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Corporate Risk-Taking, Innovation Efficiency, and High-Quality Development: Evidence from Chinese Firms

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Abstract: Facing the increasingly complex and uncertain external environment, the reasonable control of investment risk is the key to realizing the sound operation and high-quality development of enterprises. Based on the innovation perspective, this paper takes A-share non-financial listed companies from 2007 to 2021 as the research sample to explore the impact of the corporate risk-taking level on the high-quality development of enterprises and examines the transmission mechanism of the relationship between the two from the perspectives of innovation efficiency, innovation input, and innovation output. It is found that enterprise risk-taking significantly inhibits the high-quality development of enterprises, by reducing innovation efficiency; innovation efficiency plays a mediating role in the influence of the relationship between the two, which is mainly due to the fact that enterprise risk-taking increases the innovation inputs of enterprises but reduces the innovation outputs of enterprises, and then reduces the innovation efficiency of enterprises and inhibits the high-quality development of enterprises. This heterogeneity study finds that the inhibitory effect of corporate risk-taking on the high-quality development of firms is more pronounced among manufacturing firms, small-scale firms, and firms with higher capital intensity. The findings of this study provide both guidance to help enterprises to reduce risky investment decision-making behaviors and experience for regulators to effectively promote the formulation of policies related to the high-quality development of the real economy.

Keywords: corporate risk-taking; high-quality development; innovation efficiency; innovation input; innovation output

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1. Introduction

China's economy has transformed from the stage of high-speed growth to the stage of high-quality development, a stage that necessitates the establishment of a new concept of development and puts forward new requirements for technological innovation, efficiency reform, and industrial upgrading. High-quality economic development depends largely on high-quality enterprise development [1], and an important feature of high-quality enterprise development is high productivity. Total factor productivity (TFP) is the total output of non-factor inputs generated by the "surplus", reflecting the overall efficiency of inputs into outputs. Specifically, it is the enterprise production of resource utilization efficiency, governance, technology, management efficiency, and economies of scale, and many other non-productive inputs contributing to output. A high level of total factor productivity represents the degree of effective utilization of resources by an enterprise, which enables it to maintain long-term competitiveness, and is widely used to measure the level of high-quality development of an enterprise.

Corporate risk-taking refers to the behavior of enterprises weighing the high level of expected returns and the high volatility of expected returns when making investment decisions [2], reflecting the tendency of enterprises to be willing to bear the negative consequences of uncertainty due to fluctuations in returns, in the process of chasing high profits.

Enterprises need to possess a certain risk-taking ability in order to pursue performance growth and realize economic value. In practice, a higher level of corporate risk-taking means that the possibility of giving up projects with a high risk but an expected net present value greater than zero in investment decision-making is smaller, and many scholars use corporate performance volatility to measure the level of corporate risk-taking [3]. It has been shown that, on the one hand, a higher level of corporate risk-taking is associated with increased research and development (R&D) investment and capital expenditure [4,5], which can improve the efficiency of capital allocation [6], bring about good performance [7], and help enterprises to obtain high investment returns in a highly complex and uncertain environment [8]. On the other hand, investing in high-risk projects can easily lead to high corporate gearing, a short debt maturity structure, improved operational performance accompanied by overly aggressive tax avoidance strategies, increased surplus management behaviors, etc. However, the uncertainty of future returns increases the volatility of operational performance [9], leading to aggressive and short-sighted business decision-making behaviors, uncertain investment results, and increased corporate financial risk and operational risk, which are not conducive to the long-term stable development of enterprises [10]. It can be seen that the level of risk-taking is a "double-edged sword" for enterprise growth.

Researchers have mainly studied the factors influencing the high-quality development of enterprises from both the external and internal perspectives and have developed rich research results. External factors such as digital inclusive finance [11], the digital economy [12], tax- and fee-reduction policies [13], and government subsidies help to drive the high-quality development of enterprises, and the level of regional financial development has a U-shaped impact on the high-quality development of enterprises; internal factors such as good ESG performance [14], the disclosure of environmental information [15], the strengthening of technological innovation [16], improving corporate governance [17], digital transformation [18], entrepreneurship [19], and others also promote high-quality development, while R&D manipulation behavior inhibits high-quality development.

