Generalized Method of Moments (GMM) Model for Financing Decision and Capital Structure on Manufacturing Enterprises' Export Capacity

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ABSTRACT

To improve the export capacity of Chinese enterprises is the key to enhance the international competitiveness and promote economic status of China. This article employs an expanded Generalized Method of Moments (GMM) model considering financing decision and capital structure, in which we distinguish enterprises into three sizes namely large-scale ones, medium-sized ones and small ones. We select 1901 manufacturing enterprises which are capable to export in China as sample and select data during 1999—2007 to conduct empirical analysis. The result turns out that: (1) As for financing decision, increasing the leverage will improve an enterprise's competitiveness of export, especially for small businesses. (2) As for capital structure, small and medium-sized enterprises (SMEs) depend mainly on collective capital, personal capital and FDI to improve their export competitiveness. As a result, it's necessary for SMEs to enhance financing support and reduce financing cost, while for large scale enterprises, technological innovation should be motivated.

Key words: manufacturing enterprises, financing decision, capital structure, export capacity.

Mathematics Subject Classification: 62J12, 62P20

Computing Classification System: I.4

1. INTRODUCTION

With the international competition becomes increasingly fierce, the traditional extensive exportation model has been unable to meet the needs of economic development of China, forcing the exportation structure to adjust to intensive one. According to the MM theorem, this article attempts to provide a specific implementation plan on the enterprise innovative production technology and enhanced management capabilities from two aspects including financing decision and capital structure.

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Till now, there are a number of researches on the influencing factors about the export capacity of enterprises, ZB Liu and J Zhang (2009), Baier and Bergstrand (2001), J Zhang, et.al (2010) and Lawless (2007) suggested that the supply chain relationships, market segmentation and the ease of restrictions for enterprises to enter and exit from the market have significantly positive effect on export capacity. This paper argues that the financing decision and capital structure mainly influence the export capacity of enterprises through three channels, including the cost of corporate finance, technological innovation capability and preferential policies. Refers to the financing cost, Kang (2011) employed panel probity model find that financing constraint is an important factor, while foreign-funded manufacturing enterprises export behaviors are not subject to the financing constraint; On the technological innovation, Grossman and Helpman (1995) put forward the endogenous growth theory, which clearly pointed out that technological innovation plays an important role in influencing the export capacity, and JC Guan and N Ma (2002) demonstrated it. On the preferential policies, R Zeng(2013) and WG Xiao, et.al(2013) both pointed out that financing environment and loans from commercial banks can not be neglected, which play more important role on small enterprises.

Although many analyses have been made, the current literature lacks of further exploration on the underlying cause. Based on the existing research, this paper explores the relationship between the three factors and export capacity from the perspective of financing decision and capital structure. The full text is constructed as follows: The second part sorts out the intrinsic relationship between the financing decision, capital structure and export capacity; the third part conducts the empirical analysis and interprets the corresponding conclusions; the fourth part is the summary.

2. THE INTRINSIC RELATIONSHIP BETWEEN FINANCING DECISION, CAPITAL STRUCTURE AND EXPORT CAPACITY OF ENTERPRISES

There needs to be more capital investment to improve the export capacity of manufacturing enterprises in China and reduce the difference of export capacity between different sized enterprises. The usual source of finance consists of debt financing and equity financing, and different channels of financing result in different costs directly. In general, the cost of debt financing is lower than equity financing, which only requires a fixed interest returns. Currently the discovery of debt financing is promoted because of the very unstable of both international and domestic markets, it requires for more serious control of risk. Equity financing also has its own advantages to support enterprises and improve their export capacity, since the introduction of high-quality shareholders could improve enterprises' management level and bring some emerging technologies and management experience directly, all of which can affect the export capacity of enterprises.

Different sized enterprises have different capital structures. Under the premise of equity financing, the capital structure consists of seven different sources, namely the government capital, collective capital, legal capital, personal capital, Hong Kong, Macao and Taiwan investment and foreign direct investment (FDI). Different capital structures have different effects on the export capacity of enterprises.

