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The Impact of Business Environment on Innovation Performance in High-Tech Industries: Mediating Role of Debt Financing Costs and Modulating Role of Industrial Policy

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Abstract. High-tech industries are pivotal engines for future technological progress and industrial innovation, playing a strategically important role in advancing China's modernization. Using the 2010 Decision on Accelerating the Fostering and Development of Strategic Emerging Industries as a benchmark, this study examines the impact of high-tech industrial policies on corporate innovation performance and their underlying mechanisms. The analysis employs panel data from non-financial companies listed on the Shanghai and Shenzhen stock exchanges between 2007 and 2019, applying a Propensity Score Matching combined with Difference-in-Differences (PSM-DID) approach. The results indicate that high-tech industrial policies have a significant positive effect on corporate innovation performance. In terms of mechanisms, these policies enhance innovation performance primarily by reducing corporate debt financing costs. Moreover, a favorable business environment positively moderates the relationship between industrial policies and corporate innovation performance, and strengthens the effectiveness of such policies in lowering corporate debt financing costs.

Keywords: High-tech industrial policy; Innovation performance; Debt financing costs; Business environment; PSM-DID.

1. Introduction

The 20th National Congress of the Communist Party of China laid out a series of major deployments and strategic initiatives for the high-tech industry, aimed at driving the sector's growth, enhancing indigenous innovation capabilities, accelerating industrial restructuring and transformation, and addressing diverse challenges and opportunities both domestically and globally. These efforts are intended to promote sustained and healthy economic development. Against the backdrop of evolving international competition, strengthening independent innovation and achieving breakthroughs in core industrial technologies have become essential to gaining the initiative and building new competitive advantages. As an innovation-driven growth engine, the high-tech industry is characterized by high capital intensity, elevated risks, and considerable uncertainty [1]. To address market failures and improve resource allocation, especially in the early stages of development, the government has introduced a range of industrial policies to support and stimulate progress. In October 2010, the State Council officially issued the Decision on Accelerating the Fostering and Development of Strategic Emerging Industries, thereby advancing the growth of what are termed "strategic emerging industries." Since then, the term "strategic emerging industries"—often used interchangeably with "high-tech industries"—has frequently appeared in policy documents and research reports across various levels and sectors in China.

2. Literature Review

High-tech industries (manufacturing) refer to manufacturing sectors within the national economy that are characterized by relatively high R&D intensity. These encompass six major fields: pharmaceutical manufacturing; aerospace and equipment manufacturing; electronic and communications equipment manufacturing; computer and office equipment manufacturing; medical instrument and equipment manufacturing; and information chemical manufacturing [4].

In studies on innovation performance in high-tech industries, some scholars have explored the role of financing channels. For example, Gao Yang et al. [5] used the Spatial Durbin Model (SDM) to examine the spatial spillover effects of innovation capacity through three financing channels: bank credit, stock market financing, and venture capital. They found that, in terms of direct effects, only stock market financing and venture capital showed significant positive spatial spillover effects. From the perspective of corporate shareholders, Zhu Lei et al. [6] observed that equity pledges by major shareholders inhibit corporate innovation investment, which decreases as the pledge ratio increases. Drawing on agency theory, they suggest that major shareholders may develop risk-averse or tunneling incentives after pledging shares to maintain control and mitigate operational risks, thereby reducing their willingness to engage in innovation.

Government policy support also significantly influences innovation in high-tech industries. Policies related to intellectual property protection, R&D funding, and technology transfer can effectively stimulate corporate innovation activities, encouraging greater R&D investment and improved innovation performance. Accordingly, this study treats the State Council’s 2010 Decision on Accelerating the Fostering and Development of Strategic Emerging Industries as a quasi-natural experiment. Using a combination of propensity score matching and difference-in-differences analysis, it identifies the impact of high-tech industrial policies on corporate innovation performance.