Enterprise high-quality development is mainly manifested as "seeking progress while stabilizing", while innovation is an important driving force for enterprise high-quality development, and enterprise risk-taking, as a type of radical investment decision, will adversely affect enterprise high-quality development through innovation activities. In view of this, this paper takes A-share non-financial listed companies from 2007–2021 as the research sample, and empirically examines the impact of the corporate risk-taking level on corporate high-quality development and its transmission mechanism, based on the corporate innovation perspective from the three perspectives of innovation efficiency, innovation input, and innovation output.

The possible contributions of this paper lie in the following: Firstly, there are existing studies on the internal influencing factors of the high-quality development of enterprises, mainly focusing on digital transformation, technological innovation, corporate governance, etc. We examine the impact of the level of corporate risk-taking on the high-quality development of enterprises, which broadens the scope of academic research on the high-quality development of enterprises in terms of the decision-making of investment behaviors. Secondly, existing studies on the level of corporate risk-taking have mainly formed two conclusions, namely, the beneficial effect that promotes the development of corporate operations and the risk effect that inhibits the development of corporate operations, and the study proves the negative impact of corporate risk investment behavior on the quality of corporate development, further providing new empirical evidence for the risk effect of corporate risk-taking. Finally, based on the innovation perspective, we explore the mediating role of innovation efficiency in the relationship between the two, and further analyze the reason for the existence of the transmission mechanism of "enterprise risk-taking to innovation efficiency to enterprise high-quality development", i.e., the differences in the performance of innovation inputs and innovation outputs. The conclusions of this study are of great significance in guiding enterprises to make rational risk investment decisions and carry out innovation activities effectively, so as to avoid the negative impacts of both on the quality of enterprise development.

2. Literature Review Section

The research related to the impact of corporate risk-taking on innovation has led to the following two main conclusions.

Some scholars argue that corporate risk-taking has a positive impact on innovation. Castillo-Vergara and García-Pérez-de-Lema [20] show that the product innovation capacity of small and medium-sized enterprises (SMEs) has a positive impact on firm performance, and that risk-taking by SMEs promotes the transformation of creativity into product innovation capacity, thereby increasing market competitiveness. Liu et al. [21] argued that digital transformation increases the level of risk-taking in enterprises, which in turn increases their positive attitude and acceptance and recognition of innovation, enhances their motivation to innovate, and increases their willingness to invest in innovative R&D. Hock-Doepgen et al. [22] showed that a firm's high risk tolerance contributes to the impact of knowledge management capabilities on a firm's business model innovation by influencing how the firm processes and utilizes knowledge. Li et al. [23] pointed out that managerial risk-taking not only reduces agency costs, but also improves the status quo of conservative business operations, enhances the dynamic ability of firms to adapt to environmental uncertainty and the ability to withstand the risk of failure, and improves the innovation performance of firms through increased investment in innovation.

However, other scholars take the opposite view, arguing that corporate risk-taking negatively affects innovation. Based on the principles of social exchange theory, Ye et al. [24] investigated that the absorptive capacity of Chinese information technology firms has a facilitating effect on both innovation enthusiasm and innovation behavior, while the risk-taking behavior of firms has a negative moderating effect on the above facilitating relationship. Based on a systematic analysis of the factors that drive innovation performance, Giaccone and Magnusson [25] suggested that firms' risk-taking should be moderate, both to reduce the opportunity costs of missing out on innovation projects and to avoid the negative consequences of excessive risk-taking, and to minimize the combined costs of failed innovation programs.

