Empirical Analysis on the Driving Factors of Transformation and Upgrading of China's High-end Equipment Manufacturing Industry: From the Perspective of Financial Competitiveness

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Abstract: Based on the perspective of financial competitiveness, the paper makes an empirical analysis of the driving factors of the transformation and upgrading of the high-end equipment manufacturing industry and its subdivision industries, using the panel data of 107 high-end equipment manufacturing enterprises from the first quarter of 2014 to the second quarter of 2018. The main conclusions are as follows: On the whole, marketing ability, management ability, capital ability and development ability have a significant impact on the transformation and upgrading of high-end equipment manufacturing enterprises, among which marketing ability has the greatest impact. The factors affecting the transformation and upgrading of different industries are different. In many industries, including rail transit equipment industry, aviation equipment manufacturing industry, machine tool industry and robot industry, marketing ability and management ability have a significant impact on its transformation and upgrading.

1. Introduction

Cultivating and developing high-end equipment manufacturing industry is of great strategic significance for our country to accelerate the transformation of economic development mode. In 2010, high-end equipment manufacturing industry realized sales revenue of about 1.6 trillion yuan, accounting for about 8% of equipment manufacturing sales revenue. It is estimated that by 2020, the proportion will increase to 25%. However, compared with the world's advanced level, there are still large gaps in China's high-end equipment manufacturing industry, such as weak innovation capacity, low product reliability, small industrial scale, and imperfect industrial system. Since the financial crisis, the domestic and international environment has become increasingly severe. Therefore, China's high-end equipment manufacturing industry urgently needs transformation and upgrading.

Poon (2004) [1], Humphrey and Schmitz (2000) [2] believe that the transformation and upgrading of enterprises is the micro level of industrial upgrading, the process of improving the competitiveness of enterprises will eventually reflect on the improvement of corporate profitability. The strength of the company's profitability directly reflects the strength of the high-end equipment manufacturing company's competitive advantage. The improvement of financial competitiveness will directly affect the competitiveness of high-end equipment manufacturing companies (He Zhengchu et al., 2016) [3]. Therefore, this article will be based on financial competitiveness from the perspective of micro-enterprise, use quarterly panel data to conduct a comprehensive empirical analysis of the driving factors for the transformation and upgrading of China's high-end equipment manufacturing industry.

2. Variable interpretation and data description

Based on the existing research and based on the principles of scientificity, reliability and operability, this paper intends to select indicators from the following variables to explain the transformation and upgrading of the high-end equipment manufacturing industry.

2.1 Capital capability

Among all enterprise resources, financial resources are the most fluid and flexible resources because they can be used to purchase other forms of productive resources and are the key to driving other factors of production. The conflict between the resources and investment required by the enterprise to realize the function upgrade and the available resources of the enterprise is a factor that affects the transformation method adopted by the enterprise (Schmitz, 2004) [4]. If there is insufficient funds, it is difficult to directly transition to the independent brand. This article intends to select indicators such as total asset turnover rate, current asset turnover rate, fixed asset turnover rate, receivables turnover rate, inventory turnover rate, working capital turnover rate and other indicators to reflect the financial capabilities of the enterprise.

2.2 Development capacity

The development ability of an enterprise usually refers to the development trend and development potential formed by the enterprise through its own production and operation activities. Since the international financial crisis, with the rising labor costs of enterprises, and the rise of foreign trade protectionism, competition among enterprises has intensified. For enterprises to survive and develop, they must have strategic goals and long-term vision, expand and accumulate its own development potential. According to the existing research, the main indicators to measure the company's development capabilities are operating income growth rate, profit growth rate, asset growth rate, sustainable growth rate, etc.

2.3 Solvency

The debt-servicing capacity of an enterprise is an important indicator that reflects the financial status and operating capacity of an enterprise. Many domestic scholars have analyzed the impact of debt solvency on the development of enterprises. For example, Jian Yanling (2005)[5] pointed out that the inability of enterprises to repay their due debts is an internal reason for financial failure. How to ensure the safe operation of enterprises has become a factor in financial analysis. This paper intends to choose indicators such as current ratio, quick ratio, asset-liability ratio, interest protection multiple, long-term borrowing to total assets ratio, net cash flow generated by operating activities/total liabilities to reflect the company's solvency.

2.4 Risk level

Enterprises are always in a complex, dynamic and changing market environment. Whether enterprises can adapt to the dynamic changes of the environment during the restructuring and development and achieve stable operation is the biggest risk facing the enterprises. Many scholars have studied the risks in the restructuring and upgrading of enterprises. For example, Yang Guiju (2010) [6] points out that enterprises will mainly face three problems during the transition to OBM. In summary, indicators including financial leverage, operating leverage and comprehensive leverage can be selected to reflect the risk level of enterprises.

