



Empirical Research on the Impact of Corporate Income Tax Burden on Corporate Investment from the Perspective of Life Cycle——Multiple Linear Regression Analysis Based on Econometric Analysis Software STATA

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Abstract

Investment plays an important role in promoting the development of both the country and enterprises, and the corporate income tax burden has an impact on corporate investment, and the investment behaviors of enterprises in different life cycle stages are also different. In order to investigate the impact of corporate income tax burden on corporate investment and its life-cycle differences, this paper takes the financial data of A-share listed manufacturing enterprises in Shanghai and Shenzhen from 2018 to 2020 and some 2017 as the sample data and conducts an empirical study to conclude that the negative corporate income tax has a negative impact on corporate investment and its impact has life-cycle stage differences. The conclusion is that the corporate income tax burden has a negative impact on corporate investment, and its impact has a life-cycle stage difference.

Keywords-*Corporate Tax Burden; Corporate Investment; Corporate Life Cycle*

1. INTRODUCTION

Investment plays an important role in promoting the development of the country and enterprises. In order to stimulate manufacturing enterprises to invest and guide their investment direction, the state has introduced a series of tax incentives to reduce the tax burden of manufacturing enterprises, so as to mobilize their investment enthusiasm. Since the characteristics of enterprises in different life cycle stages differ greatly, their preferred investment tendencies, investment decisions and investment behaviors also differ, so it is necessary to grasp the life cycle stages of enterprises and formulate appropriate investment strategies to ensure the healthy development of enterprises.

In terms of the enterprise life cycle, Aidzes (1989) believed that a complete enterprise will go through different periods from the gestation period to the death period, that is, the development of the enterprise is a dynamic process, according to the specific analysis of

the characteristics and problems of the stage of the enterprise, and propose corresponding and specific solutions [1]. In terms of the impact of tax burden on corporate investment, early foreign scholars have done a lot of in-depth thinking and exploration, and constructed three classic research theories, namely neoclassical investment theory [2], Tobin Q investment theory [3], marginal investment theory Effective tax rate model [4]. A recent study by Chinese scholar Fan Yong et al. (2018) believes that corporate income tax can affect the investment behavior of enterprises through three aspects: cash flow, capital user cost and output demand [5].

In order to explore the impact of manufacturing enterprises' their corporate income tax burden on corporate investment and its life-cycle variability, this paper takes the financial data of A-share listed manufacturing enterprises in Shanghai and Shenzhen from 2018 to 2020 and some 2017 as sample data and conducts an empirical study, with a view to providing

support for the national formulation to help reduce taxes and fees in the manufacturing industry.

2. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESIS

From the perspective of the attribute of enterprise income tax, enterprise income tax is a direct tax, and the income tax expenses are directly deducted from the enterprise profits. Therefore, the increase of enterprise income tax will lead to the decline of enterprise profits, the reduction of operating funds and the return of enterprise owners, so as to combat the enthusiasm of enterprise investment and reduce the corresponding investment expenditure.

Hypothesis 1: An increase in corporate income tax burden will have a negative effect on corporate investment.

From the enterprise life cycle theory, it is known that the behavioral characteristics of enterprises in different life cycle stages are significantly different, so the impact of their tax burden on enterprise investment is also different, and it is necessary to classify the sample of target research enterprises so as to investigate the study. In this paper, it is hypothesized that the effect of corporate income tax burden on corporate investment is different for different life cycle stages, and in order to examine the variability of its effect, this paper proposes research hypothesis 2.

Hypothesis 2: There is life-cycle stage variability in the extent to which the corporate income tax burden affects corporate investment.

3. RESEARCH DESIGN

3.1. Sample Selection and Data Sources

This paper takes the relevant financial data of A-share Manufacturing Listed Companies in Shanghai and Shenzhen stock markets from 2018 to 2020 as the research sample, excludes the enterprise financial data with missing important financial data, ST, * ST Mark and enterprise income tax burden less than 0 or greater than 1 from 2018 to 2020, and obtains the relevant financial data of 1269 manufacturing enterprises from 2018 to 2020, forming 3807 effective research samples. In order to eliminate the negative impact of extreme values of variables in the data, this paper carries out 1% Winsorize processing on the data.

