Modeling and research of the relationship between FDI and China's international finance

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ABSTRACT

FDI has really close relationship with China's international finance. From the point of the multinational company's overseas investment, the risks of multinational company's overseas investment will increasing if there is economic crisis, leading to the severe affection to the imports assets in our country. In this way, international financial trades would get affected and so on the development of multinational companies. Based on the data of regression model, some corresponding researches and discussions are made on FDI, which might play a positive role in the development of the international finance and trade in China. At the same time, it helps to achieve the ultimate goal of reducing the risk of overseas multinational companies through financial investment.

KEYWORDS

FDI; International finance; Modeling; Research of relationship.

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INTRODUCTION

From the point of the international financial development in China, the risk of multinational company's overseas investment decides the amount of returning interests. However, the size of the international finance market liquidity is the fundamental factor that affects multinational company in terms of capital investment. The connection between this two parts will have positive or negative influence on the development of our international financial markets[1]. This paper does research on the internal relationship between them based on the measurement and regression model by studying the influence factors through related data collection, sorting and analysis. And combined with the corresponding econometric empirical assumptions, it is effective and scientific so as to provide a solid theoretical and data support for the decrease of overseas investment risks and development of China's international finance environment.

THE MODELING

Let's assume that there is a multinational company and the combination of its assets is A_t, its goal is to keep the company's benefit at maximum under the range of risk. However, In the realization of this goal, it must weigh and balance its own risk investment preference and risk-free investment so as to ensure that the allocation proportion in the process of investment can be achieved ideally. In the process, we assume that H, the proportion of investment for FDI, is between 0 to 1so that the total proportion of risk-free investment would be 1to H. However, considering the basic requirements of corporate liquidity in the market factors, we can assume the risk-free investment proportion as 1 to H and the proportion must be above 0. And it must be proportional with R. With the increase of Arrow-Pratt risk aversion measure of the risk-free investment, there would be more of risk-free assets, which can result in the corresponding formula as following:

$$\bullet(1-\theta)/\bullet\sigma > 0$$

The interests from multinational company's investment in FDI and risk-free asset according to the scale of 1 - H and H:

$$E_i = \theta A_t(1+R_i) + (1-\theta)A_t(1+r_f)$$

In the process of research and supervision of the above formula, r_r stands the size of the risk-free rate. R_i is referring to the average return efficiency in the FDI investment, as well as what we call the size of the total return capital. Since then, we will calculate the expected return rate of FDI enterprises according to the Douglas production function[2]. However, there is special properties of the foreign capital and other assets have corresponding different and limit of absorptive capacity. Whether foreign capital absorption capacity and technical level can be reached with investor is important. Its absorptive capacity will be crossed and the absorption of other countries for cash ability is stronger. Absorptive capacity of poor phenomenon exists, so it will be for the creation of the FDI enterprise production caused irreparable damage. In this function, the Labor L not only represents the number, but also embodies the quality.

Assuming that cobb-douglas production function of multinational corporations FDI investment as follows:

$$Yf = AK_f^{\bullet}L_h^{1-\bullet} \qquad\qquad\qquad\qquad (1)$$

In the reasoning process of the above formula, the specific meaning of Y_f is total output of the investment from FDI enterprises. The K_f refers to the total input of FDI in the process of enterprise

investment. The L_h is the total number of human capital of labor employed in the process of investment. In the above formula, we follow the main principle that marginal investment is equal to the marginal revenue. Therefore, we can draw that the average rate of return interests should be equal to each other. We can get the expected return rate of FDI enterprises from the calculation of the above reasoning consensus, replaced with R_i as specific as follows:

$$R_i = A \bullet K_f^{\bullet-1} L_h^{1-\bullet} \qquad (2)$$

From the above formula, we can see that R_i is the expected revenue efficiency of a multinational company in midfield in the process of the operation turnover. In the environment of the economic crisis, however, the company will choose to withdraw money overseas in response to internal economic crisis. At this point we can see the expectations of overseas investment efficiency revenue of multinational company will be less than zero[3]. We assume that the possibility for company encountered in this economic crisis is P_c, so expected revenue obtained by multinational companies making FDI investment can be got through the following formula:

$$E_{fdi} = (1-p_c)\theta A_t(1+A \bullet K_F^{\bullet-1} L_h^{1-\bullet}) + p_c \theta A_i \gamma \qquad (3)$$

