



Correlation Analysis of the Overall Tax Burden of Listed Manufacturing Companies in the Northeast Old Industrial Base

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Abstract. This study primarily utilizes data from 60 manufacturing listed companies in the Northeast old industrial base, formulates 8 hypotheses using Stata software, and empirically examines the relationship between tax burden and 8 variables including company size, asset-liability ratio, capital intensity, tax policy, fiscal subsidy intensity, property right nature, proportion of technical personnel and industry characteristics, which are consistent with the hypotheses.

Keywords: Manufacturing industry · A listed company · Overall tax burden

1 Introduction

The manufacturing industry is the main body of the national economy, the foundation of the country, the tool of the country, the foundation of the country, and the important embodiment of national creativity, competitiveness and comprehensive national strength. The “14th Five-Year Plan” emphasizes accelerating the construction of a strong manufacturing country and a strong quality country, enhancing the competitive advantage of the manufacturing industry, and promoting the high-quality development of the manufacturing industry. Docking with the national strategy, the three provinces of Black, Jilin and Liaoning respectively proposed the construction goals of “industrial strong province”, “Jilin equipment” and “intelligent manufacturing strong province”, and the implementation plan for the comprehensive revitalization of the “14th Five-Year Plan” will fully help the transformation and upgrading of the manufacturing industry in the old industrial base of Northeast China. Listed manufacturing companies serve as industry leaders, and their growth is closely tied to the support of national tax policies, with a particular focus on analyzing the real tax burden.

2 Research Design

2.1 Research Samples and Data Sources

This paper selects the data of listed companies in Northeast old industrial base from 2016 to 2021 as the research sample, and the data of each variable in the sample are from the CSMAR Economic and financial research database and the annual reports of

listed companies. Furthermore, the collected data must be accurate and comparable. The initial sample processing: After excluding the listed companies whose listing marks are B, AB, AH and ABH, ST and *ST in any year, the net tax expenditure of the company is less than 0, and the total profit is negative, the panel data of 60 listed companies during the study period is determined as the final valid sample. Data processing and empirical test were completed by Excel and Stata17 software.

2.2 Variable Setting

(1) Dependent variable. This paper adopts the measurement method of the overall tax burden rate of enterprises, expressed by TTR (Total tax rate), and the specific calculation formula is as follows:

$$\text{Total corporate tax burden} = \text{net tax expenditure/business income} \quad (1)$$

The difference between the two can basically cover all the net tax outflow of the enterprise, and both data come from the cash flow statement; As an economic source reflecting the payment of taxes and fees, the business income in the income statement is used as the denominator.

(2) Independent variables. Including tax rebates, financial subsidies and so on. See Table 1:

2.3 Research Hypothesis and Model Design

Hypothesis: The higher the tax refund degree of listed companies, the more government subsidies, the lower the tax burden level, and the two are negatively correlated.

In order to verify the above hypothesis, this paper constructs a multiple regression model with the overall tax burden of enterprises as the dependent variable, the degree of tax refund and the intensity of government subsidies as independent variables. After the Hausmann test, the mixed regression model is used to perform regression analysis on the panel data:

$$\text{TTR}_{i,t} = \alpha_0 + \alpha_1 \text{SIZE}_{i,t} + \alpha_2 \text{LEV}_{i,t} + \alpha_3 \text{CAPI}_{i,t} + \alpha_4 \text{TR}_{i,t} + \alpha_5 \text{SUBR}_{i,t} + \alpha_6 \text{POE}_{i,t} + \alpha_7 \text{RPI}_{i,t} + \alpha_8 \text{Mi}_{i,t} + \lambda_t + \delta_{i,t} \quad (2)$$

where, α_0 is the intercept term; i stands for enterprise individual; t represents different years from 2016 to 2021; λ_t represents the year effect; $\delta_{i,t}$ represents the error term.

3 Process of Empirical Analysis

3.1 Descriptive Statistical Analysis

Before model regression, in order to ensure the reliability of regression results, the stationarity test of panel data was conducted in this paper. In this paper, three methods, LLC, IPS and ADF Fisher test, were employed for the stationarity test, Shows that both

Table 1. Definitions of Variables

Variable type	Variable name	Variable symbol	calculation formula
Dependent variable	Total corporate tax burden (%)	TTR	(Taxes paid - tax refunds received)/revenue
Independent variables	Enterprise scale	SIZE	The natural logarithm of total assets
	Density of fixed assets	CAP	Total fixed assets/total assets
	Asset-liability ratio (%)	LEV	Total liabilities/total assets
	Tax rebate	TR	Tax refunds received/(Related taxes paid - tax refunds received)
	Intensity of government subsidy	SUBR	Government subsidies/revenue
	Property right nature	POE	State-owned enterprises, 1; Non-state, 0
	Manufacturing enterprise	M	Manufacturing industry dummy variable: when the company belongs to the manufacturing industry, take 1; Otherwise, take 0
	Proportion of R&D personnel (%)	RP	Number of technical R&D personnel/Total number of personnel

the explained variables and the explanatory variables pass the stationarity test, and the panel data of each variable has good stationarity. A total of 360 research samples of listed companies in the three Northeast provinces from 2016 to 2021 are grouped for descriptive statistical analysis, the mean value of tax refund degree (TR) in manufacturing enterprises reaches 0.574, while the standard deviation is 4.033, the value is too large, which is caused by the absence of tax refund in some enterprises, and the maximum value is as high as 52.15; The average tax return degree (TR) of non-manufacturing listed companies is only 0.123, indicating that the tax incentives enjoyed by manufacturing listed companies are relatively high. From the government subsidy (SUBR) index, the average value of listed manufacturing companies is 0.00962, while that of non-manufacturing companies is 0.00607, and the standard deviation of the former is also greater than that of the latter, indicating that listed manufacturing companies enjoy more government subsidies and their distribution is uneven.

3.2 Correlation Test

The absolute values of coefficients among related variables are all less than 0.8, far below the critical value, indicating that the correlation between them is weak, the independence of variables is strong, and the maximum value is 0.5269.

3.3 Regression Analysis

It can be seen from the regression results that there is a positive correlation between the enterprise SIZE (SIZE) and the comprehensive tax burden of the selected sample enterprises, and the tax refund degree (TR) of the tax policy and the comprehensive tax burden of the selected sample enterprises. There is a negative correlation between asset-liability ratio (LEV) reflecting financial characteristics, fixed asset intensity (CAP) and corporate comprehensive tax burden, tax refund degree (TR) reflecting tax policy and corporate comprehensive tax burden, and property right nature (POE), technology research and development personnel (RP) and industry characteristics (M) and corporate comprehensive tax burden.

3.4 Robustness Test

In order to verify the reliability and stability of the results of the first multiple regression, industry characteristics (M) of the explanatory variable are eliminated in this paper, and the other variables remain unchanged. Then the regression analysis of the model was carried out. Robustness test results show that the positive and negative values of regression coefficients of each variable do not change.

4 Basic Conclusions

This paper calculates the income tax burden, profit tax burden, turnover tax burden and income tax burden of manufacturing listed companies in Northeast old industrial base. It enriches the research on manufacturing tax burden and analyzes the actual tax burden of manufacturing listed companies in combination with government subsidy analysis. Construct a multiple regression model to analyze the the factors influencing the tax burden of manufacturing listed companies in the three Northeast provinces, the model proposes research hypotheses and build main estimation models, and find out the relevant factors affecting the tax burden, providing insights for reducing the tax burden in the manufacturing sector.

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