Research on the Optimization of Equity Structure of Mixed Ownership Enterprises from the Perspective of Innovation

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Abstract: From the perspective of innovation, this paper takes Chinese manufacturing enterprises with mixed ownership from 2014 to 2016 as the research object, and empirically tests the influence of equity mix degree, ownership concentration degree, the proportion of state-owned shares and institutional investors on R&D investment of enterprises. The results show that only when the mixing degree of non-state-owned shares is more than 46.03%, can the non-state-owned shares really play a role when the state-owned enterprises of manufacturing industry carry on the "mixed reform"; the ownership concentration degree is negatively related to R&D investment; there is no significant correlation between the ownership ratio of institutional investors and R&D investment of enterprises.

1. Introduction

The "Decision of the Central Committee of the Communist Party of China on Comprehensively Deepening the Reform of Some Major Issues" adopted by the Third Plenary Session of the 18th CPC Central Committee in 2013 proposed to actively develop a mixed-ownership economy. In 2015, the State Council issued the "Opinions on the Development of a Mixed Ownership Economy for State-Owned Enterprises." In December 2016, the Central Economic Work Conference emphasized that mixed ownership reform is an important breakthrough for state-owned enterprises reform. The main purpose of the reform of mixed ownership is to enhance the vitality, control and influence of state-owned enterprises through the optimization of corporate governance. However, the reform of mixed ownership is not a simple problem of ownership, but to enhance the competitiveness and vitality of enterprises, and the competitiveness depends on the advantages of technological innovation. In the mixed ownership reform, it is the key to establish a governance structure that is conducive to promoting innovation, among which the optimization of ownership structure is the most important.

Manufacturing industry, as the basic industry of the national economy, is not only the most active department in technological R&D activities and the department with the largest allocation of innovation resources, but also the main disseminator of technological innovation. However, there is still a gap between R&D of manufacturing industry in China and developed countries such as Britain and the United States. The current reform of mixed ownership in manufacturing industry should not only be a change of property rights, but also a change of corporate governance based on innovation. For the reform of mixed ownership enterprises in manufacturing industry, it is mainly to clarify how to establish a more scientific governance structure and optimized equity structure which is helpful to promote innovation. Based on the unique background of mixed ownership reform in China, this study takes manufacturing industry as the sample to study the optimization of ownership structure based on the improvement of innovation ability.

2. Literature Review

As for the equity structure and innovation, scholars discussed from the perspectives of equity nature, equity concentration, equity balance and so on.[1] showed that non-state-owned holding could facilitate enterprises to make innovation investment. The empirical result of [2]showed that there is an "inverted U-type" nonlinear relationship between equity concentration and product innovation. [3] showed that there is a significant positive correlation between equity concentration and R&D investment .However, The researches [4] showed that the equity concentration hinders the technological innovation of enterprises. [5] found that the equity balance has a significant positive impact on corporate innovation.

Domestic and foreign scholars have carried out related research on the optimization of ownership structure, mainly from the subjects and ways of shareholding. [6] thought that ESOP has a positive effect on the optimization of the ownership structure of an enterprise. [7] thought that in order to further develop the equity structure optimization , it is necessary to implement the long-term incentive policy of employee ownership.

To sum up, scholars at home and abroad have made rich research achievements in equity structure and innovation, there are still some shortcomings: Firstly, scholars at home and abroad mainly studied the impact of corporate governance on enterprise innovation from the perspective of industry and market. However, there are relatively few studies on ownership structure and innovation based on the special sample under the background of mixed ownership reform. Secondly, the existing literatures mostly regarded the company as a homogeneous whole, without distinguishing the different influences of the equity of the enterprises with different property rights on innovation. Based on the perspective of innovation, this paper analyzes the particularity of the ownership structure of mixed ownership enterprises, and distinguishes the relationship between the ownership structure of different property rights and innovation, taking the manufacturing enterprises of mixed ownership as the research object. This paper studies the optimization of equity structure which is beneficial to enhance innovation ability, and provides some experience references for the reform of mixed ownership of enterprises in China.

3. Theoretical Analysis and Research Hypothesis

3.1 Theoretical Analysis on the Nature of Equity and Innovation

In China, state-owned shareholders are agents of state assets, and the state intervenes in business decisions through shareholding, thereby realizing the preservation and appreciation of state-owned capital. However, there is "absence of owner subject" in state-owned enterprises of our country. As the chain of principal-agent becomes longer, information transmission will appear serious asymmetry, which is unfavorable for enterprises to form innovative decision. Based on this, this paper proposes the assumption:

Hypothesis 1: The proportion of state-owned shares under mixed ownership is negatively correlated with R&D investment.

3.2 Theoretical Analysis of Equity Concentration and Innovation

Since R&D is a long-term and high-risk activity, when the proportion of the largest shareholder is high, the risks of innovation investments cannot be balanced among all shareholders, and the risk of innovation failure of the first shareholder is higher. Therefore, the first shareholder will have a strong risk aversion psychology to R&D and will not choose to carry out R&D activities, which will lead to the reduction of enterprise investment level. Based on this, this paper proposes the assumption:

Hypothesis 2: Equity concentration of mixed ownership enterprises is negatively correlated with R&D investment.

