity and borrowing constraints, their rate of return on capital and the growth rate of wealth are the same.

4. The Mixed Reform of State-Owned Enterprises under Financial Friction

Based on the consensus of the second part of the article, combined with the relevant literature [4,12,35–37], we can make the following assumptions:

Hypothesis (mismatch between production efficiency and borrowing constraints):

Hypothesis 1. *The production efficiency of state-owned enterprises in China is lower than that of private enterprises.*

Hypothesis 2. *Although the production efficiency is low and the innovation is insufficient, the state-owned enterprises have the financing privilege and can obtain bank credit first.*

Hypothesis 3. *Although private enterprises have higher production efficiency, they are discriminated in financing and credit.*

4.1. The State of Mixed Ownership Reform before and after the Introduction of State-Owned Enterprises

Before the mixed ownership reform, according to Hypothesis 1, state-owned enterprise S productivity is z_S, private enterprise E productivity is z_E, and $z_S \leq z_E$; assuming a is the wealth owned by the enterprise, the enterprise's borrowing constraints are $k_i(a, z_i) \leq \lambda_i(z_i)a$, $i = S, E$, and $\lambda_S(z) > \lambda_E(z)$.

Proposition 1. *Before the reform of state-owned enterprises, enterprises have three states: (1) Private enterprises exist alone (Figure 1, line A); (2) State-owned enterprises exist alone (Figure 1, line B); (3) State-owned enterprises and private enterprises coexist (Figure 1, lines A, B).*

After the introduction of mixed state-owned enterprise reform, state-owned enterprise S productivity is z_S, private enterprise E productivity is z_E, mixed enterprise H productivity is z_H. Since the productivity of a hybrid enterprise should be between state and private enterprises, there is $z_S \leq z_H \leq z_E$. If a is the wealth owned by the enterprise, the loan constraint of the enterprise is $k_i(a, z_i) \leq \lambda_i(z_i)a$, $i = S, E, H$. Since the borrowing constraints of hybrid enterprises should be between private enterprises and state-owned enterprises, there is $\lambda_S(z) > \lambda_H(z) > \lambda_E(z)$.

Proof of Proposition 1. First of all, the return on capital of type i ($i = E\ or S$) enterprises can be obtained by Theorem 1:

$$\mathcal{R}_i(z_i) = \max\left\{{z_i}^{\frac{1}{\alpha}}\pi - (r+\delta), 0\right\}\lambda_i(z_i), \quad \pi = \alpha\left(\frac{1-\alpha}{w}\right)^{\frac{1-\alpha}{\alpha}}$$

From Theorem 2, we can obtain the growth rate of wealth of type $i^{(i=E \text{ or } S)}$ enterprises:

$$\mathcal{A}_i(z_i) = \max\left\{z_i{}^{\frac{1}{\alpha}}\pi - (r+\delta), 0\right\}\lambda_i(z_i) + r - \rho$$

(1) If $\mathcal{R}_S(z_S) = \mathcal{R}_E(z_E)$, then $\mathcal{A}_S(z_S) = \mathcal{A}_E(z_E)$, the two types of enterprises coexist;
(2) If $\mathcal{R}_S(z_S) > \mathcal{R}_E(z_E)$, then $\mathcal{A}_S(z_S) > \mathcal{A}_E(z_E)$, State-owned enterprises exist alone;
(3) If $\mathcal{R}_S(z_S) < \mathcal{R}_E(z_E)$, then $\mathcal{A}_S(z_S) < \mathcal{A}_E(z_E)$, private enterprises exist alone.

□

The cooperative team game matrix of state-owned enterprises and private enterprises is shown in Table 1 (the value of the payment matrix in the game is only indicative of the nature). It is noted that only private enterprise A and state-owned enterprise B choose to be independent in the stable Nash equilibrium strategy in this game. At the same time, the unstable Nash equilibrium strategy includes private enterprise A control, state-owned enterprise B cooperation (manager control), and state-owned enterprise B control, private enterprise A cooperation (state-owned enterprise control). The production efficiency of the former is guaranteed, but financing constraints do not necessarily improve significantly; the latter financing constraints loose, but often efficiency cannot be guaranteed. Finally, private enterprise A and state-owned enterprise B cooperation is a Pareto dominance strategy.

Table 1. Game Matrix.