For firms, both the incentive to allocate innovation resources and the ability to raise capital are critical to undertaking innovation activities. When investment risks are high and capital markets are underdeveloped, corporate confidence in R&D may be weakened. As a result, governments often intervene through policies to influence corporate investment and financing decisions. Existing literature has largely analyzed the economic consequences of R&D—such as investment efficiency and innovation outcomes—through the lens of financing constraints, with few studies assessing industrial policy effectiveness from the angle of financing costs. In China, debt financing represents a more prominent funding channel than equity financing for most enterprises. Higher debt financing costs can curb corporate investment in technological innovation and hinder business expansion. Thus, an important question remains: Can industrial policies enhance corporate innovation performance by lowering the cost of debt financing? This issue warrants further investigation.

At the same time, both policy implementation and corporate operations depend heavily on a sound business environment. As a multi-dimensional ecosystem, the business environment may significantly shape the effectiveness of industrial policies and their impact on corporate innovation, making this an area of considerable practical relevance [3].

3. Theoretical Analysis and Hypotheses

3.1. Industrial Policy and Innovation Performance

Industrial policy serves as a vital macroeconomic tool employed by the state to meet the inherent requirements of national economic development. In the presence of market failures, sole reliance on market mechanisms may be inadequate to achieve optimal resource allocation, making appropriate policy intervention necessary [7]. To improve the allocation of innovation resources, many countries have adopted measures such as tax relief and government subsidies to support corporate R&D activities. Since China began actively promoting the development of high-tech industries, the government has introduced a series of policies to foster their sustainable growth. Specifically, the influence of industrial policy on corporate innovation can be examined from the following perspectives:

(1) Indirect Inducement Effects. Policy instruments such as government subsidies, tax incentives, and credit support can alleviate endogenous financing constraints on corporate innovation, mitigate shortages in innovation funding, and reduce R&D risks. Direct subsidies or fiscal incentives further lower the marginal costs and risks of R&D projects, encouraging firms to increase R&D spending

and engage in more innovation activities, thereby yielding greater scientific and technological achievements.

(2) Direct Intervention Effects. On one hand, governments utilize administrative authority to regulate and coordinate markets through measures such as market access controls and technical standards. By leveraging their informational advantages, they help guide firms' production operations and steer industrial development. On the other hand, governments facilitate the establishment of industry–academia–research collaboration platforms, assist enterprises in acquiring technical intelligence, and accelerate the commercialization of innovations. In addition, through legislative measures such as strengthened intellectual property protection, governments help standardize corporate behavior, stabilize market order, promote the application of patents, stimulate innovation vitality, and foster healthy industrial competition.

(3) Signaling Effects. Companies that receive industrial policy support send a positive signal to external stakeholders, indicating strong governmental endorsement of the industry's prospects. This helps attract external investment and secure additional R&D resources. At the same time, such positive signals increase the likelihood of inter-firm collaboration, promoting joint research and new product development, which in turn enhances corporate innovation performance. Benefiting from policy support, firms also gain greater confidence in the industry's future, which further motivates innovation and improves its effectiveness.

Based on the above analysis, the following hypothesis is proposed:

H1: High-tech industrial policies have a promoting effect on corporate innovation performance.

3.2. The Mediating Role of Debt Financing Costs

Adequate funding is essential for sustaining corporate operations and supporting R&D innovation. When internal funds are insufficient, companies often turn to external financing to maintain the continuity of their innovation activities, making financing a crucial aspect of business strategy. To minimize financing costs, firms prioritize different funding channels, with Chinese enterprises showing a strong preference for debt and equity financing. However, due to potential information asymmetry and agency problems—combined with the substantial capital requirements of R&D—innovation-intensive companies often face elevated debt financing costs. When internal reserves are inadequate, high financing costs can expose firms to considerable financial risks. These risks may result in delayed investments, scaled-down innovation projects, or even the suspension or termination of R&D initiatives due to funding shortages, ultimately undermining innovation performance.

Lowering debt financing costs serves a dual purpose. First, it improves corporate capital allocation, preventing innovation from being hampered by insufficient funds and thus mitigating negative impacts on innovation performance. Second, it reduces financial risks and signals sound financial health to stakeholders. This helps create a virtuous cycle of capital mobilization, ensures stable R&D funding, and ultimately enhances corporate innovation performance [8].

