The Influence of Government Subsidies on Enterprise Performance
—The Research Based on Concept Stocks of New Energy Vehicles

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ABSTRACT

Based on market status and various financial data of listed new energy vehicle enterprises from 2013 to 2019, the paper draws a conclusion through empirical research. On the one hand, government subsidies have certain promoting effect on both enterprise performance and R&D investment. On the other hand, R&D investment has an incomplete weak mediating effect in government subsidies and R&D investment. In view of the results, this paper puts forward some suggestions for the government to regulate the subsidies standards reasonably, protect the intellectual property rights of emerging technologies normatively, and promote the balanced development of the industry.

Keywords: *New energy vehicle, Government subsidy, R & D investment, ROTA.*

1. INTRODUCTION

The new energy vehicle industry seems to have been on an upward trend. High government subsidies have obviously played a big role in its growth, but in the long run, will the new energy vehicle industry rely too much on subsidies? At the same time, many companies' "fraud" incidents in the past few years have made people wonder what the positive effects of government subsidies are. In addition, new energy vehicle companies with high subsidies should have invested funds in technological innovation and product research and development to give full play to the role of government subsidies and promote the rapid development of new energy vehicle core technologies. On the contrary, the level of research and development of core technologies for new energy vehicles has been widely criticized.

Bergstrom analyzed the financial data of Swedish companies from 1987 to 1993 and concluded that government subsidies have a positive effect on company performance. However, in the literature on the relationship between government subsidies and corporate performance, Hall concluded that there is no significant relationship between government subsidies and corporate performance. Secondly, with regard to the impact of government subsidies on R&D investment, Levin and Reiss believe that government subsidies promote the R&D investment of enterprises to a certain extent. However, Clausen reached the opposite conclusion by analyzing the effect of government subsidies on private enterprises. Consistent with the viewpoints of foreign scholars, in the process of Chinese scholars exploring the relationship between government subsidies and corporate performance, different viewpoints and conclusions have emerged. First of all, most of the current studies have shown that government subsidies have a certain positive effect on corporate performance. For example, Tang Xin and Chen Yongli empirically analyzed the impact of financial subsidies on the operating performance of agricultural listed companies based on the data of agricultural listed companies. Chinese government subsidies and corporate performance generally show a positive correlation. Regarding the effect of government subsidies on R&D investment, different scholars also hold different views.

2. RESEARCH HYPOTHESIS

2.1. Government Subsidies and Company Performance

According to the signal transmission theory, it can be known that the companies that receive subsidies are companies that have been screened by the government for their capabilities and quality. Only potential

companies can receive government subsidies. This is actually a signal for external investors: namely Tell outside investors what industries or companies the government is optimistic about. Therefore, external investors choose companies with strong strength, great development potential and good qualifications to invest on this basis. Hypothesis 1: In new energy vehicle concept stock companies, government subsidies have a positive effect on corporate performance.

2.2. Government Subsidies and R&D Investment

The improvement of the R&D level of enterprises will promote the technological upgrading of products, which will lead to an increase in product sales, and ultimately drive the growth of corporate efficiency. The government's measure to promote R&D investment by enterprises is to issue subsidies to enterprises.

From the perspective of the enterprises receiving subsidies, government subsidies obviously provide certain financial support for the R&D activities of enterprises. Companies that receive government subsidies will have a certain reduction in their own proportion of the capital composition of their R&D activities. This not only reduces the company's R&D costs, but also transfers the huge risks that R&D failures may bear to the country.

Hypothesis 2: Among companies with new energy vehicle concept stocks, government subsidies help companies increase R&D investment.

2.3. The Mediating Role of R&D Investment

Once there is a mismatch between total supply and total demand, the government needs to introduce policies to adjust and adjust the market to reduce adverse effects and avoid The situation deteriorated further. The effect of R&D investment on the relationship between government subsidies and corporate performance can be understood as: on the one hand, R&D subsidies bring direct financial support to the company, and directly bring cash flow to the company's R&D; on the other hand, R&D subsidies pass on It provided a positive signal to tell external investors what the industry supported by the government and the future development direction is, so that external investors' funds poured into the industry guided and supported by the government, which in turn allowed companies to increase R&D investment and promote corporate technological innovation. Technological innovation has enriched the product structure and strengthened the core competitiveness of the product. The ultimate guide is the increase in corporate performance.The following hypotheses can be put forward:

Hypothesis 3: R&D investment plays an intermediary role in the impact of government subsidies on corporate performance.