Seen from the above formula, specific benefits of the FDI can be embodied through two aspects. The first one is that in the process of corporate development stage the company gains normal. The other one is to reflect the company feedback when suffered during the process of crisis. γ means the proportion of investment of assets after being sold. We assume that γ is less than 1 and greater than zero, so it can decide the size of the whole market liquidity. To conclude from the idea, if its liquidity can be fully guaranteed, then from subjective receptive to FDI enterprises will be increased significantly, and multinationals companies will recover its investment proportion even get maximum value in this. On the contrary, with the arrival of the financial crisis, the market's liquidity can be significantly reduced into a shortage situation. Therefore, there will be less and less enterprises will be willing to accept the FDI, which will lead the investment recycling ratio presenting obvious decline and it is hard to get the value of γ [4]. From the above discussion, we can sum up that the multinational company's total assets at the early stages of the financial crisis are able to get expected profit, which can be calculated by the following formula:

$$\pi = (1-\theta)A_t(1+r_f) + p_c \theta A_t \gamma + (1-p_c)\theta A_t(1+A \bullet K_f^{\bullet-1} L_h^{1-\bullet}) - \frac{1}{2}c\theta A_t^2 \qquad (4)$$

In the process of the establishment of the above formula, the inner meaning of first paragraph is the expected income that the company can get from the risk-free investment. And the second and the third respectively on behalf of the company investment returns of FDI with or without economic crisis. And the last item refers to the total cost of the investment. In this coefficient, it reflects the size of the investor's own international trade and the stand or fall of the external environment, and the FDI investment environment is whether can suit period's overall performance. Derivation through the formula :

$$\bullet\pi / \bullet A_t = (1-\theta)(1+r_f) + p_c \theta \gamma + (1-p_c)\theta(1+A \bullet K_f^{\bullet-1} L_h^{1-\bullet}) - c\theta A_t = 0 \qquad (5)$$

Solved as:

$$\theta = \frac{(1+r_f)}{cA_t + (1+r_f) = p_c \gamma - (1-p_c)(1+A \bullet K_f^{\bullet-1} L_h^{1-\bullet})} \qquad (6)$$

Summed up from the above formula, we can get three important implications that affect FDI channels and mechanisms. The first one is that the size of the trade market liquidity has the corresponding impact on its size. Seen from the above formula, if $\bullet\theta/\bullet\gamma > 0$, trade market liquidity and the proportion of FDI enterprises investment can form the proportional relationship. For example, if there is enough money for the market investment, the liquidity can get the corresponding guarantee and in this period, the proportion of investment by multinationals will to FDI enterprises on a large scale injection. On the contrary, it will produce different effect, so that multinational companies will be inclined to in risk-free investment channels, which can reduce the risk of investment recovery rate[5].

From the discussion of the above formula, we can summarize the main aspects of the financial crisis for FDI affect is made up of two parts. Firstly, the financial crisis can cause falling trade market liquidity so that the number of FDI has been in decline. And the main reasons for this phenomenon is from FDI enterprise itself as it will be trying to save for the emergence of the current crisis and to prevent the negative influence caused by the damage,which cause the liquidity decrease. On the other hand, it is mainly due to the economic crisis in the financial institutions of financing difficulty increasing, and then to the investment effect of FDI enterprises so as to produce the corresponding inhibition. Pointed out by Goldstein, Assaf Rezin etc in 2008, the financial crisis risk for FDI flow can produce absolute influence. In the economic market with weaker liquidity, the focus of many multinational companies is to maintain cash flow, and then affect the confidence of the outward economic expansion correspondingly, which leads to the trend of decline.

ECONOMETRIC STUDY

This paper studies the impact on FDI by the financial crisis through the corresponding data model. Firstly, the size of the financial trade market can produce the influence of different level on liquidity for FDI. The increase of its investment risk factors will decline on FDI relative size. Both international trade and consumer demand can produce corresponding inhibitory effect to the scale of FDI, which will be conformed in the following data and its formula for validation of this aspect.