In addition, Zhang and Aumeboonsuke [26] studied the relationship between technological innovation, risk-taking, and firm performance and found that risk-taking is an important transmission path through which firms' technological innovation affects firm performance; technological innovation reduces firm performance by increasing firms' risk-taking capacity.

In summary, academic research on the relationship between corporate risk-taking and innovation has made some achievements, but there are two shortcomings: Firstly, it has only explored the impact of corporate risk-taking on a single level of innovation input or innovation performance, has not formed a consistent conclusion, and has not comprehensively considered the different phases of innovation. Secondly, the research on the economic consequences of corporate risk-taking has not taken into account the quality of the development of the enterprise. The high-quality development of enterprises is an important evaluation index in the stage of enterprise transformation and a key factor in realizing the high-quality development of the economy, and existing studies have not included the quality of enterprise development in the scope of research on the economic consequences of enterprise risk-taking. In this work, we conducted an in-depth study on these two important issues.

3. Theoretical Analysis and Hypothesis Development

3.1. Corporate Risk-Taking and Corporate High-Quality Development

Corporate risk-taking reflects management's investment propensity in the face of uncertainty scenarios. High-quality enterprise development is mainly characterized by "steady progress". Academics usually use earnings volatility, stock volatility, capital expenditure, and debt ratio to measure corporate risk-taking. Due to the high volatility of China's stock market, scholars generally use the volatility of corporate earnings to measure the level of corporate risk-taking. Roa is the ratio of corporate EBITDA to year-end total assets, which is a better reflection of corporate profitability, so we adopt the standard deviation of corporate Roa, adjusted by the industry average, to measure the volatility of corporate earnings, representing the risk-taking level of the enterprise. Scholars usually use the total factor productivity of enterprises to measure their high-quality development. Because total factor productivity (TFP) reflects the overall efficiency with which inputs are transformed into outputs and represents the degree to which an enterprise effectively utilizes its resources, it is an important indicator of the speed with which an enterprise's production efficiency improves, enabling it to maintain long-term competitiveness, and is widely used to measure the level of high-quality development of an enterprise.

On the one hand, based on the principal–agent theory, when the level of corporate risk-taking is high, managers, motivated by the desire to conceal excessive risky investments and maximize personal interests, may conceal negative corporate information by manipulating corporate surplus and other means, thus adversely affecting the quality of corporate development; in addition, high-risk investment projects require sufficient follow-up funds, and corporations with a high level of risk-taking will reserve a higher amount of cash holdings [27], increasing the possibility of the irrational use of cash by management, or even the misappropriation of cash, aggravating the agency cost between shareholders and managers, reducing the efficiency of enterprise management, negatively impacting the rational allocation of factors of production, and inhibiting high-quality enterprise development.

On the other hand, according to the theory of financing constraints, creditors have a higher level of risk aversion than equity investors. When enterprises invest in risky projects, crowding out financial resources and long repayment periods, financial institutions and other creditors will increase the credit restrictions on enterprises by raising the threshold for credit approval, reducing the amount of debt financing, raising loan interest rates, shortening the loan period and strengthening supervision in the loan, etc., in order to reduce the risk of debt default brought about by the tendency for risky investment. A risky investment tendency is brought about by the risk of debt default, when creditors increase the degree of prudence and have a stronger voice, forcing enterprises to face greater debt repayment pressure. In addition, enterprises investing a large amount of money in high-risk projects will inevitably squeeze out industrial funds, reduce the production of capital investment, reduce the level of output of non-production factors, and inhibit the high-quality development of enterprises. Therefore, we propose the following hypothesis H1:

Hypothesis (H1). *The level of enterprise risk-taking inhibits the high-quality development of enterprises.*

