



Study on the Impact of Value-Added Tax (VAT) Carryover Tax Credit Policy on the Capital Turnover of High-Tech Enterprises - An Empirical Analysis Based on Chinese A-Share Listed Companies from 2016 to 2022

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Abstract. As a core measure of recent tax reduction and fee reduction policies, the VAT carryover tax credit reform has significantly influenced market entities' behaviors by optimizing corporate cash flow. This paper takes Chinese A-share listed companies from 2016 to 2022 as samples, focuses on high-tech enterprises, and constructs a difference-in-differences (DID) model based on the policy shock of the Notice on Tax Policies Concerning the Refund of Partial Industries' VAT Carryover Tax Credits in 2018 (Caishui [2018] No. 70), to evaluate the impact of carryover tax credits on the capital turnover of high-tech enterprises and its mechanism. The study finds that the carryover tax credit policy significantly improves corporate capital turnover rates. The paper further proposes policy recommendations: first, implementing "precise tax refunds" by lowering tax refund thresholds for high-tech industries; second, establishing a "tax refund-research and development (R&D)" linkage mechanism to guide refunded funds into innovative activities; third, optimizing the policy's dynamic adjustment framework to balance fiscal burdens across regions. The research conclusions provide micro-level evidence and decision-making references for improving the VAT system and promoting the innovation-driven development strategy.

Keywords: VAT carryover tax credit policy, High-tech enterprises, Capital turnover

1 Introduction

1.1 Research Background

The Value-Added Tax (VAT) carryover tax credit policy, as a core instrument of China's tax reduction reforms, aims to alleviate corporate cash flow pressures by refunding excess input taxes. Since the pivotal Notice on Tax Policies Concerning the Refund of Partial Industries' VAT Carryover Tax Credits (Caishui [2018] No. 70) was enacted, this policy has profoundly impacted market entities, particularly high-tech

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enterprises facing prolonged R&D cycles and capital turnover constraints [5][6]. Despite its significance, existing studies lack empirical analysis on how VAT carryover credits specifically affect the capital turnover efficiency of high-tech firms, leaving a critical gap in policy evaluation [4].

1.2 Research Objectives

This study addresses three key objectives:

To empirically examine the impact of VAT carryover tax credits on the capital turnover of high-tech enterprises using quasi-natural experiment methods;

To analyze the underlying mechanisms through which tax refunds improve capital efficiency;

To propose actionable policy recommendations for optimizing the VAT refund system in support of innovation-driven development strategies.

1.3 Paper Structure

The paper proceeds as follows:

- Section 2 reviews literature on VAT policy and high-tech enterprise financing;
- Section 3 constructs the theoretical framework based on cash flow theory;
- Section 4 proposes research hypotheses;
- Section 5 details the DID model and data sources;
- Section 6 presents empirical results;
- Section 7 concludes with policy implications and research limitations.

2 Literature Review

2.1 Research on the VAT Carryover Tax Credit Policy

The VAT carryover tax credit aims to refund the carryover tax credits generated by enterprises when their input tax amounts exceed output tax amounts. Since 2018, China has successively introduced multiple policies to advance the implementation and refinement of carryover tax credit mechanisms. In *The Impact and Sharing Mechanism of the VAT Carryover Tax Credit Policy*, scholars Liu Yi and Nie Hai-feng (2020) combed through the policy's development trajectory and argued that optimizing the carryover tax credit policy not only reduces corporate tax burdens but also enhances corporate capital liquidity[5]and fosters sustainable business operations. Another study by scholars Yang Zhi'an and Fu Zhenggan (2019), leveraging macroeconomic data, revealed that carryover tax credits, as a component of proactive fiscal policies, can effectively stimulate market vitality [4]and promote overall economic stability and growth.

2.2 Research on Capital Turnover in High-Tech Enterprises

High-tech enterprises face substantial challenges in capital turnover due to heavy R&D investments and long return cycles. Feng Yanchao (2018) pointed out that although R&D investments in high-tech enterprises continue to increase, the prolonged cycle of transforming technologies into marketable products and realizing profits leads to slow capital recovery[1], thereby impacting capital turnover efficiency. Case studies by Xu Hailong and Wang Hongwei (2020) demonstrated that characteristics such as large fixed asset investments and significant fluctuations in capital demand render the capital chains of high-tech enterprises[7] relatively fragile. Once capital turnover becomes unsmooth, it will impede corporate innovation and development.

2.3 Research on the Impact of VAT Carryover Tax Credits on Corporate Capital Turnover

Some scholars have explored the impact of VAT carryover tax credits on corporate capital turnover. Wang Jingda and Fan Qingquan (2021) used empirical analysis to confirm that the carryover tax credit policy can significantly improve corporate cash flow[2], provide financial support for business operations, and thereby accelerate capital turnover. However, Mao Xinshu and Meng Jie (2022) proposed a different perspective, arguing that the effectiveness of tax refund utilization is closely related to corporate internal management [3]levels. Some enterprises may fail to fully leverage the policy's role in promoting capital turnover due to unreasonable capital allocation.

Overall, existing studies have separately discussed the VAT carryover tax credit policy and capital turnover in high-tech enterprises, but research on the impact of the VAT carryover tax credit policy on capital turnover in high-tech enterprises is relatively scarce, especially lacking theoretical analysis.

3 Theoretical Analysis

3.1 Cash Flow Theory

Cash flow theory posits that the smooth flow of corporate funds is crucial for maintaining production and operational activities. The implementation of the VAT carryover tax credit policy directly increases corporate cash inflows. High-tech enterprises have continuous and substantial capital demands during R&D, and the injection of tax refund funds can timely replenish working capital, ensuring the smooth progress of R&D activities. For example, enterprises can use tax refund funds to purchase R&D equipment and materials, pay R&D personnel salaries, thereby avoiding R&D project interruptions due to capital shortages, promoting technological innovation and product upgrading, and improving capital turnover.