In this part, the paper will effectively choose some countries and regions that have close trade with our country to be the research examples, mainly these choice between 1999 and 2007 that can reflect the liquidity and business risk factors such as indicators. we will do researches on China's trade taking some corresponding measurement methods as the basis of panel data econometric model, chose a panel econometric model as a way of the research process. There are two main reasons. Firstly, there is some difference for FDI, including both in essential aspects and nature parts. It is really necessary to distinguish between different countries and regions of FDI with our country with cross section data. Followed by panel data and sorting existing single time between the sample quantity, the results of the regression data display can also fully be the scientific and accurate. And in this paper, all these data are mainly from 1999-2007 annual inspection for 13 international and regional data collection. The construction of the regression model is as follows:

$$FDI_{it} = \beta_0 + \beta_1 FA_{it} + \beta_2 EX_{it} + \beta_3 PPI_{it} + \varepsilon_{it} \tag{7}$$

We can see from the above formula that i and t in the formula are respectively standing country and year. The meaning of the FA is the amount of money held abroad by the investors. However, investor money overseas holdings to a certain extent can reflect the size of the market liquidity and can reflect the investor's own market flow condition. Goldstein, Assaf Rezin had related judgment on the chances of getting the market liquidity crisis in 2008. Therefore, this paper will take investor as a reflection of the country's total overseas assets market liquidity variables[6]. And the EX is referring to export combination of the investor, which is a combination of concrete embodiment for investor import in China. The data can objectively reflect the changes of the international trade market environment. In the process, the company's business risk indicators for effective transformation is difficult. But after comparing analysis of the data and process, in the end we will take the price of the producer price index

as a measure of the company's operating risk instead of a variable. Where PPI is according to the specific measure of different commodity price changes, which can reflect change process of the goods's price. In this process, with the enhancement of price measure, the company's business profit will decrease and the risk will be greatly enhanced.

This paper sorts out China's statistical yearbooks of the past relevant data, and study them combined with 13 countries and regions for the inputs of FDI in China. It sums up the total of 13 countries overseas assets held and PPI index number, and the main source of this metric lies in the related website data sorting process. The total number of overseas assets held in the countries is calculated by the local currency so that we will be unified into dollars. The variable cross section sequence can be effectively arranged accordingly. They are the UK, France, Germany, Italy, Holland, Russia, the United States, Canada, South Korea, Japan, Malaysia, Singapore, Hong Kong. And the time sequence is between 1999 to 20008. In order to reduce corresponding negative effects generated by the calculation process, the data will be in the process of selection of the logarithmic selection process, thus the resulting data sequence is listed as LNFDI, LNAS, LNEX and PPI. However, in order to reduce the influence of heteroscedastic data for measuring process, we take the least squares regression calculation for the model. And then the obtained data can provide powerful calculation of the above formula. Related validation by the calculation process of regression model can get from TABLE 1, specific as follows:

TABLE 1 : The panel regression model results

model type	Foreign direct investment FDI		
	mixed regression	fixed-effect regression model	individual effect
C	2.3918	7.5756	7.342
Foreign assets FA	0.3025 (-2.9375)	0.1616 (-1.9201)	0.1713 (-2.0996)
Export EA	0.4433 (-4.1986)	0.2796 (-2.8243)	0.2958 (-3.1174)
producer price index PPI	0.0002 (-0.0146)	-0.0144 (-2.0144)	-0.0154 (-2.2254)
Hausman Statistic			0.59
prob			0.74

Observing from the three models in TABLE 1, the empirical results used from the mixed regression method is not significant, which can be excluded firstly. According to the result of Hausman test we can see prob is greater than 0105, which means that the null hypothesis is accepted by random effects model. Therefore, the individual random effect model is more suitable compared with the fixed-effect model[7].

Through individual random effect model in table 1, the foreign asset holdings and exports have significant positive effects on FDI, while PPI has a significant negative effect on FDI. This result is consistent with the inference. This proved that the theoretical model of the financial crisis affect FDI in three channels or mechanism of the existence of the financial crisis caused by liquidity crunch. Financial crisis can lead to a decline in FDI through increased risk of company's business and international trade environment deterioration.

CONCLUSION

This is a related research of the relationship model between FDI and China's international finance, combined with modeling and measurement in this empirical according to exploring two aspects of the research process. Through the data of regression model and related data collection, we study the internal relationship of existence. In this paper, the research is theoretical and scientific and has positive

influence on the development of China's international finance while it also provide the corresponding basis for the study in future.

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