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Employee Stock Ownership Plan and Corporate Innovation

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ABSTRACT. *Using the data of all A-share non-financial listed companies during the period from 2014 to 2018, this paper examines the relationship between the implementation of employee stock ownership plan (ESOP) and corporate innovation. The empirical study found that companies that implement ESOP have higher corporate innovation investment than companies that do not implement ESOP. Further research found that, compared with state-owned enterprises, the implementation of employee stock ownership plan in non-state-owned enterprises can promote corporate innovation. This study contributes to the research of ESOP and corporate innovation, enriches the factors influencing of corporate innovation, and provides empirical evidence for further design and improvement of the ESOP institutions.*

KEYWORDS: *employee stock ownership plan, corporate innovation, property right*

1. Introduction

At this stage, China vigorously supports innovation and has continued to promote innovation, and innovation has gradually become a source of competitive advantage for all enterprises. Innovation and entrepreneurship have become an important driving force for economic growth, an important force for promoting transformation and upgrading, and an important support for stabilizing and expanding employment. Innovation is not only a hot spot of social concern in recent years. For enterprises, the growth and active development of enterprises cannot be separated from innovation. How to improve the innovation ability of enterprises is a key issue. However, existing research pays little attention to another important human resource of the enterprise—the role of employees in innovation activities [1]. Employees are the source of many innovative ideas, and their efforts and collaboration are more related to the execution efficiency of innovative decision-making [2]. Therefore, the expansion and deepening of employee-based corporate innovation research has strong theoretical value and practical significance.

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In the "Guiding Opinions on the Pilot Implementation of Employee stock ownership plan by Listed Companies" announced by the China Securities Regulatory Commission(CSRC)on June 20, 2014, Employee Stock Ownership Plan (ESOP) of listed companies was clearly defined in terms of laws and regulations for the first time. The opinions mentioned that the pilot ESOP of listed companies was conducive to establishing and improving the benefit-sharing mechanism between workers and owners, improving corporate governance, enhancing employee cohesion and company competitiveness, and optimizing the allocation of social funds through the capital market. ESOP is re-launched after being shelved for many years and quickly becomes a hot spot in the capital market. According to statistics from the WIND database, up to December 31, 2019, a total of 1024 listed companies in the A-share market have launched ESOP, which has become a quite common employee incentive method.

The employee stock ownership plan gradually expands and shifts the incentive targets and focus of incentives to employees other than senior management, especially non-management employees such as scientific researchers and technicians. The shift of the focus of motivation makes the employee stock ownership plan a brand new function———Promote innovation [3]. Employees play an important role in corporate innovation. So, as an institutional arrangement with employees as the main body of implementation, can the employee stock ownership plan affect employee behavior and promote corporate innovation? This article will answer this. Due to the heterogeneity of different companies, the implementation effects of employee stock ownership plan may be different. At the end of this article, the paper also discusses whether companies with different property rights have significant differences in the impact of implementing employee stock ownership plan on corporate innovation.

The research contributions of this article are mainly reflected in the following two aspects: (1) Although foreign discussions on employee stock ownership plan are relatively rich, domestic research on employee stock ownership systems focuses more on the design and discussion of its system level [4-5], there is little research on its economic consequences [6]. This article considers the economic consequences of employee stock ownership plan, specifically discusses how employee stock ownership plan can exert incentive and supervisory effects to promote corporate innovation, enriches the literature on the economic consequences of employee stock ownership plan, and expands the impact of corporate innovation factors research [7]. (2) Based on the different implementation effects of employee stock ownership plan in companies with different property rights, it has certain guiding significance for companies with different property rights to design employee stock ownership plan that match more corporate innovation inputs.

2. Hypotheses Development

From the perspective of corporate innovation, innovation activities are a complex process with high investment, exploratory nature, and multiple stages, requiring the participation of employees at all levels and departments. Employees are the main

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force of innovation and are directly related to innovation. By granting equity to core employees, the employee stock ownership plan can effectively tie the benefits of the recipients with the benefits of the enterprise, stimulate employees' sense of ownership, and improve their enthusiasm, initiative and creativity in their work [3], so as to promote the smooth progress of innovation activities. At the same time, the employee stock ownership plan is conducive to the formation of a cultural atmosphere of mutual supervision and mutual learning among employees [4], mutual supervision between employees can reduce employees' laziness and free-riding behavior; employees learn from each other and have Facilitate discussion and cooperation, collide with sparks of ideas, further improve enterprise productivity, and promote enterprise innovation.