4 Research Hypothesis

4.1 The Promoting Effect of VAT Carryover Tax Credits on Capital Turnover in High-Tech Enterprises

Based on cash flow theory, cost reduction theory, and investment incentive theory, the VAT carryover tax credit policy positively impacts capital turnover in high-tech enterprises by increasing cash inflows, reducing capital costs, and enhancing investment capacity. Therefore, we propose Hypothesis H1: The VAT carryover tax credit policy can significantly improve the capital turnover efficiency of high-tech enterprises.

5 Model Specification and Variable Description

The VAT carryover tax credit policy implemented in 2018 can be regarded as a "quasi-natural experiment." Referencing existing research methods, this paper uses a difference-in-differences (DID) model to test the impact of the VAT carryover tax credit policy on innovation in productive service enterprises. The model is constructed as follows:

$$\text{turnover}_{i,t} = \alpha_0 + \alpha_1 \text{Treat}_i * \text{Policy}_t + \alpha_2 X_{i,t} + \gamma_i + \varphi_i + \varepsilon_{i,t}$$

Variable Definitions:

- **Dependent Variable:** Capital Turnover (turnover) is measured by total asset turnover rate, reflecting the efficiency of enterprises in using assets to generate income.
- **Core Explanatory Variable:** VAT Carryover Tax Credit (Treat×Policy): Based on Caishui [2018] No. 70, 18 industries including pharmaceutical manufacturing and chemical fiber manufacturing, together with power grid enterprises, are included in the treatment group. For sample companies, Treat is assigned 1 if the company belongs to the specified industries or types, and 0 otherwise. The policy was implemented in 2018, so Policy is defined as 1 for 2018 and subsequent years, and 0 for years before 2018. The interaction term evaluates the policy's impact.

Data Description: Data primarily come from the CSMAR and Wind databases, with CSMAR providing core financial indicators of A-share listed companies and Wind supplementing VAT carryover tax credit and industry classification information. Policy details and tax refund eligibility are cross-validated through State Tax Administration documents and local tax bureau announcements to ensure accuracy.

5.1 Initial Sample Scope

The study uses Chinese A-share listed companies from 2016 to 2022 as the sample, covering the full cycle before and after the policy's implementation to observe dynamic impacts. A-share listed companies are selected due to their standardized financial disclosures, high data quality, and broad industry representation, ensuring universal research conclusions.

5.2 Final Sample Composition

Focusing on high-tech enterprises, the initial sample pool of 4,823 A-share listed companies (2016–2022) is filtered using the High-Tech Enterprise Identification Management Measures. After verifying R&D investments, core technologies, and product/service indicators, 598 high-tech enterprises are selected, spanning electronics, biotechnology, new energy, and other fields. The final sample comprises 6,706 firm-year observations, ensuring homogeneity and eliminating interference for high-quality empirical analysis. 5. Empirical Results and Analysis

5.3 Baseline Regression Analysis

The regression model investigates the impact of the VAT carryover tax credit policy on capital turnover in high-tech enterprises. The dependent variable is the capital turnover index, the core explanatory variable "treat_post" represents policy implementation, and multiple control variables, enterprise IDs, and year fixed effects are included.

As shown in Table 1 (Baseline Regression Results), the "treat_post" coefficient is 0.048, with a robust t-value of 2.760, significantly positive at the 1% level, indicating the policy significantly improves capital turnover. Among control variables, "firm_size" has a coefficient of -0.059 ($t = -3.455$), showing larger enterprises have slower capital turnover; "leverage" has a coefficient of 0.098 ($t = 1.735$), indicating moderate debt increases can accelerate turnover within a certain range; Tobin's Q value is insignificant, suggesting market valuation has little impact on capital turnover.

The constant term is 1.974 ($t = 5.206$, significant at 1%), with 6,706 observations from 958 enterprises and an R^2 of 0.031. Overall, the VAT carryover tax credit policy has a positive impact on capital turnover, verifying the hypothesis.

Table 1. Baseline Regression Results

Variable	Regression Result	t-Stat
treat_post	0.048***	2.760
firm_size	-0.059***	-3.455
leverage	0.098*	1.735
Constant	1.974***	5.206

$N = 6,706$ firm-year observations (958 firms), $R^2 = 0.031$. Controls: firm, year, and industry fixed effects.

Robust t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

6 Conclusions and Recommendations

6.1 Research Conclusions

Using the DID model and fixed effects regression, this study systematically analyzes the impact of the VAT carryover tax credit policy on capital turnover in high-tech enterprises, with key findings:

- **Significant Policy Effect:** The carryover tax credit policy (`treat_post`) significantly promotes capital turnover in high-tech enterprises, with a core variable coefficient of 0.048, significant at the 1% level. This confirms the policy effectively alleviates cash flow pressure and validates Hypothesis H1.

6.2 Research Limitations and Prospects

- **Limitations:** The study relies on A-share listed company data, which may not fully capture the characteristics of all high-tech enterprises, limiting generalizability. It only examines the direct impact of the policy, lacking analysis of indirect effects and synergies with other policies, and the exploration of policy mechanisms is insufficient.
- **Prospects:** Future research could expand samples to include non-listed high-tech enterprises, test generalizability, and investigate synergies between the carryover tax credit policy and other fiscal, tax, and financial policies. More complex econometric models (e.g., mediation effect models, threshold effect models) could be used to delve into internal mechanisms and transmission paths, providing precise guidance for policy optimization and corporate decision-making.

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