2.5 Management capability

The transformation and upgrading of an enterprise not only requires replacing new customers and exploring new markets, but more importantly, it involves the transformation of the entire complex operating system of the enterprise, from the production process to the organizational structure, from the internal and external supply chains to the corporate culture. All aspects are testing the company's management capabilities. In summary, indicators including the proportion of business managers, per capita management fees and management cost can be selected to reflect the management capabilities of enterprises.

2.6 Marketing capability

Most scholars believe that the key success factor for companies to upgrade to ODM, especially to OBM, is the cultivation of brand strategy and marketing capabilities. Lin Li and Wang Dong (2013) [7] believe that one of the important paths suitable for the international operation of China's rail transit equipment manufacturing enterprises is to enhance autonomy innovate and cultivate national brands. In summary, the indicators that can be used to measure the marketing capability of an enterprise are: sales cost, sales force proportion, and the state of foreign investment, etc.

Based on the above analysis, this paper sets the regression equation of the factors affecting the transformation and upgrading of high-end equipment manufacturing enterprises as:

$$YLNL_{it} = \alpha + \beta_1 ZJNL_{it} + \beta_2 FZNL_{it} + \beta_3 CZNL_{it} + \beta_4 FXSP_{it} + \beta_5 GLNL_{it} + \beta_6 YXNL_{it} + \varepsilon_{it}$$

i=1,2…107; t=2014, 2015…2018 (1)

Among them, YLNLit measures the level of transformation and upgrading of enterprise i in period t. This paper will choose the rate of return on assets, net profit margin of total assets, net profit margin of current assets, fixed net asset profit margin, return on net assets, operating gross profit margin, operating net profit margin, used as the measurement indicators for enterprise transformation and upgrading. i represents 107 high-end equipment manufacturing enterprises, from rail transportation equipment (18), marine engineering equipment (23), aviation equipment manufacturing (17), satellite and application (13), robot industry (18), machine tool industry (18 companies). t refers to the quarterly data from January 2014 to June 2018. ZJNLit, FZNLit, CZNLit, FXSPit, GLNLit, and YXNLit respectively represent the company's financial capacity, development capacity, debt-servicing capacity, risk level, management capacity and marketing ability.

3. Empirical analysis

3.1 Overall empirical results of high-end equipment manufacturing industry

There are usually three kinds of models established with panel data, namely mixed regression model, fixed effect model (FEM) and random effect model (REM). In the analysis of formula (1), the indicators selected for enterprise transformation and upgrading, financial capability, development capability, solvency, risk level, management capability and marketing capability are: operating gross profit margin, current asset turnover rate, operating income growth Rate, interest protection multiple, comprehensive leverage, management expense rate and sales expense rate.

The estimation results of the three models are shown in columns (1)-(3) of Table 1. It can be seen from this that different models have certain differences in estimation results. It can be seen from the three models that the financial capacity has a significant impact on the profitability of high-end equipment manufacturing companies. This also confirms the previous analysis. During the transformation of the company, regardless of the purchase of production raw materials, the salary of employees, or the new A series of activities such as the introduction or innovation of technology, the building of marketing capabilities, and the establishment of brands all require financial support. Without the support of capital, it is difficult for enterprises to transform and upgrade successfully. The coefficient of development capability is significant at the level of 1% in the three models, which means that high-end equipment manufacturing companies must have strategic goals and long-term vision in the process of transformation and upgrading, and continue to expand and accumulate their own development potential. The solvency is only significant in the mixed regression model, but neither in the fixed effect model nor the random effect model, and the sign is not stable. The impact of risk level on the transformation and upgrading of high-end equipment manufacturing enterprises is only significant at the 10% level in the random effect model, and neither in the mixed regression model nor the fixed effect model. Management capabilities and marketing capabilities are significant in the three models, which also fully illustrates the importance of management capabilities and marketing capabilities in the transformation and upgrading of high-end equipment manufacturing enterprises. According to the estimation results of the fixed-effect model (column 2 of Table 1), marketing ability has the greatest impact on the transformation and upgrading of high-end equipment manufacturing enterprises, followed by funding ability, management ability and development ability also have a significant impact on the

transformation and upgrading of high-end equipment manufacturing enterprises.

In order to test the robustness of the regression results of formula (1), we use another set of index systems to perform regression analysis. The estimation results of the three models are shown in columns (4)-(6) of Table 1. It can be seen that the empirical results are robust.