Private Enterprise A				
independence	co-operation	control		State enterprise B
(0, −1)	(0, 2)	(−1, −1)	control	
(0, −1)	(1.5, 1.5)	(2, 0)	co-operation	
(0, 0)	(−1, 0)	(−1, 0)	independence	

Here, we quote the following important conclusions without proof, which is usually called the nameless theorem: Any feasible payment vector of Pareto superior to Nash equilibrium is a specific subgame perfect equilibrium of infinite repeated games (a textbook description of this conclusion can refer to Zhang Jun (1999) literature review [2]). Therefore, in the cooperative team game of private enterprise A and state-owned enterprise B, (cooperation, cooperation), (control, cooperation), (cooperation, control) are perfect equilibrium strategies of subgame. This conclusion can give us the following proposition 2.

Proposition 2. *After the reform of state-owned enterprises, enterprises have seven states: (1) Private enterprises exist alone (Figure 1, line A); (2) State-owned enterprises exist alone (Figure 1, line B); (3) Coexistence of state-owned enterprises and private enterprises (Figure 1, lines A, B);(4) Private enterprises and mixed enterprises coexist, usually managers control type (Figure 1, lines A, D, C); (5) State-owned enterprises and mixed enterprises coexist, usually state-owned assets control type (Figure 1, lines, B, E, C); (6) Mixed Enterprise Exclusive (Figure 1, line C, D, C, E); (7) Three types of enterprises coexist, state-owned assets control and management control exist at the same time (Figure 1, lines A, B, D, C, E, C). After the reform of state-owned enterprises, the growth rate of return on capital and wealth is not less than the growth rate of return on capital and wealth before the reform.*

Proof of Proposition 2. The return on capital $\mathcal{R}_i(z_i)$ of type $i^{(i=S \text{ or } E \text{ or } H)}$ enterprises can be obtained from Theorem 1. From Theorem 2, we can obtain the growth rate of wealth $\mathcal{A}_i(z_i)$ of Class $i^{(i=S \text{ or } E \text{ or } H)}$ enterprises.

Pre-reform status (1):

(a) If $\mathcal{R}_S(z_S) = \mathcal{R}_E(z_E) = \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) = \mathcal{A}_E(z_E) = \mathcal{A}_H(z_H)$, Coexistence of three types of enterprises;

(b) If $\mathcal{R}_S(z_S) = \mathcal{R}_E(z_E) > \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) = \mathcal{A}_E(z_E) > \mathcal{A}_H(z_H)$, state-owned enterprises and private enterprises coexist;
(c) If $\mathcal{R}_S(z_S) = \mathcal{R}_E(z_E) < \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) = \mathcal{A}_E(z_E) < \mathcal{A}_H(z_H)$, mixed enterprises exist alone;

In pre-reform status (2):

(d) If $\mathcal{R}_S(z_S) > \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) > \mathcal{A}_H(z_H)$, state-owned enterprises exist alone;
(e) If $\mathcal{R}_S(z_S) = \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) = \mathcal{A}_H(z_H)$, state-owned enterprises and mixed enterprises coexist;
(f) If $\mathcal{R}_S(z_S) < \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) < \mathcal{A}_H(z_H)$, the mixed enterprise exists alone;

In pre-reform status (3):

(g) If $\mathcal{R}_S(z_S) > \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) > \mathcal{A}_H(z_H)$, private enterprises exist alone;
(h) If $\mathcal{R}_E(z_E) = \mathcal{R}_H(z_H)$, then $\mathcal{A}_E(z_E) = \mathcal{A}_H(z_H)$, private enterprises and mixed enterprises coexist;
(i) If $\mathcal{R}_S(z_S) < \mathcal{R}_H(z_H)$, then $\mathcal{A}_S(z_S) < \mathcal{A}_H(z_H)$, the mixed enterprise exists alone.

□

4.2. Numerical Simulation of the Model

The paper use MATLAB software (MATLAB 12) for numerical simulation. The computer operating system was Windows 7 (Microsoft Ltd., Redmond, Washington, DC, USA) with an Intel Core i3-3217U CPU @1.80GHz 1.80GHz processor (Intel, Santa Clara, CA, USA) and 4G memory. The software was MATLAB version R2012a, developed by MathWorks. The simulation experiment environment is shown in Table 2. In Table 2, we set the basic parameters of the model. The parameters are set based on Hsieh and Klenow (2009) [14] and Song et al. (2011) [12] analysis of Chinese industrial enterprise data.

