Chapter 3

Research Methodology

This research is quantitative research. The details about the research method as follows:

1. Research Design
2. Population and Sample Size
3. Research Methods
4. Data Collection
5. Data Analysis

Research Design

The research design encompasses four primary methods: literature analysis, induction and summary method, quantitative analysis method, and productivity estimation method.

Firstly, the literature analysis method is utilized to collect and organize relevant literature on foreign direct investment and financing structure. This step establishes the groundwork for further research and design.

Secondly, the induction and summary method is employed to analyze the changes in the scale and choice of foreign direct investment by enterprises. Findings are summarized based on the actual situation.

Thirdly, the quantitative analysis method is applied, utilizing the Probit model estimation method and Logit model to handle dummy variables. If one of the explained variables exhibits excessive dispersion, a negative binomial regression model is used. The LP method is employed to calculate firm productivity, and a mediation effect model is utilized to test the hypothesis regarding the influence mechanism.

Finally, the productivity estimation method is employed to estimate the total factor productivity of enterprises. The LP method is preferred over other methods, such as the OP method, as it can overcome the correlation between explanatory variables and random error terms, thereby avoiding the loss of a significant amount of sample data.

Population and Sample Size

Taking into consideration the availability and continuity of the samples, this paper selects the data of A-share companies listed from 2000 to 2020 as research samples. Listed companies in the financial industry, those facing delisting risk, and those with negative equity (insolvent) are excluded. As a result, a total of 18,975 samples from 1,725 listed companies are obtained. The original enterprise-level data used in this paper are sourced from the Guotai 'an and WIND databases. The specific data regarding enterprises' foreign direct investment are derived from the overseas affiliated company table in the overseas investment database of Guotai 'an and WIND.

Research Methods

1. Literature analysis

By collecting and sorting out relevant literature, the contents of foreign direct investment and the financing structure of enterprises are interconnected from different perspectives. Through the analysis and synthesis of literature, along with reference to the research methods and contents of relevant studies, the research questions of this paper are formulated. This process establishes a foundation for further research and design.

2. Induction and summary method

An inductive argument is a method of reasoning that moves from specific instances to a general conclusion. It is specifically employed in the statistical analysis of enterprises' foreign direct investment and financing structure. This involves collecting data on the changes in the scale and choices of foreign direct investment made by enterprises, and summarizing them based on the actual situation.

3. Quantitative analysis method

In this paper, the explained variables are dummy variables, and therefore the Probit model estimation method and Logit model are utilized. Furthermore, to address the issue of excessive dispersion in one of the explained variables, a negative binomial regression model is constructed for empirical regression analysis. For assessing the influence mechanism, the LP method is employed to calculate the firm's productivity, and the mediation effect model is used to test the hypothesis regarding the influence mechanism.

4. Productivity estimation method

Productivity, also known as total factor productivity, is a crucial concept in current economic research. It reflects the level of productivity of the research subject, excluding the inputs of labor and capital factors. Various methods can be used to estimate productivity, including the least square method, LP method, OP method, and enveloping analysis method. Previous studies have shown that the endogeneity problem can be addressed by using semi-parametric OP and LP estimation methods, which are relatively straightforward to calculate. The LP method has a comprehensive Stata command, making it more convenient to use. In comparison to the OP method, the LP method can overcome the issue of correlation between explanatory variables and random error terms, as well as problems related to simultaneity and deviations in the C-D function. It replaces the proxy variable from investment to intermediate input and does not result in the loss of a significant amount of sample data. Therefore, this paper employs the LP method to estimate the total factor productivity of enterprises. Assuming that the production function follows the C-D form, the estimation equation for the LP method is as follows:

$$Y_{it} = \beta_0 + \beta_{li} l_{it} + \beta_{ki} k_{it} + \beta_{mi} m_{it} + \omega_{it} + \eta_{it}$$

In this equation, "i" represents the enterprise and "t" represents the year. "y" represents the logarithm of the total industrial output of the enterprise, "l" represents the logarithm of the annual average number of employees of the enterprise, "k" represents the logarithm of the enterprise capital, and "m" represents the logarithm of the enterprise intermediate input. "ω" represents the total factor productivity, and "η" represents the independent uniformly distributed random error term. Based on this equation, the productivity of enterprise "i" in year "t" can be calculated as follows:

$$\widehat{\omega_{it}} = y_{it} - \widehat{\beta_{li}} l_{it} - \widehat{\beta_{ki}} k_{it} - \widehat{\beta_{mi}} m_{it}$$

Data Collection

Taking into account the need for up-to-date and reliable research conclusions, this study selects enterprise data from the period of 2000 to 2020.

Data Analysis

To address the challenge of obtaining specific data on the scale of enterprises' overseas direct investment (OFDI), this study utilizes a measurement index where the presence or absence of foreign direct investment by enterprises is used. This measurement is represented by a dummy variable, where a value of 0 indicates that enterprises have not engaged in overseas direct investment in the current year, and a value of 1 indicates that enterprises have undertaken overseas direct investment in the current year. Building upon this approach, a Probit model is constructed to test the research hypothesis of this paper.

$$OFDI_{it} = \alpha_0 + \alpha_1 DEV_{it} + \sum_{i=2}^{n} \alpha_n \, control_{it} + \varepsilon_{it}$$

In this equation, the subscript i represents the company, t represents the year, and ε is the random disturbance term. The main dependent variable, OFDI, indicates whether the enterprise engages in foreign direct investment. The explanatory variable, DEV, represents the enterprise's financing structure. The equation also includes control variables such as productivity and R&D innovation, which capture specific financial index characteristics of the company.