Table 1. Three model regression results

Estimator	Pooled OLS (1)	FEM (2)	REM (3)	Pooled OLS (4)	FEM (5)	REM (6)
ZJNL	-.0740034***	-.021607**	-.0233218**	.1540752*	.3003606***	.2838476***
	(0.000)	(0.022)	(0.011)	(0.055)	(0.000)	(0.000)
FZNL	-.0003283***	-.0008552***	-.0008294***	2.857228***	2.507589***	2.582143***
	(0.004)	(0.000)	(0.000)	(0.002)	(0.007)	(0.005)
CZNL	-3.88e-06***	4.38e-07	3.51e-07	-.2947371**	.0380165	-.2063558*
	(0.000)	(0.261)	(0.370)	(0.012)	(0.816)	(0.091)
FXSP	-.0001903	-.0000272	-.0000306*	-.0027323	-.0007149	-.0009821
	(0.170)	(0.143)	(0.063)	(0.179)	(0.494)	(0.393)
GLNL	.0409984***	.0117173**	.0127827**	-.0385557***	.0357756*	.0186334
	(0.001)	(0.030)	(0.027)	(0.003)	(0.095)	(0.162)
YXNL	-.6032684***	-.6164778***	-.6160567***	.3259211	-2.379379***	-1.744397***
	(0.000)	(0.000)	(0.000)	(0.618)	(0.004)	(0.000)
Constant	.3154902***	.3020883***	.3132011***	.1992167***	.1619066**	.2389256***
	(0.000)	(0.000)	(0.000)	(0.009)	(0.014)	(0.000)
Observations	1617	1617	1617	1569	1569	1569
R^2	0.8498	0.8383	0.8391	0.2326	0.1055	0.1654
F	3200.60	335576.10	-	6.14	7.08	-

* Significant at 10%; ** Significant at 5%; ***Significant at 1%； P value in brackets.

3.2 Empirical results of various sub-sectors

Here, on the basis of formula (1), we will conduct an empirical analysis on the transformation and upgrading of high-end equipment subdivision industries such as rail transportation equipment, marine engineering equipment, aviation equipment manufacturing, satellite and applications, machine tool manufacturing, robotics industry.

The main conclusions are as follows. The impact of financial capacity and risk level on the profitability of rail transportation equipment companies is not significant in the three models. The solvency variable is only significant in the mixed regression model, but neither in the fixed effect model nor the random effect model. The influence of management ability, marketing ability and development ability on the profitability of rail transportation equipment enterprises is significant in the three models.

The influence of development ability, debt solvency, risk level and marketing ability on the profitability of offshore engineering equipment enterprises is not significant in the three models. The influence of management ability and financial ability on the profitability of offshore engineering equipment enterprises is significant in the three models.

The impact of marketing and development capabilities on the profitability of aviation equipment manufacturing companies is significant in all three models. However, the influence of financial capability, solvency and risk level on the profitability of aviation equipment manufacturing enterprises is not significant in the three models. The management ability is not significant only in the mixed regression model, but is significant in both the fixed effect model and the random effect model.

The impact of financial capabilities and development capabilities on the profitability of satellite and application companies is significant in all three models. The impact of management capability and risk level on the profitability of satellite and application companies is not significant in the three models. Marketing ability is not significant only in the mixed regression model, but it is significant in both the fixed effect model and the random effect model. Solvency is significant in both mixed regression models and random effects models, but not in fixed effects models.

The influence of capital ability, management ability and marketing ability on the profitability of machine tool enterprises is significant in the three models. However, the influence of development ability, solvency and risk level on the profitability of machine tool enterprises is not significant in

the three models. According to the fixed-effects model, the factors that affect the transformation and upgrading of machine tool companies include financial capabilities, management capabilities, and marketing capabilities, of which marketing capabilities have the greatest impact on the transformation and upgrading of machine tool companies, followed by management capabilities and financial capabilities.

The influence of financial ability, management ability and marketing ability on the profitability of robot companies is significant in the three models. The influence of development ability and solvency on the profitability of robot companies is not significant in the three models. The risk level is only significant at the 10% level in the random effects model, but neither in the mixed regression model nor the fixed effect model.

4. Policy implications

According to the results of the above empirical analysis, in order to promote the transformation and upgrading of the high-end equipment manufacturing industry, we should proceed from the following aspects. 1. Strengthen enterprise online and offline marketing system construction, and constantly improve after-sales service. 2. Strengthen cooperation with important customers and enhance their position in the value chain. 3. Accelerate the advancement of information integration in all links of the enterprise value chain. 4. High-end equipment manufacturing enterprises should make changes in the following basic directions: expand management scope, reduce levels, comprehensive management functions, further decentralization, and improve organizational flexibility and efficiency.

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