Table 2. Simulation Environment and Parameter calibration.

Component	Environment	Parameter Declaration	Parameter Setting
Operating system	Windows 7	Capital share α	0.5
CPU	Intel Core i3-3217U CPU @1.80GHz 1.80GHz	Capital depreciation rate δ	0.1
Memory	4.0 GB	interest rate r	0.0175
MATLAB	version R2012a (7.14.0.739)	wage rate w	3.1

In addition, we assume that financing constraints vary among firms at the beginning (see Table 3). This setting is consistent with a large number of empirical studies.

Table 3. Constraint function settings.

Lending Constraints of Private Enterprises	$\lambda_E(z_E) = 1.2{z_E}^{0.3} = 1.2z^{0.3}$
Lending Constraints of State-owned Enterprises	$\lambda_S(z_S) = 3.6{z_S}^{0.3} = 3.6(z - 0.58)^{0.3}$

In Figure 2, we use the above parameters to verify the three existing states of enterprises. Interestingly, our results are consistent with the analysis of the impact of the proportion of non-state-owned shares on enterprise efficiency by [24]. Their research uses the data of all state-owned enterprises and non-state-owned enterprises above the scale from 1998 to 2003 to construct the fixed effect model of enterprises. After controlling the factors such as macro environment, industry competition and enterprise characteristics, it is found that the enterprises with more non-state-owned shares are usually smaller, such as the proportion of non-state-owned shares increases by 1%, which will lead to the decline

of asset logarithm 0.1437, but the sales logarithm increases by 0.2069. This is consistent with the line (private enterprises) higher than the imaginary line (state-owned enterprises) in Figure 2. Note that at this time ROE and production efficiency is relatively low, means that there is no economies of scale, the size of the enterprise is small. At the same time, non-state-owned shares increase the profit rate of enterprises, such as the proportion of non-state-owned shares increased by 1%, will increase the asset profit rate of 1.71%, sales profit rate of 3%; non-state-owned shares increase labor productivity, the proportion of non-state-owned shares increased by 1 per cent, per capita profits by 2.2801 and per capita sales by 51.5037.

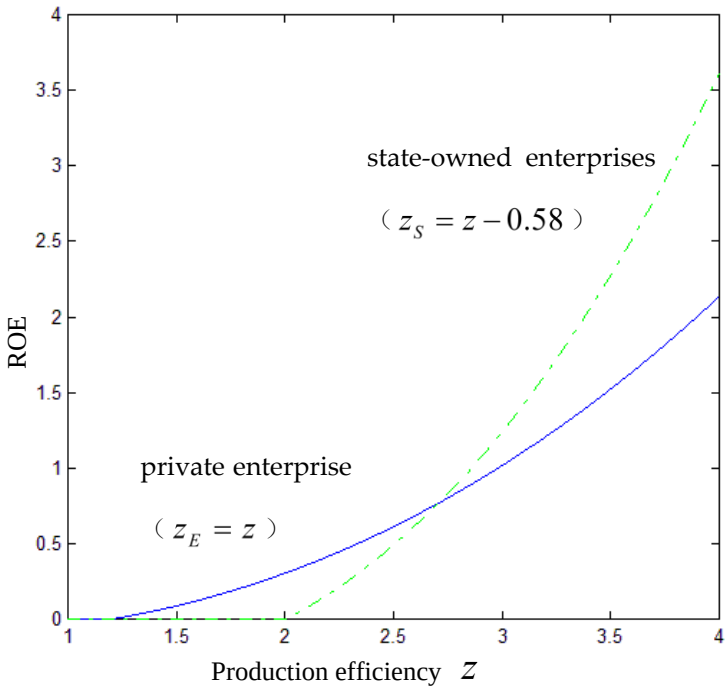


Figure 2. Simulation before mixing.

For different ownership enterprises are subject to constraints, empirical research from different time periods, different industries econometric model of specific results, although there are some differences, but have verified the development of mixed ownership is conducive to promoting the efficiency of state-owned enterprises to improve. The enlightenment of empirical research is that in the process of marketization reform, we should encourage the development of mixed ownership and optimize the structure of equity ownership. The constraint function settings after mixing are shown in Table 4.

Table 4. Constraint Function Settings for Mixed Enterprises.