Government capital has two effects on the export capacity, on the one hand, it brings preferential policy from national or local government, especially when the export capacity declines, the government can support enterprises to overcome difficulties; on the other hand, the government capital can lead to principal-agent problem, which results in a lack of incentive mechanism and motivation for enterprises to develop their potential. There is a certain similarity in collective capital and government capital, but the former has less influence on the policy than the later, which lead to less policy support and more serious agency problem. The influence of Hong Kong, Macao, Taiwan and FDI on the export capacity of enterprises includes three aspects: First, the effect of financial support, it provides adequate and efficient funding for enterprises, enables the company to adjust its development direction to the economic environment's rapidly changes; Second the technology spillover effects, the foreign advanced technology and patents permeate through the investment destination accompanied by FDI to improve local technological level, thus affecting the ability to export. However, the introduction of FDI may also make   manufacturing enterprises in China more dependent on imitation and introduction of external technology, so as to reduce its own ability to innovate, thereby affecting the potential for sustainable development; Third, the increase of pressure on the transfer of funds. Due to the gradual decline of labor bonus, production costs increase and the competitive advantage of export prices declines. These directly result in the outflow of capital which cannot be controlled by government, making this part of capital less stable. Corporate capital and personal capital have a big uncertainty of the impact on export capacity of enterprises, influenced by legal entities or individual's attitude toward the development and the entrepreneurship of the target enterprise. It is the uncertainty impact different financing decisions and capital structures have on supporting innovation that highlights our empirical study with both theoretical and practical significance.

3. EMPIRICAL ANALYSIS OF THE INFLUENCE OF FINANCING DECISION AND CAPITAL STRUCTURE ON EXPORT CAPACITY

According to the previous theoretical part, financing method has a significant impact on the improvement of manufacturing enterprises' export capacity, and equity financing and debt financing have respective advantages in supporting enterprises' export capacity. Therefore, we need to apply data to examine the specific impact of financing decision and capital efficiency on enterprise innovation.

3.1Theoretical model and data sources

We select manufacturing enterprises in China as empirical sample and employ panel data analysis. Export capacity of manufacturing enterprises stands for the explained variable, while financing methods represent explanatory variables. In addition, we introduce some control variables. i is on behalf of enterprise and t denotes time. Then we construct two models to examine relationships between capital structure and export capacity.

$$\text{Model I :} \quad \ln ex_{it} = C + \alpha_1 ca_{it} + \chi_i \phi_{it} + \varepsilon_{it}$$

Where ex_{it} is explained variable, represented by enterprise total export. ca_{it} is capital structure, with debt-to-assets ratio as its proxy variable. ϕ_{it} denotes business age, which is control variable. In the meantime, we distinguish the scales of manufacturing enterprises (sca) into 3 levels, with 1,2,3 on behalf of small、medium-sized and large scale enterprises respectively1.C is a constant term, and ε_{it} denotes residual term. Model I is mainly used to investigate the effect of Chinese manufacturing enterprises' debt financing and equity financing on the comparative advantages of export capacity. That is to say, a positive coefficient of debt-to-assets ratio (i.e. ca_{it} is positive) indicates that increased financial leverage will have a significant promoting influence on improving export capacity.

$$\text{Model II:} \quad ex_{it} = C + \alpha_i td_{it} + \beta_i \varphi_{it} + \chi_i \phi_{it} + \varepsilon_{it}$$

In order to comprehend the reason why different sources of capital will lead to diverse export capacity, we further divides equity financing into seven types ,that is government own capital(td), capital (govc), collective capital（groc）, corporate capital（insc）, personal capital(perc), Hong Kong、Macao and Taiwan capital(hkc), and foreign direct investment capital(fidc). In model II, φ_{it} is explained variable, which is on behalf of seven types of direct financing above. Model II is used to analyse the effect of Chinese manufacturing enterprises' equity financing decision on export capacity and compare the different efficiency of different capital sources. It should be noted that model I is a semi logarithmic model, which adopts the logarithm value of export sales as explained variable, while model II adopts absolute value of export sales as explained variable. The difference should be attributed that the explanatory variable of model I is debt-to-asset ratio, take logarithm could eliminate dimensional problem, while model II is beyond this problem.

4.large scale enterprises are the ones with both annual sales revenue and total assets above500 million yuan，medium-sized enterprises with both annual sales revenue and total assets range from 50 million to 500 million yuan，the rest are small companies.

Table 1 Statistical Description

Variable	Obs	Mean	Std.Dev.	Min	Max
ex	8027	216935	1.415e+06	1	6.420e+07
ca	8027	0.710	0.181	0.00782	0.999
td	8027	818900	2.685e+06	448	6.720e+07
govc	8027	108496	554997	0	1.450e+07
groc	8027	5511	85083	0	5.312e+06
insc	8027	92907	356960	0	5.492e+06
perc	8027	20185	88550	0	4.312e+06
hkc	8027	13055	164239	0	7.403e+06
fdic	8027	41395	227199	0	53000

The selected period ranges from 1999 to 2007, and data come from Chinese Industry Enterprise Performance Database. Due to the lack of data in 2004, we can only employ those data in a period of 8 years. As we adopt manufacturing enterprises in China as samples, we select manufacturing enterprises whose industry classification code range from 13 to 43.There are 1901 enterprises altogether, and 8027 observed samples in total. On account of several discontinuous data, these are non-equilibrium panel data.