3.3 Theoretical Analysis of Equity Mixing Degree and Innovation

In the mixed-ownership enterprises controlled by the state, when the degree of mixing of state-owned shares and non-state-owned shares is low, the effectiveness of mixing is low. With the increase of the degree of equity mixing, the power balance of non-state-owned shareholders to state-owned shareholders will gradually appear, and the government's control over state-owned enterprises will gradually weaken, which makes the "market-oriented" characteristics of enterprises obvious. Thus, enterprises are forced to increase R&D investment out of the pursuit of economic interests.

In non-state-owned mixed-ownership enterprises, when the degree of mixing between state-owned shares and non-state-owned shares is low, it will lead to the "free-rider" behavior of state-owned shares. The resources and technological advantages of state-owned shares cannot fully contribute to R&D activities of enterprises, which is not conducive to improving R&D investment of enterprises. When the degree of mixing of state-owned shares and non - state - owned shares increases gradually, their checks and balances become stronger. And the resource advantages of state-owned shares and the innovation vitality of non-state-owned shares will be maximized, which is helpful for enterprises to carry out R&D activities. Based on this, this paper proposes the assumption:

Hypothesis 3: In the state-owned and non-state-owned mixed-ownership enterprises, the equity mix has an asymmetric "U" relationship with R&D investment.

3.4 Theoretical Analysis of Institutional Investors and Innovation

Compared with ordinary investors, institutional investors have financial, professional and information advantages that can reduce information asymmetries between them and management, which will help institutional investors and managers to communicate more equitably and make institutional investors more consistent with the characteristics of rational economic man. Institutional investors can grasp more effective information when investing, have stronger value discovery ability, and can more objectively recognize the role of R&D investment in improving long-term profits of enterprises. Based on this, this paper proposes the assumption:

Hypothesis 4: The shareholding ratio of institutional investors is positively correlated with R&D investment.

4. Empirical Analysis

4.1 Sample Selection and Data Description

This paper selects the manufacturing mixed ownership enterprises in China from 2014-2016 as the research sample. The selection process of the sample is as follows:① Exclude ST and *ST listed companies;②Remove listed companies with partial missing data;③ On the screening of mixed ownership enterprises, first of all, according to the list of major shareholders of Resset Database and the ranking and categories of shareholders disclosed in the shareholding structure (including state-owned shareholders, other shareholders and foreign shareholders), and the top ten shareholder categories are obtained. Then, according to the categories of shareholders, the top ten shareholders including state-owned shareholders and non-state-owned shareholders are selected as research samples;④Winsorize tail reduction for extreme values of some main indicator data.

4.2 Variable Selection and Explanation

4.2.1 Selection of Dependent Variables

Innovation R&D investment is the most typical index to measure technological innovation ability and R&D input intensity is used as the dependent variable in this paper.

4.2.2 Selection of Interpretation Variables

Equity Mixing Degree: Referring to the research of Liu Xinmin (2017)[8], this paper measures

the degree of equity mixing from two perspectives. If the actual controller of the enterprise is state-owned, the proportion of non-state-owned shares / state-owned shares is chosen to indicate the degree of equity mixing; if the actual controller of the enterprise is non-state-owned, the proportion of state-owned shares / non-state-owned shares is chosen to indicate the degree of equity mixture.

Equity Concentration: This paper selects the shareholding ratio of the largest shareholder to represent the ownership concentration and examines the influence of the proportion of the largest shareholder's shareholding in the total capital stock on the intensity of R&D investment.

State-owned Share Ratio and Institutional Investor Share Ratio: This paper selects the proportion of state-owned shares in the total share capital as the explanatory variable of the proportion of state-owned shares. And the proportion of institutional investors in total equity is the explanatory variable of the proportion of institutional investors.

4.2.3 Selection of Control Variables

This paper chooses enterprise size, cash holding level, enterprise growth, enterprise performance, year and the nature of the actual controller as control variables.

4.3 Construction of Model

According to the previous theoretical analysis, this paper constructs an econometric model of the company's ownership structure and R&D investment (1) as follows:

$$RDI_{1,2,3} = \alpha_1 + \delta_1 MED + \delta_2 OCE + \delta_3 PS + \delta_4 PI + \gamma_i P_i + \varepsilon_i \quad (1)$$

In the above models, $RDI_{1,2,3}$ represents the R&D input intensity of the whole sample enterprises, state-owned holding enterprises and non-state-owned holding enterprises respectively.