3. RESEARCH DESIGN AND EMPIRICAL MODEL

3.1. Sample Selection and Data Sources

This article selects the annual report data of the Shanghai and Shenzhen A-share listed company, China New Energy Automobile Concept Stock Company. The data sources are all from the Guotaian database. The study period is from 2013 to 2019. Since the 2019 annual report has not been fully announced, and there are data

After removing and sorting the missing samples, a total of 1223 valid samples were obtained. Import all data input into STATA statistical software, and then carry out Winsorize tailing processing, thereby effectively removing the influence of extreme values.

Table 1. Related variables

Variables	Variable name	Symbol	Variable declarations
Dependent variable	Return on total assets	ROA	End of year net profit/Net assets at year end
Independent variable	Government subsidies	Sub	Government subsidies received that year/Operating income of that year
Intermediary variable	R&D investments	RD	R&D Investment/Operating income
Control variable	the ability of obtaining Cash	Cash	Net cash flow from operating activities/Total liability
	Ownership nature	Own	State owned enterprise=1, non state owned enterprise=0
	Capital structure	Lev	Total assets/Total liabilities
	Year	Year	Annual control virtual variables

3.2. Variable Design

The variable indicators involved in the model are shown in Table 1 above this page.

3.3. Model Establishment

In order to test the hypothesis 1, hypothesis 2, and hypothesis 3 respectively, this paper constructs the following three models in sequence, which are denoted as: model (3.1), model (3.2), model (3.3).

$$Roa = \beta_0 + \beta_1 Sub + \beta_2 Cash + \beta_3 Own + \beta_4 Lev + \beta_5 Year + u$$

(3.1)

$$Rd = \beta_0 + \beta_1 Sub + \beta_2 Cash + \beta_3 Own + \beta_4 Lev + \beta_5 Year + u$$

(3.2)

$$Roa = \beta_0 + \beta_1 Sub + \beta_2 Rd + \beta_3 Cash + \beta_4 Own + \beta_5 Lev + \beta_6 Year + u$$

(3.3)

Among them, β_0 is the intercept term in the model, β_1 is the regression coefficient of the explanatory variable (Sub), the others are the regression coefficients of each control variable, Year is a series of annual control variables, and u is the model residual. According to the aforementioned hypothesis, for model (3.1), if β_1 is positive, it indicates that government subsidies have a positive effect on corporate performance. Therefore, the research hypothesis in this paper supports the result that β_1 is positive; for model (3.2), if β_1 is positive, it means that the government The increase in subsidies is positively related to the increase in enterprise R&D investment. Therefore, the

research hypothesis 2 of this article supports the positive result of β_1: for hypothesis 3, the model (3.3) studies the relationship between government subsidies, R&D investment and enterprise performance , We must combine the model (3.1) and the model (3.2) to judge the mediating effect of R&D investment.

4. EMPIRICAL PROCESS AND RESULTS

4.1. Descriptive Statistical Analysis

It can be seen that the minimum value of return on total assets (ROA) is -23.89 and the maximum value is 18.68. There is a large gap between the two, indicating that the profitability of new energy vehicle concept companies is relatively large. Larger. The minimum value of R&D subsidy (Sub) is 0.00410, and the maximum value is 11.65. The gap is also very large. It can be seen that in this industry, government subsidies are also quite different. In terms of the nature of ownership (Own), as a whole, new energy vehicle concept stock companies have a higher proportion of non-state-owned enterprises than state-owned enterprises. As for other control variables, I will not repeat them one by one. The range of several variables is relatively large. This shows that the development of various companies under the concept of new energy vehicles is not balanced, and there is still a big gap in the strength of large and small companies.