In addition, the employee stock ownership plan is compared with the equity incentive plan. In addition to senior management and core personnel, the target will also cover middle management and general technical personnel. The employee stock ownership plan can motivate a wider range of employees. The employee stock ownership plan can attract and retain talents, accumulate human capital, ensure the stability of the core team, and effectively reduce the turnover rate of core talents [8]. Especially when the employees participating in the plan are closely related to the company's innovation activities, the remaining employees are more conducive to the continuation of the innovation activities, thereby promoting corporate innovation. Therefore, this article proposes the following assumptions:

H1: Compared with companies that have not implemented an employee stock ownership plan, companies that implement an employee stock ownership plan can promote corporate innovation better.

3. Research Design

3.1 Research sample and data source

Since ESOP was restarted in 2014, this study uses the data of China's A-share listed firms for 2014–2019. The dependent variable corporate innovation needs to lag one period of data, and the available data are from 2014 to 2018, so the year of observation is from 2014 to 2018. During the sample period, we obtain a total of 961 initial ESOP samples from the WIND database. This study excludes 53 samples of the company's multiple ESOP issued in the same year, and only retains its first phase of ESOP. Simultaneously, it excludes 106 samples of ESOP that have not passed or stopped the implementation at the shareholders' meeting. Finally, the result is 802 effective ESOP samples. Furthermore, We exclude listed firms of the financial industry, ST and *ST firms, and firms lacking related data: the result is 10,984 effective samples of 2,895 listed companies, of which 538 listed companies and 662 implemented ESOP. For listed companies that launched ESOP that year, it usually takes more than half a year from the publication of the draft to the implementation of ESOP. Therefore, this study uses the cross-sectional data of listed companies deferred for one year to reflect corporate innovation. The financial data comes from

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the China Stock Market and Accounting Research (CSMAR) database. All continuous variables are winsorized at 1% percentiles to mitigate the impact of outliers.

3.2 Definitions of variables

Dependent variable. corporate innovation (Innovation) is measured by the ratio of the company's R&D expenditure to the total assets referring to the studies of Huang et al [9].

Independent variables. ESOP, 1 for firms that implemented ESOP that year, 0 otherwise.

Control variables. Controlled property rights (State), cash holdings (Cash), asset-liability ratio (Lev), shareholding ratio of the largest shareholder (Sh1), proportion of fixed assets (Fix_share), company listing age (Age), company size (Size), growth (Growth), GDP level of regional per capita(GDP), industry and year. The specific variable definitions appear in Table 1.

Table 1 Definitions of variables

Variables	Definition
Innovation	Ratio of R&D expenditure to total assets
ESOP	1 for firms that implemented ESOP that year, 0 otherwise
State	Ratio of monetary funds to total assets
Cash	Ratio of total liabilities to total assets
Lev	Ratio of the number of shares held by the largest shareholder to the total number of shares
Sh1	Ratio of capital expenditure to total assets
Fix_share	Ratio of net fixed assets to total assets
Age	The difference between the financial year and the listing year
Size	Ln(total assets)
Growth	Operating income growth rate
GDP	Ln(per capita GDP of the province where the company is located)
Year	With 2014 as the benchmark, dummy variables are set
Industry	According to CSRC classification guideline of firm industries, dummy variables are set

3.3 Measurement accuracy experiment of ultrasonic sensor

We construct the regression model (1) to test H1:

$$Innovation_{t+1} = \beta_0 + \beta_1 ESOP_t + \gamma_i Control_t + \varepsilon \quad (1)$$

If the correlation coefficient β_1 in the model (1) is significantly positive, hypothesis 1 is verified.To reduce the influence of extreme values, all continuous variables are processed by winsorize up and down 1%. In the regression process, the variance inflation factor (VIF) of each variable was also checked. The average value of VIF was 2.95, indicating that multicollinearity is not a serious threat.

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4. Empirical Results and Analysis

4.1 Descriptive Statistics

The descriptive statistics of the variables are listed in Table 2. The mean and median values of enterprise innovation (Innovation) are 2.175 and 1.845, respectively, and the standard deviation is large, indicating that there are large differences in the sample enterprise innovation among companies; the 75th quantile of the mean value of the employee stock ownership plan (ESOP) is 0 , Indicating that less than 25% of the sample companies have implemented employee stock ownership plan, which is in line with reality. Other control variables are basically consistent with the actual situation of the enterprise.

