Can "Capital-Biased" Preferential Tax Policies Promote Capital Deepening?

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Abstract. Capital deepening is an inevitable trend to cope with the aging of the population and the declining birth rate. Therefore, based on the data of manufacturing enterprises in the Shanghai and Shenzhen stock markets from 2011 to 2018, this paper examines the impact of the accelerated depreciation policy of fixed assets on capital deepening. The empirical test shows that the policy significantly increases the per capita capital of enterprises, and the growth rate of capital factor exceeds that of labor factor. The group discussion found that the capital deepening effect of this policy on capital-intensive and innovative enterprises is more obvious. These conclusions provide a basis for optimizing relevant tax policies.

Keywords: tax incentives; accelerated depreciation of fixed assets; Capital deepening.

1 Introduction

The deepening of capital has a profound impact on industrial transformation and upgrading, as well as high-quality economic and social development. Since the reform and opening up, China has fully tapped the advantages of labor resources, focused on the development of labor-intensive industries, and promoted rapid economic growth. However, with the shift of China's economy to a stage of high-quality development, coupled with prominent problems such as the declining birth rate and the aging of the population, the development mode that relied on the comparative advantage of labor in the past no longer meets the needs of current economic and social development. Therefore, governments at all levels should promote the transformation and upgrading of traditional labor-intensive enterprises through macro policy tools, and better cope with the trend of declining proportion of the working population.

Capital deepening involves changes in the proportion of capital and labor factor inputs in enterprises. In order to encourage enterprises to increase the proportion of capital factor investment, the finance and taxation department has designed a preferential tax policy for accelerated depreciation of fixed assets (hereinafter referred to as the "accelerated depreciation policy") and carried out pilot projects by industry. With the pilot implementation of the accelerated depreciation policy, the academic research on

this policy has gradually deepened, but the impact of the policy on corporate investment decisions [1-3], R&D and innovation [4], and enterprise total factor productivity is limited, and further research is urgently needed to clarify the impact of accelerated depreciation policy on the proportion of enterprise capital and labor factor input.

2   Theoretical Analysis and Hypothesis Proposed

Capital deepening refers to the increase in the ratio of capital to labor in production. The accelerated depreciation policy reduces the tax burden of enterprises and provides tax incentives through one-time or accelerated depreciation deductions. Studies have shown that this policy reduces the cost of fixed asset investment, prompting enterprises to increase capital investment and expand investment[5].

The existing studies have different conclusions on the impact of accelerated depreciation policy on the scale of labor employment. Tuzel et al. found that this policy led to an increase in capital investment by United States firms, which in turn significantly reduced the scale of labor employment[6]. Li Jianqiang et al. pointed out that although high-skilled workers have replaced low-skilled workers, the overall employment scale has not changed significantly[7]. Xie et al. argue that the accelerated depreciation policy increases the corporate budget by reducing investment costs, and promotes the growth of production factor input and labor employment[8]. Based on the above discussion, the following hypotheses are proposed:

H1: After the implementation of the accelerated depreciation policy, the growth rate of capital factors invested in production is greater than that of labor factors, and the per capita capital of enterprises increases, promoting capital deepening.

H2: After the implementation of the accelerated depreciation policy, the growth rate of the capital factor invested in production is equal to the labor factor, and the per capita capital of the enterprise remains unchanged.

H3: After the implementation of the accelerated depreciation policy, the growth rate of capital factors invested in production is smaller than that of labor factors, and the per capita capital volume of enterprises declines, which inhibits the deepening of capital.

3   Research Design

3.1   Data Sources and Sample Descriptions

This paper takes the manufacturing enterprises in the Shanghai and Shenzhen stock markets from 2011 to 2018 as the research sample, and the original data are from the CSMAR database and the Wind database. Drawing on the screening methods of existing studies, the financial industry, enterprises that have undergone mergers and acquisitions during the sample period, enterprises that have been subject to risk warning, have been delisted, and enterprises that have been missing key data for more than two years are excluded. After a series of rigorous screening and processing, a sample dataset of 1247 manufacturing enterprises was finally obtained.

3.2 Empirical Design

Core Explanatory Variables. Based on the pilot process of the accelerated depreciation policy, the companies included in the pilot industries in 2014 and 2015 were set as the experimental group, and the other enterprises in the manufacturing industry were set as the control group. If the value of Policy is 1, enterprise i is affected by the policy in year t, and if the value is 0, it means that the enterprise is not affected by the policy.

Econometric Models. In order to test the impact of accelerated depreciation policy on capital deepening, the following model was established with reference to the research methods of Liu Jinke et al. [9]:

$$\ln Y_{it} = \alpha_0 + \alpha_1 \text{Policy}_{it} + \sum \alpha X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{1}$$

In the above formula, i represents the business and t represents the year; The explanatory variable lnY is the amount of capital per capita of the enterprise, which is measured by the logarithm of the ratio of the amount of fixed assets to the number of employees; The core explanatory variable Policy is the interaction between the pilot variable and the time dummy variable, which reflects the situation of the policy pilot. In addition, X_{it} is the control variable; μ_i and λ_t are individual and temporal fixed effects, respectively. ε_{it} stands for Random Distractor.

Control Variables. In order to alleviate the bias caused by the omission of variables, this paper selects several key enterprise characteristic indicators as control variables: return on equity (ROE), corporate cash flow (CF), audit opinion (Opin), two-in-one (Mega), top 10 shareholders (Top10), and independent director ratio (Duality).