Mixed enterprise production efficiency unchanged	Managerial Control	$\lambda_H(z_H) = L_H {z_H}^{0.3}$	(Figure 3)
Mixed corporate lending constraints remain unchanged	State assets control type	$\lambda_H(z_H) = 2.4(z-h)^{0.3}$	(Figure 4)

Figures 3 and 4 simulate the results of state-owned enterprise mixed reform from different angles, which are consistent with the conclusions given by the model, and can verify that the results are robust. Figure 3 usually corresponds to managerial control. At this point, the production efficiency is basically unchanged, but the financing constraints are often changed according to the willingness of state capital to participate (see Figure 1,

lines D, C). If a state-owned enterprise is able to perform the duties of a fund partner, then the financing constraint $\lambda_H(z_H)$ is relaxed, and the return on capital and wealth of the enterprise are maximized (red lines in Figure 3). Similarly, Figure 4 corresponds to the usual state-owned asset control. At this time, the financing constraints are basically unchanged, but the production efficiency changes because the management of private enterprises must be suitable for the administrative mode of state-owned enterprises (see Figure 1, line E, C). If private enterprises are not suitable for this administrative mode, the production efficiency z_H declines rapidly, and the return on capital and wealth of enterprises cannot be maximized (the red line in Figure 4). The above discussion process, although after the reform of the enterprise's capital yield and wealth growth rate is not less than before the reform of the enterprise's capital yield and wealth growth rate, but the specific results are different.

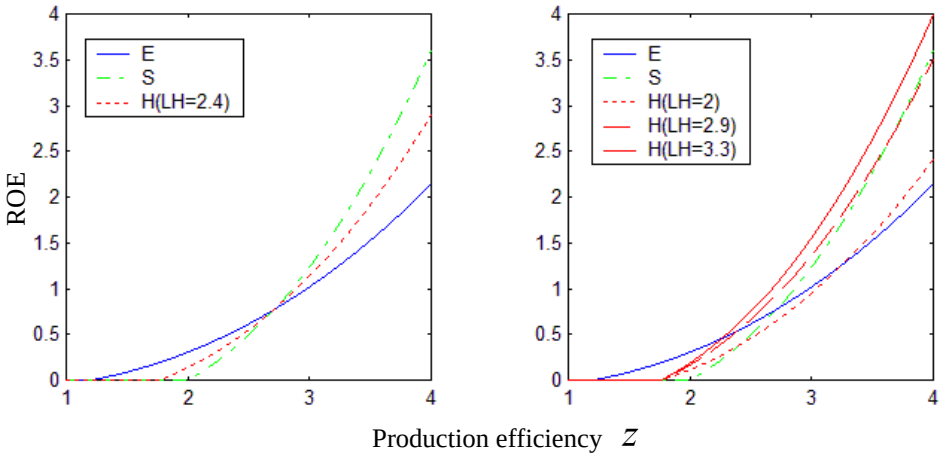


Figure 3. Mixed firms are managerially controlled (productivity remains constant, lending constraint coefficient changes).

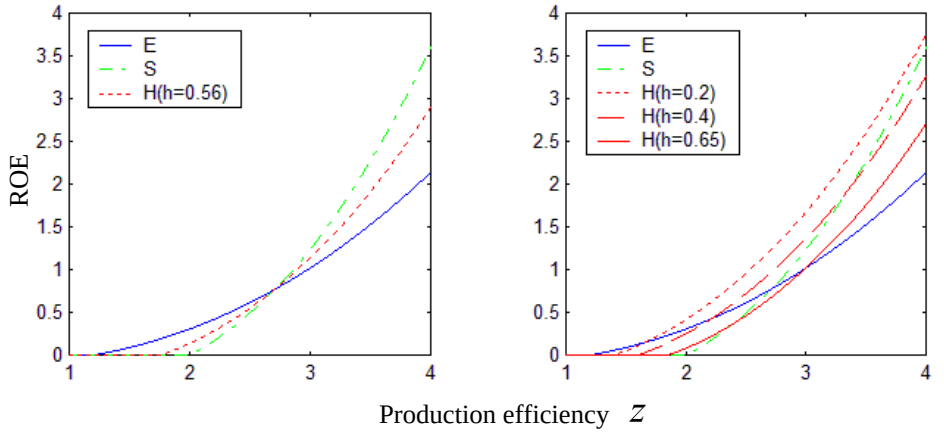


Figure 4. Mixed firms are state-controlled (lending constraints remain unchanged, productivity varies).