Table 2 Descriptive statistics of the sample

Varibles	Number	mean	sd	min	P25	P50	P75	max
Innovation	10,984	2.175	1.892	0.006	0.829	1.845	2.915	10.281
ESOP	10,984	0.060	0.238	0.000	0.000	0.000	0.000	1.000
State	10,984	0.313	0.464	0.000	0.000	0.000	1.000	1.000
Lev	10,984	0.409	0.196	0.059	0.252	0.398	0.554	0.891
Cash	10,984	0.150	0.110	0.011	0.072	0.120	0.196	0.582
Sh1	10,984	0.340	0.144	0.087	0.227	0.321	0.433	0.740
Fix_share	10,984	0.213	0.151	0.002	0.095	0.183	0.299	0.695
Age	10,984	9.692	6.861	1.000	4.000	7.000	16.000	26.000
Size	10,984	22.233	1.255	19.945	21.339	22.062	22.930	26.186
Growth	10,984	0.207	0.458	-0.567	0.000	0.124	0.290	3.133
GDP	10,984	11.182	0.396	10.284	10.835	11.242	11.499	11.851

4.2 Correlation analysis

Table 3 correlation coefficientof Variables

Varibles	1	2	3	4	5	6	7	8	9	10
1.Innovation	1.000									
2.ESOP	0.023**	1.000								
3.State	-0.192***	-0.108***	1.000							
4. Lev	-0.218***	-0.006	0.291***	1.000						
5. Cash	0.215***	-0.013*	-0.051***	-0.361***	1.000					
6.Sh1	-0.126***	-0.023***	0.246***	0.057***	0.036***	1.000				
7.Fix_share	-0.196***	-0.033***	0.206***	0.068***	-0.294***	0.094***	1.000			
8. Age	-0.228***	-0.058***	0.491***	0.351***	-0.145***	-0.032***	0.093***	1.000		
9.Size	-0.237***	0.012	0.386***	0.542***	-0.229***	0.190***	0.101***	0.416***	1.000	
10.Growth	0.034***	0.047***	-0.086***	0.033***	0.009	-0.017**	-0.097***	-0.048***	0.041***	1.000
11.GDP	0.167***	-0.010	-0.129***	-0.077***	0.070***	0.000	-0.226***	-0.121***	-0.001	0.005

Notes: N = 10,984, p < 0.1, ** p < 0.05, *** p < 0.01.

Table 3 is the correlation analysis of each variable. It can be seen that there is a significant positive correlation between employee stock ownership plan and corporate innovation. Cash holdings, company growth, regional GDP per capita, and

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corporate innovation are significantly positively correlated. The nature of property rights, debt-to-asset ratio, shareholding ratio of the largest shareholder, The proportion of fixed assets, company listing years, company scale and corporate innovation are significantly negatively correlated.

4.3 Results of regressions

Table 4 Empirical results of employee stock ownership plans and corporate innovation

Varibles	Innovation		
	(1)	(2)	(3)
ESOP		0.163**	0.170***
		(2.270)	(2.616)
State	0.038	0.008	0.050
	(0.906)	(0.178)	(1.171)
Lev	-0.296***	-0.455***	-0.295***
	(-2.871)	(-4.166)	(-2.861)
Cash	1.801***	2.214***	1.807***
	(11.470)	(12.914)	(11.513)
Sh1	-0.550***	-1.278***	-0.549***
	(-4.820)	(-10.235)	(-4.810)
Fix_share	-0.652***	-0.948***	-0.644***
	(-5.231)	(-7.762)	(-5.161)
Age	-0.019***	-0.035***	-0.019***
	(-6.820)	(-11.407)	(-6.749)
Size	-0.071***	-0.150***	-0.074***
	(-4.402)	(-8.563)	(-4.560)
Growth	0.047	0.065*	0.045
	(1.406)	(1.750)	(1.342)
GDP	0.362***	0.456***	0.362***
	(8.597)	(10.003)	(8.608)
Year	YES	YES	YES
Industry	YES	NO	YES
_cons	-1.233**	1.094*	-1.195**
	(-2.209)	(1.830)	(-2.141)
N	10,984	10,984	10,984
R2	0.301	0.139	0.301

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01(robust t-statistics in parentheses).