3.2. Units

3.2.1. Explanatory variable: corporate investment.

Corporate investment refers to the investment activities and investment behaviors carried out by enterprises as main investors, which can be measured by the proportion of corporate net investment and corporate assets.

3.2.2. Explanatory variable: corporate income tax burden.

This paper measures the corporate income tax burden by the ratio of the amount of "income tax expense" to the amount of "total profit" in the corporate financial statements.

3.2.3. Control variables.

The control variables adopted in this paper include: accumulated depreciation, firm size, financial leverage, profitability and cash holdings.

The definitions of explained variables, explanatory variables and control variables are shown in Table 1.

TABLE 1. VARIABLE DEFINITION TABLE

Variable	Name	Symbol	Description
Explained variables	Corporate Investment	Invest	(Cash paid for the acquisition of fixed assets, intangible assets and other long-term assets—Cash recovered from disposal of fixed assets, intangible assets and other long-lived assets) / Total assets at the beginning of the year
Explanatory variables	Corporate income tax liability	Tax	Income tax expense / Total profit
Control variables	Accumulated depreciation	Dep	Net fixed assets / Total assets at the end of the period
	Business size	Size	Total assets of the enterprise at the end of the period are taken as the natural logarithm

	Financial leverage	Lever	Gearing ratio
	Profitability	Roa	Return on assets
	Cash holdings	Cash	Closing balance of cash and cash equivalents / Total assets at the end of the period

3.3. Business Life Cycle Segmentation

In this paper, the types of cash flow combinations in the enterprise life cycle can be seen in Table 2. When determining the cash flow symbol, the classification method of Li Xuhong (2019) [6] is used for reference, and the average value of the data in the past three years (2018-2020) is used as the measurement basis. At this stage, my country adopts the review and approval system for companies that plan to issue stocks, and puts forward higher requirements for the capital strength of the companies to be listed. Therefore, this paper believes that almost no listed companies are in the start-up stage. In order to ensure the rationality of the division, Therefore, the traditional life cycle stage of the start-up period and growth period of enterprises are combined to study.

TABLE 2. CLASSIFICATION OF THE TYPES OF CASH FLOW PORTFOLIOS OVER THE LIFE CYCLE OF A BUSINESS

	Cash flow from operating activities	Cash flows from investing activities	Cash flows from financing activities
Newborn period	-	-	+
Growth period	+	-	+
Mature period	+	-	-
Recession period	-	-	-
	+	+	+
	+	+	-
	-	+	+
	-	+	-

3.4. Business Life Cycle Segmentation

In order to investigate the impact of corporate income tax burden on corporate investment, this paper constructs the model shown below, thus testing hypothesis 1.

$$Invest = \alpha_0 + \alpha_1 Tax + \alpha_2 Dep + \alpha_3 Size + \alpha_4 Lever + \alpha_5 Roa + \alpha_6 Cash + \varepsilon \quad (1)$$

Among them, the coefficient α_1 of corporate income tax is used to measure the direction and degree of influence of corporate income tax liability on corporate investment. Hypothesis 1 is valid if the coefficient α_1 of the corporate income tax is less than 0 and significant.

In order to investigate the differences in the impact of corporate income tax burden on corporate investment at different life-cycle stages, the sub-samples at different life-cycle stages are tested separately to test hypothesis 2.

4. EMPIRICAL RESEARCH

4.1. Descriptive statistics

After eliminating outliers and missing values, a total of 3807 effective research samples from 1269 listed companies during 2018 to 2020 were selected. The econometric analysis software stata15.1 was used to conduct variable descriptive statistics on all sample data, and the results were shown in Table 3.