4.3. The Puzzle of State-Owned Equity Ratio and Performance

Our model can explain the puzzle of state-owned equity ratio and performance. In the process of concrete implementation of state-owned enterprises mixed reform, if the layout adjustment of state-owned capital is not reasonably guided, such as the investment of state-owned capital in overcapacity industries, the mixed reform will only aggravate the distortion of resource mismatch and lead to ineffective reform, which may not reach the goal of industrial upgrading and structural adjustment. Around 2000, due to the recommendation of enterprise reform, a large number of empirical studies on the relationship

between the proportion of state-owned shares and enterprise performance emerged, but the results of the study are controversial (see Table 5).

Table 5. The relationship between the proportion of state-owned shares and performance (literature).

Relation	Literature	Data Set	Explanation
negative correlation	[38]	1993–1995, listed company	More than 300 state-owned holding ratio
	[39]	2002–2011, listed company	state-holding ratio
	[40]	2013–2014, listed company	Private enterprises participate in state-owned enterprises
	[41]	1998–2008, chinese industrial enterprise database	Private enterprises participate in state-owned enterprises
positive correlation	[42]	2005–2015, listed company	High-end equipment manufacturing industry
	[43]	2005–2017, listed company	18 State-owned enterprises participating in private enterprises
u-shaped relationship	[44]	2004–2014, listed company	27 gas and water companies
	[45]	1998–2003, Sinofin Database annual data	6421 enterprises
	[46]	2010–2019, A shares	348 enterprises
	[47]	1997–2000, listed company	1555 enterprises
inverted u-shape relationship	[48]	2002, Shandong Industrial Survey	
	[49]	2009–2013, listed company	1576 enterprises
	[50]	2008–2014, listed company	1932 valid data
	[51]	Annual Reports of State Holdings, Shareholdings and Local City Commercial Banks in 2005 and 2006	46 enterprises

Table 5 and the model in this paper show that state-owned equity and its proportion are state-dependent with the performance of mixed enterprises, and are related to the development level of productivity of state-owned and private enterprises and the borrowing constraints of financing. State dependence is manifested in:

First, when both are in low productivity and the lending gap between the two is small, private enterprises have better sole proprietorship. The negative correlation shows that the higher the proportion of state-owned holding, the worse the performance of the company. The possible reason is that the overall productivity of state-owned holding enterprises is not high, and the proportion of state-owned holding enterprises in China has little effect on lending constraints.

Second, when the productivity is high and the lending gap is large, state-owned enterprises are better wholly owned. The positive correlation shows that the higher the proportion of state-owned holding is, the better the company's performance is. The possible reason is that the middle and high-end equipment manufacturing industry and non-state-owned holding companies are the research objects. Such enterprises have high productivity, and the participation of state-owned capital will bring greater financing convenience. The increase in the proportion of state-owned enterprises will improve the efficiency of enterprises.

Third, state-owned proportion and performance show a U-shaped relationship. The reason for this phenomenon may be that equity balance is not considered, followed by low state-owned share ratios, where the benefits of improved financing from state-owned shares are less than that of political intervention to reduce corporate wealth; when state

ownership is relatively high, the benefits of improved financing are greater than that of political intervention that reduces corporate wealth.

Fourth, there is an inverted U-shaped relationship between state-owned proportion and performance. The reduction of the proportion of state capital has a very significant effect on the improvement of the efficiency of restructuring, but it is not that the lower the proportion of state capital is, the higher the efficiency is, and there is an asymmetric inverted U-shaped relationship between the proportion of state capital and corporate performance. Although administrative intervention affects the efficiency of enterprises, the restructured enterprises still have a certain degree of dependence on the subjects of state-owned property rights. Only by making full use of administrative and market resources can the restructured enterprises maximize efficiency.

Considering the productivity and borrowing constraints, the proportion of shares owned by the mixed enterprises in China and the production efficiency of enterprises should be state-dependent (corresponding to the three cases in Figure 5). This nature can well explain why the initial reform of state-owned enterprises was direct privatization. Because the productivity of state-owned enterprises and private enterprises was quite different at that time, and the loan constraints had little difference between the two types of enterprises. Reasonable policy is both direct privatization of state-owned enterprises, so that the maximum efficiency of enterprises. With the advancement of the reform, the production efficiency of state-owned enterprises has been improved, and the advantages of state-owned enterprises in financing, the mixed reform of state-owned enterprises is the best choice. The optimal strategy is the decentralization of ownership, which can integrate the respective advantages of state-owned capital and private enterprise productivity, so as to achieve the optimal efficiency of enterprises. State-owned equity ratio and corporate asset returns inverted U-shaped.