4.4 Multivariate Regression Analysis

Table 1 Model (1) Analysis of Regression Results

Variables	Full sample	State holding sample	Non-state holding sample
M-ED	-0.0307**	-0.0371**	-0.0727*
	(-2.55)	(-2.01)	(-1.75)
M-ED^2	0.0357	0.0403	
	(1.60)	(1.38)	
OCE	-0.0285***	-0.0144	-0.0314***
	(-3.06)	(-0.81)	(-2.69)
PS	-0.0219*	-0.0118	-0.0871
	(-1.92)	(-0.67)	(0.94)
PI	-0.0036	-0.0016	-0.0118
	(-0.67)	(-0.18)	(0.92)
Scale	0.0329**	0.0008	0.0053***
	(2.29)	(0.45)	(2.58)
Cash	-0.0204**	-0.0195	-0.0386***
	(-2.08)	(-1.08)	(-2.92)
Cash^2	0.2089***	0.0711*	0.2962***
	(8.73)	(1.77)	(9.66)
Growth	0.0765**	0.0312***	0.0027
	(2.01)	(3.84)	(0.62)
Tobin`Q	0.0053***	0.0041***	0.0055***
	(8.66)	(3.37)	(7.78)
Year	control	control	control
cons	-0.0179	0.0258	-0.0522
	(-0.6)	(0.66)	(-1.17)
Adjusted R^2	0.1915	0.1121	0.2471
N	1231	473	758

(1)In the regression of equity mixing degree and R&D investment intensity, the quadratic power of equity mixing degree is positively correlated with R&D investment, but fails the significance test, and the equity mixing degree is negatively correlated with R&D investment and has passed 5% significant level test. It is shown that the relationship between equity mixing degree and R&D

investment is of an asymmetric "U" type, which is verified in both the whole sample and the state-controlled sample. According to the calculation, the U-shaped inflection point of the whole sample is 0.4230, and the state-controlled's is 0.4603.That is, in all sample enterprises, when the degree of equity mixing is below 42.30%, the participation of non-state-owned shares only realizes the diversity of simple equity subjects, so this degree of mixing does not promote the R&D investment of enterprises. When the degree of equity mixing is higher than 42.30%, the addition of non-state-owned shares makes the mixed equity truly realize the equity depth and balance, and the game of heterogeneous shareholders makes both state-owned shares and non-state-owned shares give full play to their respective resources and management advantages. Only in this way can the equity mix really play a role in promoting enterprise R&D. Similarly, in state-owned holding enterprises, when the degree of equity mixing is lower than 46.03%, it shows that non-state shares don't play a practical role in promoting enterprise innovation, and only when the degree of equity mixing is above 46.03%, non-state shares can really play a role. In addition, in non-state-controlled enterprises, the degree of equity mix is negatively correlated with enterprise innovation and has passed the significance test, indicating that in non-state-controlled enterprises, the greater the proportion of state-owned shares in non-state-owned shares, the greater the hindrance to innovation decision-making, which is not conducive to long-term development

(2)The negative correlation between ownership concentration and R&D investment is verified in all three groups of sample enterprises. The difference is that in the whole sample and non-state-owned holding sample, the negative correlation has passed the significance test at the level of 1%.In the state-owned holding sample, the ownership concentration degree is negatively correlated with R&D investment, but this negative correlation doesn't pass the significance test, which shows that the impact of ownership concentration on R&D investment is not obvious in state-owned holding enterprises.

(3)There is no significant correlation between the proportion of institutional investors holding shares and R&D investment, which is verified in all three groups of sample enterprises. This conclusion is in line with the institutional investor neutral theory that rational institutional investors are mainly concerned with the net cash flow after deducting costs and pay little attention to the enterprise R&D expenditure.

5. The Path of Ownership Structure Optimization Based on the Improvement of Innovation Ability

(1)Implement core employees stock ownership to optimize the ownership structure.

(2)Introduce strategic investors and cultivate institutional investors to optimize the shareholding structure.

(3)Optimizing ownership structure by appropriate cross-shareholding.

(4)Establish an appropriate structure of multiple major shareholders' equity checks and balances.

6. Conclusions

(1)At present, the mixed ownership reform of manufacturing industry has not really realized the diversification of ownership structure, and the influence of ownership structure of state-owned holding enterprises and non-state-owned holding enterprises on innovation is different. It can be seen from the empirical results that in the case of "mixed reform" of state-owned holding enterprises in the manufacturing industry, only when the degree of mixing of non-state-owned shares reaches more than 46.03%, can non-state-owned shares really play a role, and only in this way can the checks and balances on ownership be conducive to improving the innovation of state-owned enterprises. When "mixed reform" is carried out on non-state-owned holding enterprises, the more state-owned shares enter, the stronger the inhibition effect of innovation investment on non-state-owned holding enterprises.

(2)The composition of stock ownership of mixed ownership enterprises in manufacturing industry gradually tends to be reasonable. The proportion of state-owned shares has decreased year

by year, and the ownership structure has been gradually diversified. Although the degree of equity concentration has declined, the proportion of enterprises whose ownership concentration is more than 50% remains at about 15%, the phenomenon of "one stock is dominant" still exists, and the second to tenth shareholders have little checks and balances on the largest shareholders.

(3)In the sample of state-owned holding, the high degree of equity concentration is not conducive to innovation. In the mixed ownership enterprises, institutional investor holding shares has little effect on innovation, which accords with institutional investor neutrality theory and is also related to the present situation of capital market in China.

Acknowledgement

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