3.2 Empirical results and its economic analysis

To more accurately investigate the effect of financing structure on export capacity, we conduct quantitative analysis. The empirical test of this paper is divided into two parts, one is the comparison of different effects of debt financing and equity financing on export capacity, the other one is the comparison of diverse export capacity which are caused by seven kinds of capital sources. We take empirical tests specific to large scale, medium-sized and small manufacturing enterprises respectively, to investigate effects of different sized enterprises' financing decisions on export capacity. Table 2 shows the results of the regression equation 1.

Table 2 effects of different sized enterprises' financing decisions on export capacity

variables	(1)	(2)	(3)	(4)	(5)	(6)
ca	1.469***	1.389***	0.693**	0.463**	0.936**	0.690**
	(0.280)	(0.229)	(0.278)	(0.209)	(0.373)	(0.290)
open	0.00611**	-0.000692	0.00613*	-0.00538**	0.0203***	0.00181
	(0.00276)	(0.00203)	(0.00349)	(0.00258)	(0.00589)	(0.00405)
Constant	9.286***	9.079***	8.990***	9.429***	7.803***	8.160***
	(0.224)	(0.183)	(0.215)	(0.169)	(0.277)	(0.240)
No. of observations	3,400	3,400	3,451	3,451	1,176	1,176
Number of sections	726	726	848	848	327	327
R^2	0.472	0.461	0.311	0.364	0.513	0.522
Fixed effects	YES	NO	YES	NO	YES	NO
Firm size	small	small	medium	medium	large	large

*, ** and *** indicate the rejection of the null hypothesis at 10%, 5%, and 1%, respectively (t-statistic). Standard errors in parenthesis

Corporate financing decision will influence costs, competitiveness of products and ultimately export capacity. Seen from table 2, we can draw out that in both fixed effect model and random effect model, financing decision plays a significant role in enterprises' initial innovation. Proxy variables representing debt financing and equity financing in three different sized enterprises all pass the check, which indicates that financing decision does affect export capacity. However, there exist differences. As for debt financing, the effect of large enterprises is more significant than small companies, while regarding equity financing, the opposite conclusion holds. Under this circumstance, large enterprises can improve export capacity by increasing debt financing while small ones should enhance equity financing.

Table 3 effects of different sized enterprises' capital structures on export capacity

	(1)	(2)	(3)	(4)	(5)	(6)
govc	-0.0882	-0.271**	0.238*	-0.0199	-0.448	-2.038***
	(0.0726)	(0.109)	(0.143)	(0.0960)	(0.804)	(0.712)
groc	7.164***	6.923***	0.414***	0.211**	-0.443	-0.834*
	(1.132)	(1.171)	(0.104)	(0.0976)	(0.589)	(0.499)
insc	-0.156	-0.316*	0.204	-0.0425	-1.037	-1.119*
	(0.156)	(0.182)	(0.164)	(0.117)	(0.840)	(0.591)
perc	1.659**	1.387*	0.490**	0.224	-0.303	-0.343
	(0.671)	(0.726)	(0.193)	(0.162)	(0.643)	(0.747)
hkc	-0.348	-0.488	0.291***	0.204***	0.220	-0.227
	(0.712)	(0.649)	(0.105)	(0.0638)	(0.545)	(0.224)
fdic	1.368**	1.148**	0.250	0.491*	0.313	-0.799
	(0.600)	(0.542)	(0.277)	(0.269)	(0.237)	(0.503)
td	0.208***	0.210***	0.375***	0.378***	1.678**	1.158**
	(0.0455)	(0.0523)	(0.0575)	(0.0547)	(0.739)	(0.455)
open	4,032***	-5.045	271.2	-107.6	-909.0	-774.6*
	(1,135)	(886.8)	(221.3)	(200.1)	(579.8)	(404.7)
Constant	-251,549***	-10,905	-27,607	-2,645	-60,862	-94.19
	(84,549)	(52,311)	(17,715)	(17,438)	(37,327)	(14,736)
No. of observations	3,400	3,400	3,451	3,451	1,176	1,176
Number of sections	726	726	848	848	327	327
R^2	0.520	0.5163	0.209	0.2024	0.433	0.410
Fixed effects	YES	NO	YES	NO	YES	NO
Firm size	small	small	medium	medium	large	large

*, ** and *** indicate the rejection of the null hypothesis at 10%, 5%, and 1%, respectively (t-statistic). Standard errors in parenthesis

There is little deviation between the estimate results and theoretical analysis of the impact capital structure plays on export capacity, i.e. parameters have all passed through the test and support our theoretical hypotheses.