Based on the above analysis, the following hypothesis is proposed:

H2: High-tech industrial policies can improve corporate innovation performance by reducing debt financing costs, which play a mediating role in this relationship. ustrial policy on corporate innovation can be examined from the following perspectives:

3.3. The Mediating Role of Debt Financing Costs

A favorable business environment is a key indicator of a nation or region's economic soft power and a crucial factor in enhancing overall competitiveness. The quality of the local business environment directly affects the growth and development of market entities, shaping the region's investment appeal, production efficiency, and growth momentum. As an important moderating factor in innovation strategy, the business environment significantly influences corporate innovation performance. On the one hand, a sound business environment helps maintain economic stability, reduces uncertainty in policy implementation, and safeguards the intended outcomes of industrial policies, thereby improving corporate innovation performance. On the other hand, it stimulates market vitality, strengthens endogenous growth drivers, increases policy applicability, and encourages policy innovation. This contributes to the formulation of more refined industrial policies that better support corporate technological innovation and enhance innovation outcomes.

When operating in a favorable business environment, firms are more confident that their innovative outputs or technologies will be successfully commercialized and yield higher economic returns. This, in turn, boosts their willingness to engage in R&D, make innovation-oriented decisions, and carry out research activities, ultimately raising their innovation performance.

Based on the above analysis, the following hypothesis is proposed:

H3: A favorable business environment positively moderates the effect of high-tech industrial policies on the reduction of corporate debt financing costs.

4. Research Design

4.1. Data Sources

This study selected listed companies on the Shenzhen and Shanghai A-share markets from 2007 to 2019 as research samples, processing the data as follows: ① Excluding ST, ST*, and PT-classified enterprises; ② Excluding financial enterprises; ③ Excluding sample observations with missing data. Considering outlier issues, continuous variables underwent trimming at the upper and lower 1% percentiles. Following these screening criteria, a final sample of 20,801 observations was obtained. Corporate financial data originated from the CSMAR database and annual reports of listed companies, patent data from the CNRDS database, and business environment indicators from the China Marketisation Process Index – Annual Report on the Relative Marketisation Progress of Provinces and Regions.

4.2. Variable Design

4.2.1. Dependent Variable.

Enterprise innovation performance serves as the dependent variable. Existing research predominantly measures innovation performance using indicators such as new product sales revenue, patent grants, or patent applications. This study employs the number of invention patent applications to gauge innovation performance, while the total number of patent applications (covering inventions, utility models, and designs) is used for robustness testing. Given the right-skewed distribution of the patent data sample, the data underwent log transformation with a +1 offset.

4.2.2. Independent Variables.

IP is defined as a policy grouping dummy variable to indicate whether an enterprise is classified within the high-tech industry sector. Enterprise classification into high-tech industries is determined based on the China Strategic Emerging Industries Composite Index (referred to as the 'Emerging Industries Composite Index') published by the Shanghai Stock Exchange and China Securities Index Co., Ltd. on 3 January 2017. Enterprises classified under the Emerging Industries Composite Index are assigned an IP value of 1 and allocated to the experimental group; otherwise, IP is assigned a value of 0, placing the enterprise in the control group.

Post is defined as the policy implementation dummy variable, distinguishing the timing of high-tech industry policy implementation. In October 2010, the State Council issued the 'Decision on Accelerating the Cultivation and Development of High-Tech Industries,' marking the formal implementation of high-tech industry policies. To ensure policy year completeness, 2011 was designated as the policy implementation year. Post was assigned a value of 0 for pre-policy years (2007–2010) and 1 for post-policy years (2011–2019).

4.2.3. Mediating Variable.

Debt financing costs serve as the mediating variable. Following the methodology of Wang Zhenjie [9], debt financing costs (DEBT) are measured using the ratio of financial expenses to total liabilities.

4.2.4. Moderating Variable.

The business environment index serves as the moderating variable. Regarding business environment measurement, domestic and international studies predominantly employ the World Bank's Doing Business indicators. However, this approach primarily evaluates national-level business environments globally and is unsuitable for China's urban context. This study utilises the marketisation index from the China Provincial Marketisation Index Report compiled by Fan Gang et al. [10] as the metric for the business environment (Envir).