Table 2. Pearson correlation test

	ROA	Sub	RD	Cash	Own	Lev
ROA	1					
Sub	0.131***	1				
RD	0.075***	0.314***	1			
Cash	0.121***	-0.087***	-0.175***	1		
Own	0.100***	0.00800	-0.068**	0.260***	1	
Lev	-0.339***	-0.062**	-0.00200	-0.421***	-0.135***	1

Table 3. Model regression results

· VARIABLES	model(3.1) ROA	model(3.2) RD	model(3.3) ROA
Sub	0.294***	0.430***	0.236***
	(3.85)	(11.61)	(2.94)
RD			0.134**
			(2.27)
Cash	-0.335	-2.381***	-0.015
	(-0.40)	(-5.84)	(-0.02)
Own	0.705**	-0.159	0.726**
	(2.21)	(-1.03)	(2.28)
Lev	-6.859***	-0.506*	-6.791***
	(-11.03)	(-1.68)	(-10.93)
Constant	4.144***	4.520***	3.537***
	(7.57)	(17.02)	(5.82)
Observations	1,223	1,223	1,223
R^2	0.159	0.148	0.162
Annual control	control	control	control
Adjusted R^2	0.152	0.142	0.155
F	25.41	23.48	23.46

4.2. Pearson Correlation Test

Table 3 below shows the results of the Pearson correlation test on the variables in the sample of new energy vehicle concept stock companies.According to the results, the dependent variables of corporate performance (ROA) and government subsidies (Sub), R&D investment (RD), cash strength (Cash), and the nature of ownership (Own) are all significantly positively correlated with capital structure (Lev) It is a significant negative correlation, which indicates

that the variables are closely related and have good correlation. In addition, R&D investment RD and government subsidies (Sub) are also significantly positively correlated, indicating that government subsidies and R&D investment are also highly correlated. Overall, the correlation between the variables in this article is relatively good.

4.3. Multiple Regression Analysis

Regression estimation of the model (3.1), the model (3.2) and the model (3.3) through the measurement statistics software, the results can be obtained as shown in Table.

According to the above table, the degrees of fit (adjusted R-Square) of the three models in this paper are 0.152, 0.142, and 0.155, respectively, indicating that these variables can produce about 15% of the explanatory power of the company's performance (ROA). Considering that there are many factors affecting enterprise performance (ROA), comparing with some documents with similar sample size, it can be seen that the fit degree is within a reasonable range between 0.1-0.3, and it can be inferred that the fitting effect is relatively good.

For the model (3.1), the t statistic of government subsidies (Sub) is 3.85, which can be significant at the 5% significance level, indicating that this variable can have a significant explanatory power for corporate performance (ROA). And its regression coefficient is 0.294 (greater than 0), which shows that under the control of other factors, the higher the government subsidy intensity, the higher the corporate performance. The two are positively correlated, so Hypothesis 1 can be verified.

For the model (3.2), Similarly, its regression coefficient is 0.430, which is also greater than 0, which means that under the control of other factors, the higher the government subsidy, the higher the R&D investment

of the enterprise, and the two are positively correlated. Thus Hypothesis 2 is also verified

Model (3.3) is the final model to verify the mediation effect. In this model, government subsidies (Sub) and R&D investment (RD) are both independent variables. The regression coefficient of government subsidies (Sub) is 0.236, which is less than 0.294 of the model (3.1) that does not include R&D investment (RD). Therefore, according to the principle of the three-step intermediary effect test, it can be considered that there is a partial intermediary effect. That is, government subsidies can improve the performance of enterprises through the increase of R&D investment. Of course, the process does not completely depend on R&D investment. Perhaps R&D subsidies themselves directly promote the improvement of enterprise performance.

5. RESEARCH CONCLUSIONS

First, the impact of government subsidies on corporate performance can be determined by the results of the two significantly positive correlations. Hypothesis 1 is established, that is, government subsidies have a positive effect on corporate performance. Second, government subsidies can also have a significant positive correlation between the two. It can be determined that Hypothesis 2 is established, that is, in new energy automobile companies, government subsidies are conducive to promoting R&D investment: Finally, regarding the mediating effect of R&D investment, the regression results show that R&D investment has an incomplete mediating effect, that is, government subsidies can be passed The increase in R&D investment in turn improves the performance of the company, but the process does not completely depend on R&D investment.

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