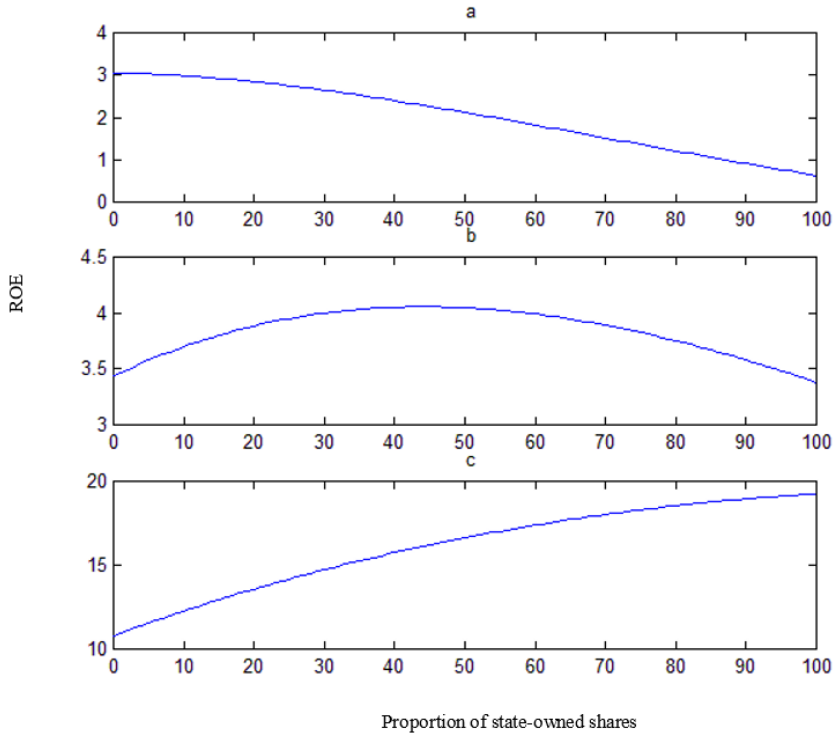


Figure 5. The relationship between the efficiency of mixed ownership enterprises (ROE) and the proportion of state-owned shares. Note: Different productivity levels ((**a**): production efficiency minimum, (**b**): higher, (**c**) maximum).

Therefore, our theory can guide the existing state-owned enterprise reform from two aspects. As in Figure 5, when the production efficiency is low, state-owned enter-

prises participate in private enterprises, so as to achieve the goal of industrial upgrading and transformation; when production efficiency is high, private enterprises participate in state-owned enterprises to improve enterprise efficiency and achieve the purpose of maintaining and increasing the value of state-owned capital. Our theory is inconsistent with [46] U-shaped theory. According to the U-shaped theory, either all privatization or all nationalization is the 'bottom value trap'. We find that when the productivity of state-owned enterprises develops to a certain level, state-owned shares can be invested in private enterprises with a certain preferential loan policy, and the efficiency of hybrid enterprises is the best. This has a guiding significance for our current supply-side structural adjustment. The government can form a combination of industry and finance by means of state-owned capital investment and operation companies, with appropriate industrial support policies, so as to achieve the purpose of industrial upgrading. With the change of state-owned capital investment direction and layout adjustment to improve the efficiency of state-owned capital operation, with the dynamic optimization of state-owned capital layout to achieve the structural adjustment of state-owned economy, promote the improvement of enterprise efficiency and social welfare.

4.4. Validity Test of Mixed Ownership Reform

The model can also be used to test the effectiveness of mixed ownership reform. First of all, considering the reform of state-owned enterprises, is corporate efficiency really improved? The study found that overall restructuring enhanced the profitability of enterprises. State-owned holding companies sometimes perform even better than private holding companies because the former can be supported by national policies when the technical level of the former is similar to that of the latter. For example, [52] through the survey of 683 state-owned enterprises from 1995 to 2001, analyzed the significance of private shares in enterprises for enterprise efficiency. They found that the capital profit rate of private holding enterprises was 1.21 to 1.51 percentage points higher than that of pure state-owned enterprises (efficiency improvement), while the capital profit rate of state-owned holding enterprises was 2.69 percentage points higher than that of pure state-owned enterprises (policy support).