4.2.5. Control Variables.

Drawing upon the research of Li Wenjing et al. [11], control variables were selected based on two considerations: (1) Considering fundamental corporate characteristics, two variables were chosen: firm size (Size, the natural logarithm of total assets) and firm age (Age, the logarithm of the difference between the observation year and the listing year plus one). Both the scale of a firm and the duration of its operations exert a certain degree of influence on its innovation capacity. (2) Considering corporate financial characteristics, four variables were selected: cash flow (CF, natural logarithm of net cash flow from operating activities), gearing ratio (Lev, ratio of total liabilities to total assets), fixed asset scale (PPE, ratio of fixed assets to total assets), and current ratio (Liquidity, ratio of current assets to current liabilities). The availability of sufficient capital directly impacts a company's ability to undertake research and development activities, thereby influencing its innovation performance.

4.3. Research Methodology

This paper aims to examine the impact of high-tech industrial policies on corporate innovation performance and the pathways through which such effects manifest. The implementation of high-tech industrial policies may induce changes in corporate innovation performance, which could stem from ‘policy effects’ or be influenced by ‘time effects’ arising from temporal growth and economic development. Drawing upon existing literature, we employ the Difference-in-Differences (DID) method for policy effect evaluation to distinguish between ‘policy effects’ and ‘time effects. Specifically, we select enterprises affected by high-tech industrial policies as the treatment group and unaffected enterprises as the control group. By comparing changes between these groups, we assess the policy's efficacy. To mitigate selection bias within the sample, we employ Heckman's [12] propensity score matching method to find the most closely matched control group counterpart for each treatment group subject, thereby ensuring parallel trends testing. Thus, we employ propensity score matching combined with the difference-in-differences approach (PSM-DID) to evaluate the impact of high-tech industrial policies on corporate innovation performance. The specific basic hypothetical model is as follows:

$$Y_{i,t}^{psm} = \alpha_0 + \alpha_1 IP \times Post_{i,t} + \alpha_2 Size_{i,t} + \alpha_3 Age_{i,t} + \alpha_4 CF_{i,t} + \alpha_5 Lev_{i,t} + \alpha_6 PPE_{i,t} + \alpha_7 Liquidity_{i,t} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Where subscripts i and t denote individual firms and years respectively; $Y_{i,t}^{psm}$ represents the dependent variable, indicating the innovation performance of firm i in year t. IP×Posti, t serves as the explanatory variable, where IP denotes the policy grouping dummy variable and Post represents the policy implementation dummy variable. Firm size (Size), firm age (Age), cash flow (CF), debt-to-equity ratio (Lev), firm fixed asset scale (PPE), and liquidity ratio (Liquidity) function as control variables; μ_i signifies the firm-specific effect, λ_t denotes the time effect, and ε_{it} represents the random error term.

Considering that the innovation process is influenced by time and firm-specific conditions, a two-way fixed effects model is selected as the benchmark estimation method. The coefficients for IP and Post are absorbed by the individual effect and time effect respectively. To avoid multicollinearity issues, the policy grouping dummy variable (IP) and policy implementation dummy variable (Post) are no longer included in the model. This study focuses on the coefficient α_1 of IP×Post, which represents the causal effect of high-tech industrial policy shocks on firm innovation performance.

5. Empirical Findings

5.1. Descriptive Statistics

According to the descriptive statistics for key variables in Table 1, the sample data reveals an annual mean of 2.024 for invention patent applications (inventions), with a standard deviation of 1.431. In comparison, the annual mean for total patent applications (patents) stands at 2.818, with a standard deviation of 1.542. This indicates substantial variation in innovation capabilities across enterprises, reflecting an overall deficiency in innovation levels. The policy grouping dummy variable (IP) is 0.331, indicating that enterprises influenced by high-tech industrial policies constitute one-third of all listed companies, consistent with actual circumstances and enhancing data credibility. The business environment metric variable (Envir) exhibits significant variation between its maximum and minimum values, suggesting considerable disparities in business environments across different regions.