3.2. Corporate Risk-Taking, Innovation Efficiency, and Enterprise High-Quality Development

3.2.1. Mechanisms of Innovation Efficiency

High-quality development is the development of innovation as the first driving force. Enterprise innovation activities are associated with greater uncertainty, with a long research and development cycle and high-risk characteristics. Risk assessment is an important part of an innovation activity being carried out successfully, so innovation activities have higher requirements regarding the enterprise's risk-bearing ability. The key to innovation efficiency lies in the two aspects of innovation enthusiasm and innovation ability. Innovation input can better reflect the enterprise's attitude and willingness to act on innovation, and is mostly used to measure the enterprise's innovation enthusiasm. Innovation output can more accurately measure the enterprise's innovation ability, and innovation efficiency is the ratio of innovation output to innovation input. However, low innovation ability is the main reason why enterprises face a severe "innovation dilemma". Innovation efficiency is the ratio of innovation inputs and outputs, and improving innovation ability requires enterprises to not only increase their innovation inputs, but also to control their innovation costs and improve innovation efficiency, i.e., to improve the transformation efficiency of innovation inputs and outputs and the utilization efficiency of innovation resources.

On the one hand, the level of corporate risk-taking enhances management's adventurous investment preferences [28], blindly focusing on inputs and outputs, resulting in a substantial increase in R&D costs and lower R&D funding allocation efficiency, resulting in lower innovation efficiency; on the other hand, enterprises addicted to risky investment behavior may not consider the expansion and quality of the R&D team, and increasing its level of knowledge is the basis for an enterprise to enhance its innovation efficiency. If the knowledge absorption capacity of R&D personnel decreases, this will cause a decline in the enterprise's innovation knowledge accumulation and remove the intrinsic driving force for innovation, which will directly inhibit the improvement of innovation efficiency, which in turn is not conducive to the improvement of total factor productivity. Accordingly, therefore, we propose the following hypothesis H2:

Hypothesis (H2). *The level of corporate risk-taking inhibits the high-quality development of enterprises by reducing innovation efficiency, and innovation efficiency plays a mediating role in the impact relationship between these two factors.*

3.2.2. Mechanisms of Innovation Inputs

Innovation activities are essentially a kind of investment activity with both returns and risks [29], and the level of corporate risk-taking inhibits the high-quality development of enterprises through the different impacts on innovation inputs and innovation outputs.

Innovation input is the degree of financial support for innovation, and a higher risk-taking ability of enterprises can enhance the management's investment confidence, encouraging them to actively choose high-risk and high-yield investment opportunities and to actively carry out innovation activities through high capital expenditure and high innovation input [30]. Innovation requires a large amount of capital investment, which will inevitably squeeze out industrial funds, according to the theory of resource finiteness. The production and operation activities of enterprises have a negative impact, reducing the level of enterprise output and product market share, and threatening the competitive position of enterprises in the market, and are not conducive to the effective allocation of enterprises' factors of production. Therefore, corporate risk-taking is conducive to innovative inputs, but inhibits enterprise high-quality development. Based on the above analysis, we propose hypothesis H2a:

Hypothesis (H2a). *The level of corporate risk-taking inhibits the high-quality development of enterprises by promoting innovation inputs.*

3.2.3. Mechanisms of Innovation Outputs

Innovation outputs such as patented technology enhance the actual production capacity and improve the quality of enterprise development through a series of intermediary elements such as knowledge stock transformation, changing the ratio of internal factor inputs and improving the efficiency of resource allocation [31]. However, innovation activities are a kind of high-input, high-risk strategic investment activity, with high uncertainty of innovation outputs and a high possibility of innovation failure [25], which will have serious negative impacts on the quality of enterprise development.

Firstly, despite the incentive effect of corporate risk-taking on corporate innovation investment, a large amount of external financing is required in the process. If the innovation project is successful, the high financing cost reduces the profitability of the innovation project; conversely, if the innovation project fails, the enterprise bears a greater opportunity cost, so the high financing cost and opportunity cost reduce the output level of the innovation project.

Secondly, innovation activities require core knowledge and technology, and enterprises are usually willing to disclose limited information due to the concern of the spillover of the core benefits of innovation, which leads to investors not being able to fully understand the progress of the invested projects promptly, exacerbating the degree of information asymmetry between the providers and demanders of innovation funds, and even leading to financial difficulties of enterprises, which negatively affects the output of innovation.