Secondly, what is the efficiency impact mechanism of restructuring? The research emphasizes the innovation incentive of enterprise restructuring. Restructuring into state-owned enterprises with state-owned capital as the main body is conducive to improving production efficiency. The transformation to non-state-owned enterprises helps to improve both production efficiency and innovation efficiency [32]. Ref. [53] Based on the data of China's industrial enterprise database from 2002 to 2007, this paper analyzes the influence of ownership structure of privatization enterprises on enterprise innovation, and finds that the proportion of non-state-owned equity is positively correlated with the innovation activities of privatization enterprises. The promotion effect of non-state-owned equity on the innovation of privatization enterprises is mainly derived from the foresight of managers, rather than political concepts. Ref. [54] Based on the panel data of listed banks in China from 2007 to 2013, this paper constructs a model to study the relationship between mixed ownership and bank business innovation and market performance. The empirical study finds that the higher the degree of equity ownership mixing is, the more conducive to the business innovation and transformation of commercial banks. Compared with state-owned commercial banks, the mixed ownership of equity has a more obvious promoting effect on the business transformation of joint-stock commercial banks. There is a positive correlation between bank business innovation and financial performance.

The innovation incentive of enterprise restructuring can be shown in Figure 6b that the capital return of mixed enterprise (H) is always lower than that of private enterprise (E) or state-owned enterprise (S). Therefore, we should reasonably guide the state-owned capital investment to innovative industries, and improve the efficiency of state-owned capital operation through the change of state-owned capital investment and layout adjustment. At the same time give full play to the advantages of private enterprises in enterprise

management and innovation. Only when the two complement each other and make use of their respective advantages, can the purpose of industrial upgrading and structural adjustment be better achieved. This situation can be expressed in Figure 6a that the return on capital of mixed reform enterprises (H) is higher than that of private enterprises (E) or state-owned enterprises (S).

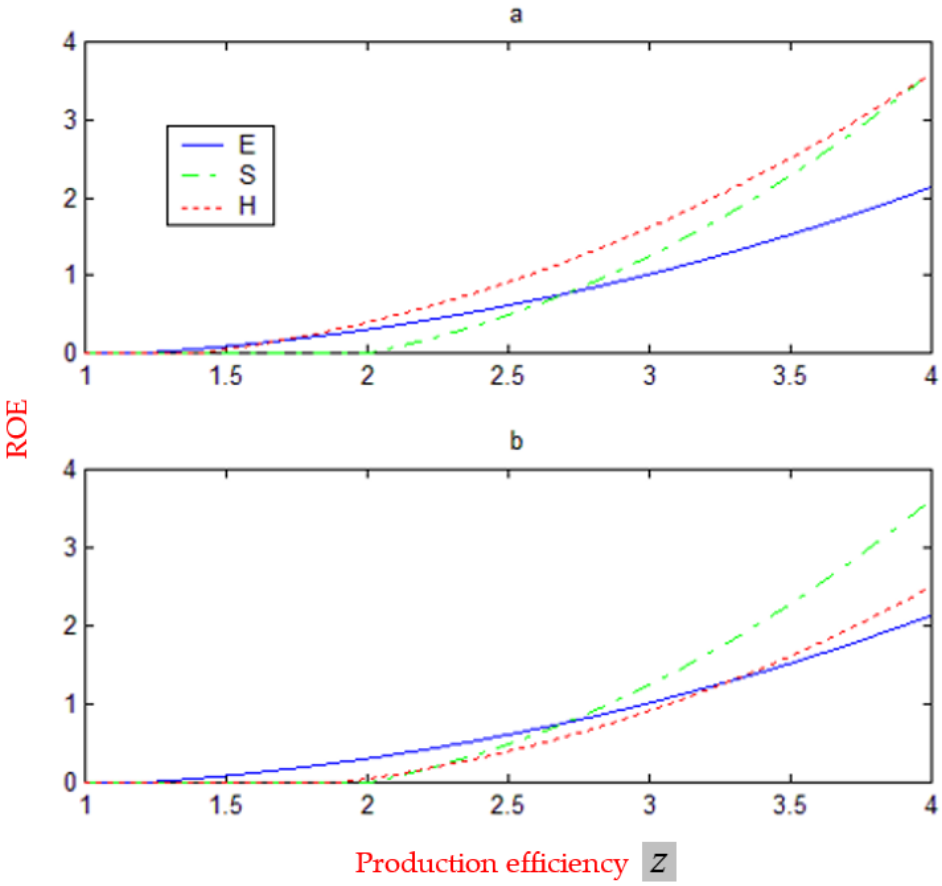


Figure 6. Industrial upgrading, structural adjustment and mixed reform. (**a**) the return on capital of mixed reform enterprises (H) is higher than that of private en-terprises (E) or state-owned enterprises (S). (**b**) the capital return of mixed enterprise (H) is always lower than that of private enter-prise (E) or state-owned enterprise (S).