Table 1. Descriptive statistics

Variable	Observed values	Mean	Standard deviation	Minimum value	Maximum value
Invention	20800	2.02	1.43	0	5.93
Patent	20800	2.82	1.54	0	6.72
IP	20800	0.33	0.47	0	1
DEBT	20800	0.004	0.04	-0.21	0.07
Envir	20800	8.35	1.84	-0.23	11.4
Size	20800	21.99	1.25	19.86	26.09
Age	20800	1.84	0.93	0	3.22
CF	20800	15.05	7.85	0	23.42
Lev	20800	0.40	0.20	0.05	0.88
PPE	20800	0.21	0.14	0.004	0.68
Liquidity	20800	2.77	2.90	0.32	17.82

5.2. Analysis of Propensity Score Matching Results

Propensity score matching (PSM) was employed to maximise similarity between the experimental and control groups, thereby establishing a shared trend between them. The primary steps were as follows:

(1) Randomized sorting of the data was conducted, using the selected control variables as covariates.

(2) Employing a Logit model, regress the dependent variable (whether belonging to a high-tech industry) against the covariates to derive propensity scores.

(3) Employed the nearest neighbour matching method for 1:1 matching. Finally, defined matching effectiveness based on the absolute deviation range: if the absolute deviation exceeded 10%, it indicated substantial post-matching variable discrepancies and suboptimal matching; conversely, if the absolute deviation was below 10%, it signified minimal post-matching variable discrepancies and satisfactory matching.

Table 2 demonstrates that the standardized deviation of all matched variables post-matching remains below 10%, indicating favorable matching outcomes. Furthermore, the f-tests for most variables prior to matching yielded highly significant results, whereas post-matching, these variables/test results no longer proved significant. This confirms that no significant systematic differences persist between the experimental and control groups after matching, satisfying randomized trial requirements and ensuring the reliability of subsequent double-difference results.

Table 2. Preference Score Matching Results

Variable	Match	Experimental group	Control group	Standard deviation/%	Percentage reduction in standard deviation	t	p
Size	Before	22.022	21.979	0.20	44.6	2.350	0.019
	After	22.022	22.046	-0.11		-1.130	0.257
Age	Before	1.938	1.7894	7.67	91.8	10.920	0.000
	After	1.9383	1.9505	-0.63		-0.800	0.423
CF	Before	14.657	15.247	-4.03	81.9	-5.100	0.000
	After	14.656	14.549	0.73		0.770	0.440
Lev	Before	0.3871	0.4012	-3.64	78.6	-4.800	0.000
	After	0.387	0.3901	-0.80		-0.870	0.387
PPE	Before	0.174	0.2258	-29.77	98.6	-24.960	0.000
	After	0.1739	0.1747	-0.46		-0.340	0.734
Liquidity	Before	3.082	2.6183	15.05	91.3	10.870	0.000
	After	3.0824	3.0421	1.31		0.730	0.464

5.3. Parallel Trends Test

A crucial prerequisite for employing the difference-in-differences model is that the experimental and control groups satisfy the parallel trends assumption. This posits that, absent high-tech industrial policy intervention, the trends in innovation performance would be consistent across both groups. To validate the applicability of the difference-in-differences model, an event study approach was adopted to conduct a parallel trends test. The model was constructed as follows:

References are cited in the text just by square brackets [1]. (If square brackets are not available, slashes may be used instead, e.g. /2/.) Two or more references at a time may be put in one set of brackets [3, 4]. The references are to be numbered in the order in which they are cited in the text and are to be listed at the end of the contribution under a heading References, see our example below.

$$Y_{i,t}^{psm} = \sum_{k=-3}^{k=3} \delta_k \, IP \times Year_{i,t0+k} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

In the equation: IP $\times$ $Year_{i,t0+k}$ denotes the interaction term between the policy grouping dummy variable and the policy dummy year; $t0$ represents the policy implementation time point, and k denotes the kth year of policy implementation. The coefficient of the interaction term reflects the difference between the experimental and control groups in a specific year. If no significant difference exists between the experimental and control groups prior to policy implementation, this demonstrates that the parallel trends assumption holds. The test results satisfy the parallel trends assumption, indicating that the difference-in-differences approach is appropriate for this study.