Thirdly, corporate risk-taking may cause the management to invest in projects with excessive technical difficulty, those that are long-term, and those with no market prospects, and this kind of risk-taking behavior causes a great waste of resources; in addition, the corporate high-risk-taking capacity causes huge borrowing, and the financial risk and debt default risk brought about by high-leverage behavior seriously affect the level of corporate innovation output, which is detrimental to the high-quality development of the enterprise.

Based on the above analysis, we propose hypotheses H2b:

Hypothesis (H2b). *The level of corporate risk-taking inhibits the high-quality development of enterprises by weakening innovation output.*

4. Research Methods

4.1. Data Sources

In this paper, all A-share listed companies during the period of 2007 to 2021 were selected as the initial sample, and the following procedures were performed: we excluded financial industries and listed companies with important data missing; we excluded special treatment (ST and *ST) listed companies; and the main continuous variables were shrink-tailed at the 99% and 1% levels. Finally, 25,665 sample observations were obtained, and all data were from the China Stock Market and Accounting Research (CSMAR) database, except for the number of innovation output patent applications, which was from the China Research Data Service Platform (CNRDS).

4.2. Variable Definition

4.2.1. Dependent Variable

Enterprise high-quality development (*lnTFP*). Since total factor productivity (TFP) is an important indicator of the speed of improvement of an enterprise's productivity, we adopted TFP to measure the high-quality development of an enterprise. There are two commonly used methods for calculating TFP, namely, the Olley–Pakes method (OP) and the linear programming method (LP). Compared with the OP method, the LP method better overcomes the problem of endogeneity that exists in the estimation of the Solow residual value using the ordinary least-squares method, and thus, the total factor productivity obtained through the LP method is more effective. We referred to the research of most scholars and adopted total factor productivity (TFP) to measure the high-quality development of enterprises, and this measurement method adopted the LP method; in addition, for the robustness test, we used the OP method to calculate the TFP as a proxy of enterprise high-quality development (*TFP_op*). The LP method of measuring the TFP of an enterprise first requires a model of the production function as follows:

$$\ln Y_{\mathrm{i,t}} = \lambda_1 \ln L_{\mathrm{i,t}} + \lambda_2 \ln K_{\mathrm{i,t}} + \lambda_3 \ln M_{\mathrm{i,t}} + TFP_{\mathrm{i,t}} \quad (1)$$

In this model, Y represents the operating income of the enterprise, L represents the number of employees of the enterprise, K represents net fixed assets, and M represents intermediate inputs, which are defined as M = operating costs + selling expenses + administrative expenses + financial expenses—depreciation of fixed assets and amortization of intangibles—cash paid to and for employees. Secondly, we measured the *TFP* of the enterprise using the LP semiparametric estimation method of the Stata software (Stata 15.1), and enterprise high-quality development (*lnTFP*) was measured by taking the logarithm of *TFP*.

4.2.2. Explanatory Variable

Corporate risk-taking level (*Risk*). Since the tenure of executives of listed companies in China is generally three years, when calculating the volatility of earnings, this paper first adjusted the Roa of the enterprise for each year by using the industry average, and then calculated the industry-adjusted standard deviation of Roa on a rolling basis using three years as an observation period. We used the degree of corporate surplus volatility to measure the level of risk-taking, and the larger the indicator, the higher the level of corporate risk-taking. The specific approach was as follows: firstly, the net profit margin of total assets (*Roa*) was chosen as the performance indicator, and we used Formula (2) to obtain Adj_Roa by subtracting the annual industry Roa average from the corporate Roa; secondly, we used Formula (3) to calculate the standard deviation of industry-adjusted Roa (*Adj_Roa*) every three years (from $t-1$ to $t+1$) as a period of observation on a rolling basis, and this standard deviation was used as a measure of the corporate risk-taking level (*Risk*). Finally, using Equation (4), the rank difference in *Adj_Roa* from period $t-1$ to $t+1$ was used as a measure of corporate risk-taking level in performing the robustness test.