4 Analysis of Empirical Results

4.1 Analysis of Benchmark Regression Results

The regression analysis was carried out with the per capita capital of the enterprise as the explanatory variable, and the results are shown in Table 1. Column (1) is the result of not considering the influence of control variables, and the coefficient of policy variable (Policy) is 0.052, which is significant at the level of 1%. The coefficient of the policy variable was 0.057, and the significance level remained stable. The accelerated depreciation policy has significantly promoted the deepening of corporate capital. Therefore, the hypothesis H1 is proven.

Table 1. Accelerated depreciation policy and capital per capita

Var	Capital per capita	
	(1)	(2)
Policy	0.052***	0.057***
	(0.018)	(0.018)

Control variables	Not included	Included
Two-way fixed effect	Controlled	Controlled
N	9854	9854
Adj.R^2	0.811	0.813

4.2   Mechanism Analysis

In this article, we will discuss asset investment and labor and employment, and explore how accelerated depreciation policies can promote capital deepening.

Firstly, the impact of accelerated depreciation policy on fixed asset investment is examined. Accelerated depreciation policies can help improve the cash flow position of enterprises, especially in the early stage of investment, which can reduce the financial pressure of enterprises, promote enterprises to carry out technological transformation and equipment renewal, and thus improve production efficiency and competitiveness. In this paper, the natural logarithm of fixed assets is used as the explanatory variable for regression analysis, and the results are shown in column (1) of Table 2, and the regression coefficient of the policy variable is significantly positive, which indicates that the fixed asset investment of enterprises affected by the policy has increased by 12.8% since the policy pilot.

Secondly, the impact of accelerated depreciation policy on enterprise labor employment is examined. The above theoretical analysis only points out that there are "substitution effects" and "output effects" in the impact of accelerated depreciation policy on enterprise labor employment, and it is impossible to judge how the scale of enterprise labor employment changes after the implementation of the policy. This paper examines the specific impact of the policy on the size of labor employment through the natural logarithm of the number of employees, the number of high-skilled and low-skilled employees, and the results are shown in Table 2 (2), (3), and (4), respectively. The empirical results show that after the implementation of the policy, enterprises employ more highly skilled labor, and the scale of labor employment of enterprises expands.

To sum up, after the implementation of the accelerated depreciation policy, the capital factor and labor factor invested by enterprises increased at the same time, but the increase of capital factor was greater than that of labor factor, which promoted the deepening of capital.

Table 2. Accelerated depreciation policy and fixed assets and labor employment

Var	(1) lnFA	(2) lnemp	(3) lnhskill	(4) lnlkill
Policy	0.128***	0.070***	0.059**	-0.200
	(0.022)	(0.023)	(0.029)	(0.133)
control variables	Included	Included	Included	Included
Two-way fixed effect	Controlled	Controlled	Controlled	Controlled
N	9854	9837	9568	9800
Adj. R^2	0.914	0.905	0.812	0.651

4.3   Group Discussions

Next, this article will discuss in groups from two aspects: capital intensity and willingness to innovate.

Firstly, the impact of corporate capital intensity on the effect of accelerated depreciation policy is discussed. Accelerated depreciation reduces the cost of capital investment, and capital-intensive firms are more motivated to upgrade their machinery and equipment than labour-intensive firms. Referring to the practices of Xie Shenxiang and Lu Yi, this paper uses the average per capita fixed assets as the standard for measuring the capital intensity of enterprises, and defines those enterprises whose capital intensity does not exceed the median of all sample enterprises in the current year as labor-intensive enterprises, and the rest of the enterprises are classified as capital-intensive enterprises[10]. The results of columns (1) and (2) in Table 3 show that the policy effect of accelerated depreciation of fixed assets on capital-intensive enterprises is greater than that of labor-intensive enterprises.

The impact of the willingness to innovate on the effect of accelerated depreciation policy is further analyzed. If enterprises have a strong willingness to innovate, they will often seize the opportunity provided by the accelerated depreciation policy to actively promote the construction of highly automated "unmanned factories", which in turn can deepen their capital. Drawing on the research methods of scholars such as Jiang Shuangshuang[11], the ratio of enterprise R&D investment to operating income is used to measure the innovation willingness of enterprises, and the enterprises with innovation willingness exceeding the median of all sample enterprises in that year are classified as enterprises with strong innovation willingness(SW), and other enterprises are classified as enterprises with weak innovation willingness(WW). The results of columns (3) and (4) in Table 3 show that accelerated depreciation policy has a more significant policy effect on firms with strong desire to innovate.

Table 3. Accelerated Depreciation Policy and Capital Per Capita: An Analysis of Capital Intensity and Willingness to Innovatea

Var	(1) Labor-intensive	(2) Capital-intensive	(3) WW	(4) SW
Policy	0.052**	0.075**	0.046*	0.064***
	(0.021)	(0.029)	(0.027)	(0.021)
Control variables	Included	Included	Not included	Included
Two-way fixed effect	Controlled	Controlled	Controlled	Controlled
N	4933	4921	4703	4736
Adj.R^2	0.700	0.611	0.835	0.808

5   Conclusions and Implications

Taking the accelerated depreciation policy implemented in 2014 and 2015 as a quasi-natural experiment, this paper constructs a two-way fixed-effect model to prove that

the accelerated depreciation policy can promote the deepening of corporate capital. Mechanism analysis shows that the policy promotes the increase of capital and labor factors at the same time, and the former grows faster than the latter, which ultimately promotes the deepening of enterprise capital.

The policy recommendations are: First, gradually expand the coverage of preferential tax policies, especially for non-manufacturing enterprises with a large proportion of fixed assets, so as to alleviate their financial pressure and promote asset renewal. Second, we can consider increasing policy preferences. High-end precision instruments are expensive, and raising their one-time deduction standards will effectively enhance the attractiveness of the policy.

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