TABLE 3. VARIABLE DEFINITION TABLE

Variables	Number of samples	Mean value	Standard deviation	Minimum value	Maximum value
Invest	3807	0.0602	0.0583	-0.0135	0.3036
Tax	3807	0.1612	0.0893	0.0138	0.6039
Dep	3807	0.2210	0.1239	0.0278	0.5965
Size	3807	22.3237	1.2031	20.1642	25.9958
Lever	3807	0.3841	0.1672	0.0741	0.7607
Roa	3807	0.0913	0.0772	-0.2286	0.3144
Cash	3807	0.1466	0.0980	0.0164	0.4927

The average corporate income tax burden of listed companies in China from 2018 to 2020 is 16.12%, which is lower than the nominal corporate income tax rate of 25% in China, which is due to the fact that the sample data selected for the article are the financial data of listed companies in the manufacturing industry, many of which have undergone high-tech enterprise recognition and use a preferential tax rate of 15%, so the average corporate income tax burden will be lower than the 25% corporate income tax burden. The average corporate income tax burden will be lower than the nominal corporate income tax rate of 25%.

4.2. Analysis of regression results

In order to explore the impact of corporate income tax burden on enterprise investment behavior and verify hypothesis 1, this paper uses the financial data of 1269 A-share Manufacturing Listed Companies in Shanghai

and Shenzhen stock markets as research samples to make a multiple linear regression analysis of corporate income tax burden on enterprise investment. As shown in Table 4, the impact coefficient of corporate income tax burden on corporate investment is -0.0503. It can be seen that corporate income tax burden has a very significant negative impact on corporate investment at the significance level of 1%. The empirical research results are consistent with the results of the previous theoretical analysis, so hypothesis 1 can be verified.

TABLE 4. ANALYSIS OF REGRESSION RESULTS OF THE IMPACT OF CORPORATE INCOME TAX BURDEN ON CORPORATE INVESTMENT FOR THE FULL SAMPLE

Variable	Coefficient	t-value	Standard deviation	VIF
Tax	-0.0503***	-4.99	0.0101	1.02
Dep	0.1149***	15.21	0.0076	1.11
Size	-0.0059***	-6.65	0.0009	1.44
Lever	0.0435***	6.66	0.0065	1.51
Roa	0.1686***	14.03	0.0151	1.09
Cash	-0.0043	-0.43	0.0101	1.23
N	3807			
R2	0.1147			
Mean VIF	1.23			
Probe>F	0.0000			

Control variables also have a significant impact on enterprise investment. First, accumulated depreciation has a significant positive impact on enterprise investment. Second, there is a negative correlation between enterprise scale and enterprise investment, which shows that small and medium-sized enterprises will choose to increase investment and expand production scale to improve their business ability, and their willingness to invest is strong. Third, financial leverage and enterprise investment have a significant positive impact on enterprise investment. Fourth, there is an obvious positive correlation between return on assets and enterprise investment. Fifth, the influence coefficient of cash holdings on enterprise investment is small, the positive and negative directions are different, and the significance level is not high.

TABLE 5. ANALYSIS OF REGRESSION RESULTS OF THE IMPACT OF CORPORATE INCOME TAX BURDEN ON CORPORATE INVESTMENT FOR THE FULL SAMPLE

	Growth period	Mature period	Recession period
Tax	-0.0491*** (-2.82)	-0.0041 (-0.34)	0.0232 (1.09)
Dep	0.1776*** (11.95)	0.0737*** (10.6)	0.0441** (2.57)
Size	-0.0010 (0.63)	-0.0195*** (-4.76)	0.0029** (2.23)
Lever	0.0262** (2.09)	-0.0169** (-2.53)	0.0021 (0.12)
Roa	0.2260*** (10.72)	0.1569*** (12.64)	0.0351 (0.99)
Cash	-0.0177	0.0006	-0.0212

	(-0.84)	(0.50)	(-0.75)
N	1683	1719	405
Average VIF	1.23	1.24	1.25
R2	0.1491	0.1373	0.0496

Based on the above analysis, the impact of corporate income tax burden on corporate investment from different life cycle perspectives is different in life cycle stages, and research hypothesis 2 is verified. As shown in Table 5, the corporate income tax burden has a very significant impact on the growth of enterprise investment at the significance level of 1%. According to the t value, it can be concluded that the impact of the corporate income tax burden on the growth enterprise, recession enterprise and mature enterprise shows a decreasing trend. At the same time, the corporate income tax burden has a negative impact on the growth of enterprise and mature enterprise investment, which inhibits their enterprise investment behavior; And it has a positive effect on enterprise investment in the recession period, which promotes its enterprise investment behavior.