5.4. Testing the Impact of High-Tech Industrial Policies on Firm Innovation Performance Using the PSM-DID Model

Based on propensity score matching results, a control group sample with characteristics similar to the experimental group was obtained. A double difference estimation was then conducted on this basis, yielding more reliable outcomes. A two-way fixed effects approach was employed to estimate Model (1), with Table 3 presenting the specific regression results.

Table 3. The Basic Regression of High-Tech Industrial Policy on Corporate Innovation Performance

	(1)	(2)	(3)	(4)
Variable	Double difference		Double difference for propensity score matching	
	Invention	Invention	Invention	Invention
IP×Post	0.2462***	0.1609***	0.2462***	0.1606***
	(0.0000)	(-0.0001)	(0.0000)	(-0.0001)
Size		0.5547***		0.5541***
		(0.0000)		(0.0000)
Age		0.0486**		0.0488**
		(-0.0211)		(-0.0208)
CF		-0.0002		-0.0002
		(-0.8087)		(-0.8388)
Lev		-0.1335*		-0.1363*
		(-0.0598)		(-0.0548)
PPE		0.2369***		0.2347**
		(-0.0095)		(-0.0101)
Liquidity		—0.0015		-0.0019
		(-0.6988)		(-0.6103)
Constant	0.6285***	-10.9717***	0.6291***	-10.9789***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Time-specific effect	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes
N	20800	20800	20790	20790
R^2 (Within)	0.2217	0.2737	0.2216	0.2738

Table 3: Columns (1) and (2) present the results estimated using the difference-in-differences method, with and without the inclusion of the control variable, respectively. Columns (3) and (4) present the results estimated using the propensity score matched difference-in-differences method, with and without the inclusion of the control variable, respectively. The results in columns (1) to (4) indicate that the coefficient estimates for IP×Post remain positive at the 1% significance level regardless of whether control variables are included. This demonstrates that the implementation of high-tech industrial policies significantly enhances corporate innovation performance. While the basic regression analysis validates the hypothesis, examining the control variables in columns (2) and (4) reveals that firm size and firm age exert a significant positive influence on innovation performance. Firms of greater scale and longer operational history typically possess stronger innovation capabilities and command larger market shares. To maintain their market position, such enterprises continuously pursue technological innovation, thereby positively influencing innovation performance. The negative coefficient for the debt-to-asset ratio, significant at the 10% level, indicates that a lower debt-to-asset ratio is more conducive to enhancing innovation performance. As the debt-to-asset ratio increases, so does the financial risk faced by the enterprise, leading to reduced profitability. This may adversely affect the enterprise's innovation and R&D activities, diminishing innovation efficiency. The coefficient for the scale of fixed assets is significantly positive. Generally, the larger the scale of fixed assets, the stronger the technological innovation foundation of the enterprise, which is more conducive to enhancing innovation performance.

5.5. Robustness Tests

Further tests examining the impact of high-tech industrial policies on corporate innovation performance were conducted by substituting total patent applications (Patent) for invention patent applications (Invention) as the dependent variable. As shown in columns (1) and (2) of Table 4, the coefficient for the interaction term IP×Post remained significantly positive regardless of whether control variables were included. This indicates that high-tech industrial policies contribute to enhancing corporate innovation performance, thereby reaffirming the core hypothesis H1 of this study.