Table 4 reports the OLS regression results. Model (1) is an OLS regression model that only contains control variables, and controls the annual and industry effects; model (2) is the regression result that puts ESOP as an independent variable into the model and controls The annual effect; model (3) controls the industry effect on the basis of model (2). The regression (2) shows that the implementation of the employee stock ownership plan (ESOP) is positively correlated with corporate innovation, and it is significant at the 5% level, which validates Hypothesis 1. The regression (3) shows that the implementation of the employee stock ownership plan (ESOP) is positively correlated with corporate innovation, and it is significant at the

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10% level, further verifying Hypothesis 1. Explain that the employee stock ownership plan affects corporate innovation through a variety of ways (shared learning with each other, strengthened employee supervision, attracting and retaining talents, improving the quality of innovation activities, etc.), and implementing employee stock ownership plans can improve corporate innovation.

4.4 Further research

Table 5 reports the results of the OLS regression, which examines the impact of the implementation of employee stock ownership plan on corporate innovation in the context of different property rights, indicating that the implementation of employee stock ownership plan in non-state-owned enterprises has a better role in promoting corporate innovation than state-owned enterprises.

Table 5 Empirical results of property Rights

variables	Innovation		
	Full sample	State-owned	Non-state-owned
ESOP	0.162**	0.306	0.156**
	(2.508)	(1.539)	(2.199)
Lev	-0.283***	-0.330**	-0.402***
	(-2.760)	(-2.079)	(-3.001)
Cash	1.824***	1.046***	2.144***
	(11.669)	(3.746)	(11.286)
Sh1	-0.517***	-0.567***	-0.510***
	(-4.665)	(-3.164)	(-3.476)
Fix_share	-0.629***	-1.182***	-0.127
	(-5.069)	(-6.679)	(-0.743)
Age	-0.018***	-0.020***	-0.020***
	(-6.873)	(-4.629)	(-5.328)
Size	-0.072***	-0.116***	-0.032
	(-4.454)	(-5.130)	(-1.378)
Growth	0.042	0.103*	0.037
	(1.259)	(1.808)	(0.897)
GDP	0.359***	0.197***	0.493***
	(8.550)	(3.211)	(8.689)
Year	YES	YES	YES
Industry	YES	NO	YES
_cons	-1.224**	1.845**	-3.698***
	(-2.195)	(2.442)	(-4.631)
N	10,984	3,434	7,550
R2	0.301	0.333	0.268

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01(robust t-statistics in parentheses).

The implementation of employee stock ownership plan by state-owned enterprises may be due to the need to cater to national policies. ESOP has become a means of rent-seeking for management, and it may also be a performance of management's political promotion [10], resulting in the failure of employee stock

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ownership plan. Give full play to the incentive effect. In addition, state-owned enterprises have large employees, and the phenomenon of "free-riding" among employees is more serious than that of non-state-owned enterprises. Therefore, the implementation of employee stock ownership plan in state-owned enterprises is more of a kind of welfare equity incentives, while the salary arrangements and promotion mechanisms of non-state-owned enterprises are more in line with market requirements, and the incentive effects of employee stock ownership plan are more effective.

5. Conclusions

This paper takes China's Shanghai and Shenzhen A-share listed companies from 2014 to 2018 as the research object, examines the impact of employee stock ownership plans on corporate innovation, and further explores the influence mechanism of the nature of property rights on the relationship between employee stock ownership plans and corporate innovation, and obtains the following research conclusions : (1) The implementation of the employee stock ownership plan has promoted the improvement of corporate innovation. (2) Compared with state-owned enterprises, the implementation of employee stock ownership plans by non-state-owned enterprises can increase corporate innovation.

The research conclusions of this article have the following management enlightenment and practical value: (1) The employee stock ownership plan is an important company incentive mechanism. The implementation of the employee stock ownership plan can increase the enthusiasm of employees and increase the supervision methods of employees to the decision-making level of the company. It is conducive to improving enterprise innovation and provides new ideas for how to enhance enterprise innovation. (2) Compared with non-state-owned enterprises, the employee stock ownership plan cannot fully exert a good incentive effect in state-owned enterprises. The reform process of state-owned enterprises needs to be further deepened, and the political constraints on the management of state-owned enterprises can be appropriately relaxed to make up for the management. The imperfect incentive mechanism and supervision mechanism of the company have allowed the employee stock ownership plan to give full play to the incentive and supervision effects.

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