4.3. Robustness tests

In this paper, the robustness of the regression analysis results is tested by changing the explanatory variables. In the previous paper, the net investment amount of the enterprise is calculated by considering the proceeds from the disposal of assets and subtracting them in the process of selecting the indicators of enterprise investment. In the robustness test, the ratio of the amount of "cash paid for the purchase and construction of fixed assets, intangible assets and other long-term assets" in the cash flow statement to the total assets of the enterprise at the beginning of the period is used to calculate the total investment of the enterprise to measure the investment of the enterprise, and the total investment of the enterprise is used as a proxy variable for the net investment of the enterprise in the previous paper to conduct the regression analysis again.

Hypothesis 1 is retested by examining the effect of gross corporate investment on corporate tax burden, and the regression results are shown in Table 6. The empirical results of the robustness test using gross corporate investment are consistent with the results of net corporate investment above.

TABLE 6. REGRESSION RESULTS ANALYSIS OF THE IMPACT OF CORPORATE INCOME TAX BURDEN ON CORPORATE INVESTMENT FOR THE FULL SAMPLE

Variable	Coefficient	t-value	Standard deviation
Tax	-0.0481***	-4.80	0.0100
Dep	0.1188***	15.82	0.0075
Size	-0.0064***	-7.29	0.0011
Lever	0.0465***	7.15	0.0065

Roa	0.1713***	14.34	0.0120
Cash	-0.0062	-0.62	0.0128
N	3807		
R2	0.1217		
Average VIF	1.23		
Probe>F	0.0000		

Hypothesis 2 is retested by grouping the sample to test the role of total corporate investment on corporate tax burden at each life cycle stage, and the regression results are shown in Table 7. The empirical results of the robustness test using total corporate investment are consistent with the results of net corporate investment above.

TABLE 7. REGRESSION RESULTS ANALYSIS OF THE IMPACT OF CORPORATE INCOME TAX BURDEN ON CORPORATE INVESTMENT BY SUB-SAMPLE OF LIFE CYCLE STAGES

	Growth period	Mature period	Recession period
Tax	-0.4434** (-2.55)	-0.0049 (-0.41)	0.0214 (0.99)
Dep	0.1815 (12.20)	0.0780*** (11.37)	0.0479*** (2.75)
Size	-0.0015 (-0.91)	-0.0047*** (-5.41)	0.0041* (1.71)
Lever	0.0258** (2.06)	-0.0104 (-1.58)	0.0041 (0.23)
Roa	0.2275*** (10.78)	0.1622*** (13.25)	0.0431 (1.20)
Cash	-0.0197 (-0.94)	0.0012 (0.42)	-0.0245 (-0.85)
N	1683	1719	405
Average VIF	1.23	1.24	1.25
R2	0.1515	0.1477	0.330

5. RESEARCH CONCLUSIONS AND RELEVANT SUGGESTIONS

By taking the financial data of 1269 A-share manufacturing listed enterprises in Shanghai and Shenzhen from 2018 to 2020 and some 2017 as sample data and conducting empirical research, two research conclusions are drawn. First, the tax burden of enterprise income tax has a negative impact on enterprise investment. Second, its impact has the difference in life cycle stages: from the significance level, the impact of enterprise income tax burden on enterprise investment in

the growth period is the most significant, while the impact of enterprise income tax burden on enterprise investment in the mature and declining periods is not significant; From the positive and negative impact direction, the corporate income tax burden in the growth period and mature period has a negative impact on corporate investment, and the corporate income tax burden in the recession period has a positive impact on corporate investment.

Three suggestions are made on the conclusion of this study. First, expand the scope of pre-tax deduction and reduce the corporate income tax rate. Second, implement tax incentives to further support the development of start-up and growth stage enterprises. Thirdly, to guide the mature enterprises to optimize their investment by expanding the differential tax incentives.

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