First, the impact of large enterprises dominated by government capital on export capacity is notably

higher than that of small ones. This illustrates that more loans are available to large enterprises when they need the favor of government capital, which affects their export capacity. Although small companies' capital requirements are small too, they need more flexible market reaction and lower cost of financing to improve their capacity of export. China is deepening its dependence on reform and opening up, invigorating large enterprises while relaxing control over small ones gradually. This differentiates the government support towards enterprises of three scales unconsciously, which directly leads to their varied export capacity. Regarding of capital structure, collective capital-oriented enterprises of small-sized have large influence on export capacity, this well explains the rapidly growth of SMEs in most villages and towns of our country. Since they have both background as state-owned enterprises and flexible transformation of production mode to meet the needs of the external market. The typical cases happen in coastal cities, where a large number of collective capital-oriented enterprises product export commodities or conduct the "three plus one" trading mix making advantage of labor dividends, which turns out the main impetus of local economy development.

Second, corporate capital-oriented enterprises mainly rely on the entrepreneurship of managers, so when the managers are equipped with forward looking sight and earnest manner, they can lead the enterprise to expand market and promote export capacity. This explains the results in the table 3 that there exists significance partly but not that strong and comes with certain randomness. Again regarding to capital structure, personal capital-oriented enterprises of large size have less significant effect on export capacity than small ones. This reveals not only the reasons for the rapid growth of private businesses and their gradually taking over the export market share of large enterprises, but the occurring of management dilemma when large enterprises have personal capital investment, since they would have to face problems such as family inheritance and management of close relative and so on. From the case of most enterprises in our country at present, we will find few of the management dilemmas be settled, which leads to personal capital-oriented businesses of large size have less significant effect on export capacity than small ones.

Third, although investment from Hong Kong, Macao and Taiwan and foreign countries make up the external capital of our country, they form different export capacity because of different adaption degree to the present state of China and varied local preferential policies. Among Hong Kong, Macao and Taiwan investment-oriented enterprises, medium-sized ones have the most outstanding influence on export capacity, which does match the present development situation of our enterprises of Hong Kong, Macao and Taiwan. The amount of investment from these three places is a gradually increasing process with a small and stable amount initially called water phase, then an increasing amount in the middle time brings the enterprise into rapid and stable development which directly influences export capability. What's more, when additional investment at last period happens, the enterprise would face certain restriction of development because of problems like management pattern and communication to local government. Since foreign-invested enterprises are in support of our country's reform and opening up, many local governments are positive to compete for and make use of foreign investment. As a result, enterprises of these three scales all influence export capacity notably. But the government behavior of protect native enterprises' market shares and increase the export capacity of own brands, would restrain the expansion of foreign-invested enterprises, which turns out that the impact of large foreign-invested businesses on export capacity is not the most significant one.

Finally, we compare the same type of enterprises' performance in different capital structures vertically to find that, collective capital-oriented enterprises impose greater effect on export capacity than foreign-invested ones among small businesses, both collective capital-oriented and foreign-invested

enterprises show significant effect on export capacity among medium-sized businesses, and large enterprises can reveal great effect on export capacity only when dominated by government capital.

4. CONCLUSION

This paper, using the analytical framework of the GMM model, theoretically characterizes the financing decision and capital structure of Chinese manufacturing enterprises' export capacity, analyzes Chinese manufacturing enterprises export data during a period ranging from 1999 to 2007, influenced by the financing decision and capital structure, and provides the quantitative estimation of the contribution of the financing decision and capital structure's impact on export capacity of three different scaled enterprises. The results show that, both financing decision and capital structure have significant effects on the export capacity of enterprises, and the results indicate that we can make full use of the adjustment on financing decision and capital structure of companies of all sizes to achieve the purpose of improving manufacturing enterprises' export capacity in China.

The study also finds that in equity financing there are also differences among the influences that different capital structures have on Chinese manufacturing enterprises' export capacity. Through guiding the collective capital and foreign investment into small manufacturing enterprises, the cost of financing of small businesses can be reduced, which not only expands export capacity of enterprises in China, but also protect the country's large and medium-sized native enterprises to some extent. In medium-sized enterprises, collective capital as well as Hong Kong, Macao and Taiwan capital has the most significant effect on export capacity, so the policy should guide these two funds into medium-sized enterprises, and effectively controls their sizes, so that they can improve export capacity to the largest extent. For large state-owned enterprises, there should be less regulation as well as policy support so as to strengthen their capability of initial innovation, developing intrinsic motivation to enhance the export capacity. What's more, it's important to establish and foster a team of managers equipped with technological innovation spirit, to encourage technological innovation aimed at the improvement of export capacity.

At present, China's exports growth slows down influenced by the sluggish international market. This study draws out important policy implications for businesses of all sizes, and we found that an enterprise can increase the export capacity by adjusting its financing decision and capital structure. Therefore, when it comes to the development policies for enterprises, policymakers should guide enterprises to optimize their financing decisions and capital structures considering their different firm sizes and nature, so as to achieve the purpose to enhance and improve the export capacity of enterprises.

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