5. Conclusions and Policy Recommendations

Mixed ownership economy refers to the state of ownership formed by the combination of different types of ownership and different forms of ownership economy in the same social economy [55]. From different levels, it can contain two meanings: on the one hand, the ownership structure of the whole national economy as a whole and the social and economic basis determined by it; on the other hand, the property right structure of the individual enterprise and the corresponding corporate governance structure. The former is to determine the nature and fundamental characteristics of the socio-economic system from a macro perspective, and the latter is to determine the ownership of property rights and institutional arrangements for interests, responsibilities and risks of the enterprise subject from a micro perspective. Whether from the macro level or from the micro level, 'mixed ownership economy' itself is not only the realization form of economic system, but also constitutes the essential characteristics of social economic system under certain historical conditions.

In this paper, the theoretical model of financial friction is used to explore the mixed ownership reform of state-owned enterprises. On the whole, the mixed ownership reform is beneficial to the improvement of enterprise performance, which is basically consistent

with the research results of [56], Privatization is beneficial to the improvement of enterprise performance. However, we study further and find that enterprise performance and the proportion of state-owned shares of enterprises are dependent on productivity and loan constraints. Through the study of the financial friction theory, our policy recommendations for the mixed reform of state-owned enterprises include the following points:

First, strengthen the market construction, let the market play a decisive role in resource allocation. The improvement of marketization compresses the government intervention space, and the financing advantage of state-owned equity weakens. Marketization of interest rates can limit the arbitrariness of credit allocation, correct over-investment of state-owned enterprises due to loan convenience, and under-investment of private enterprises due to loan constraints. Thus, the resource allocation efficiency of the overall economy is improved. Since China's market-oriented development is not yet mature, there are many contradictions that are contrary to the market economy. This paper believes that when there are financial frictions, the allocation of financial resources can be reasonably optimized in stages, and the loss of productivity and enterprises caused by misallocation of financial resources can be partially eliminated, so as to promote economic growth.

Second, speed up the construction of financial legal system, provide the necessary conditions for the development of financial markets, improve and perfect the stock market investment and financing function, optimize the allocation of resources. Refs. [5,6,57,58] believed that improving the allocation efficiency and return rate of financial resources can improve productivity. Ref. [8] believed that financial development was the direct cause of technological innovation, and technological innovation was the direct cause of conspicuousness promoting economic growth.

Third, breaking monopoly, eliminating discrimination against private enterprises in the financial market, and establishing a fair and competitive investment environment with equal rights. A large number of studies have shown that state-owned enterprises and private enterprises in production efficiency and financing capacity are very mismatched ([12,21,59–62]). In terms of capital gains, state-owned enterprises are only half of private enterprises, while the proportion of bank and government subsidies in total investment is more than three times that of private enterprises [61]. Ref. [63] investigated the allocation of credit resources in enterprises, and found that the short-term financing or credit resources of enterprises are mainly based on the fixed assets and sales income of enterprises. This allocation method has a weak correlation with the profits of enterprises, which is reflected in the low efficiency of financing allocation. The effect of such financial markets on commodity markets is that the development of private enterprises is inhibited and the most potential value growth in the real economy may not be effectively supported by financial support.

Fourth, optimizing the layout of state-owned capital and establishing corresponding state-owned capital investment companies and operating companies. Taking the state-owned capital platform as the starting point, reasonably dispose the stock of state-owned enterprises, expand the quality increment, give full play to the guarantee role of state-owned capital in the basic and key industries, and improve the operation efficiency of state-owned capital. Ref. [64] believe that the transformation of state-owned capital supervision to 'managing capital' not only improves the liquidity of production factors, but also adjusts the industrial layout of state-owned enterprises through investment and financing of state-owned capital. Therefore, the transformation from state-owned assets supervision to 'managing capital' can improve capital allocation efficiency and economic structure.

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