When employing the PSM-DID method to assess the impact of high-tech industrial policies on corporate innovation performance, a crucial precondition is that, absent the policy shock, the trend in innovation performance between the treatment and control groups should not exhibit significant systematic differences over time. In other words, if the improvement in innovation performance is genuinely attributable to policy implementation rather than specific temporal effects, then altering the policy implementation year would invalidate the DID model estimates. Here, we narrow the sample window to the pre-policy period (2007–2010), constructing virtual DID models with 2008 and 2009 as hypothetical policy years. Model (1) regression analysis verifies that if similar regression results persist after changing the hypothetical policy year (where the coefficient for the interaction term IP×Post is positive and significant), this would indicate that the earlier findings may have been attributable to random factors and thus fail to support the hypothesis. Columns (3) to (6) in Table 4 present the estimation results under the two hypothetical policy years, using invention patent applications (Invention) and total patent applications (Patent) as the dependent variables respectively, with control variables included. The results indicate that applying a double difference estimation with dual fixed effects renders the coefficient estimate for the interaction term IP×Year no longer significant. This confirms that the earlier conclusion was not attributable to a placebo effect stemming from temporal variation, thereby lending greater reliability to the estimation results presented herein.

Table 4. Robustness Tests

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Using the total number of patent applications as the dependent variable		Counterfactual testing			
	Patent	Patent	Invention	Patent	Invention	Patent
IP×Post	0.1961***	0.0987**				
	0	-0.025				
IP×Year08			0.0978	0.1277		
			-0.3937	-0.3554		
IP×Year09					0.0264	0.0227
					-0.7671	-0.835
Constant	1.3551***	-11.2900***	-12.3831*	-8.0961**	-12.3400*	-8.0635**
	0	0	-0.0001	-0.0189	-0.0001	-0.0199
Controls	No	Yes	Yes	Yes	Yes	Yes
Time-specific effect	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	20791	20791	1912	1912	1912	1912
R^2 (Within)	0.2409	0.2942	0.1764	0.1979	0.1758	0.1971

6. Summary

This study employs the PSM-DID method to empirically examine the impact of high-tech industrial policies on corporate innovation performance using sample data from non-financial listed companies on the Shanghai and Shenzhen stock exchanges between 2007 and 2019. The findings indicate:

(1) The implementation of high-tech industrial policies exerts a significant positive influence on enhancing corporate innovation performance, a conclusion that remains robust after stability testing.

(2) Debt financing costs partially mediate the relationship between high-tech industrial policies and corporate innovation performance. Elevated debt financing costs may inhibit innovation performance improvements to some extent, whereas high-tech industrial policies can enhance innovation performance by reducing corporate debt financing costs.

(3) A favorable business environment exerts a positive moderating effect on the enhancement of corporate innovation performance through high-tech industrial policies.

This study empirically analyses the impact of high-tech industrial policies on corporate innovation performance, providing evidence for refining China's high-tech industrial policies. Based on these findings, the following implications are proposed:

(1) Further implement tax incentives such as additional deductions for R&D expenditure to stimulate corporate innovation. Concurrently, continuously improve the regulatory framework for innovation commercialization and enhance government service efficiency in relevant sectors.

(2) To alleviate financing difficulties and high costs in technological innovation, the government should support and encourage eligible enterprises to raise capital through public listings, thereby increasing the proportion of equity financing for high-tech enterprises. Furthermore, the bond market should be vigorously developed to facilitate interest rate transmission between bond and credit markets, enhancing the substitutability of debt financing and guiding a downward trend in debt financing costs. Financial market policies for the high-tech sector should also be guided to attract greater social investment. Coordinate the development of investment and financing information platforms to aggregate and share enterprise data, facilitating the interconnection of financial status, regulatory information, and credit data to reduce debt financing costs.

(3) Governments at all levels must continuously optimize the business environment to ensure the smooth implementation of industrial policies. Interdepartmental coordination should streamline approval processes, enhance service efficiency, and accelerate the innovation pace of high-tech enterprises. Concurrently, efforts should be intensified to improve the financial environment, safeguard creditors' interests, and encourage financial institutions to issue funds. This will alleviate financing constraints for high-tech enterprises and enhance the ease of access to finance. Providing enterprises with an open and transparent market operating environment will encourage voluntary disclosure of accurate and reliable financial information, thereby establishing institutional safeguards to reduce corporate debt costs. Furthermore, the legal protection system should be continuously refined to safeguard the legitimate rights and interests of market entities, strengthen intellectual property protection, and foster a virtuous cycle within the market innovation environment.

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