$$Adj\_Roa_{\mathrm{i,t}} = Roa_{\mathrm{i,t}} - \frac{1}{X}\sum_{k=1}^{X} Roa_{\mathrm{i,t}} \tag{2}$$

$$\sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left(Adj\_Roa_{\mathrm{i,t}} - \frac{1}{T}\sum_{k=1}^{X} Adj\_Roa_{\mathrm{i,t}}\right)^{2}}, T = 3 \tag{3}$$

$$Risk\_r_{\mathrm{i,t}} = Max(Adj\_Roa_{\mathrm{i,t}}) - Min(Adj\_Roa_{\mathrm{i,t}}) \tag{4}$$

In the above equation, *Roa* is the ratio of firms' EBITDA to total assets at the end of the year, and *Adj_Roa* represents firms' Roa, adjusted for industry averages. X represents the total number of firms in an industry; T takes the value of 3, which represents the observation period from year $t-1$ to year $t+1$; and i, t, and k represent the firm, the year, and the kth firm in an industry, respectively.

4.2.3. Mechanism Variable

Innovation input (*RD*). Innovation investment mainly refers to the enterprise innovation development process in the innovation body related to human, financial, management, and technological resources and other aspects of resource investment, and R&D investment is the necessary measurement index used to measure the enterprise's investment in a variety of resources, which can be more accurate in measuring the enterprise's innovation enthusiasm. We adopted the ratio of R&D investment to revenue (*RD*) to measure innovation investment, which better reflects the differences in the intensity of R&D investment in different firm volumes than the absolute total R&D investment [32].

Innovation output (*lnpat*). Patent innovation is an excellent indicator used to characterize the overall technical strength of enterprises [33], related to the possession of patented technology for enterprise negotiation, investment, and financing in order to increase bargaining chips, reflecting the innovation ability of enterprises. As the approval time for enterprises to obtain patents is quite long, leading to more uncertainty factors, compared with the number of patents obtained, the number of patent applications is better able to reflect the level of enterprise innovation output. According to their value to the enterprise from high to low, patents can be divided into three types, namely invention patents, utility model patents, and design patents. We adopted the number of patent applications to measure the innovation output, and according to the different types of patent applications, we constructed the measure based on the total number of patent applications (*lnpat1*) and the measure weighted by the number of different types of patent applications (*lnpat2*). The weighting method was designed to be able to more accurately measure the level of a firm's innovation output by assigning weights of 50%, 30%, and 20% to each of the above three types of patents, which are defined as follows:

$$lnpat1 = ln(\ total\ number\ of\ patent\ applications + 1) \tag{5}$$

$$lnpat2 = ln\left(\begin{array}{l} number\ of\ invention\ patent\ applications \times 0.5 \\ +number\ of\ utility\ applications \times 0.3 \\ +number\ of\ design\ applications \times 0.2 + 1 \end{array}\right) \tag{6}$$

Innovation efficiency (*INEFF*). Innovation efficiency reflects the enterprise's innovation willingness and innovation ability at the same time, and it is the comprehensive embodiment of the enterprise's innovation inputs and innovation outputs. Academics mainly use the proportion of innovation outputs to innovation inputs to measure the innovation efficiency. We constructed the innovation efficiency measurement indexes as follows:

$$INEFF = \frac{\ln pat2}{\ln(1 + RD)} \tag{7}$$

4.2.4. Control Variables

Drawing on the existing literature on the high-quality development of enterprises, we selected the following control variables: the enterprise size (*size*), the asset–liability ratio (*lev*), the cash flow ratio (*cash*), the growth rate (*grow*), the enterprise value (*tobinq*), the enterprise age (*age*), the shareholding ratio (*hold*), the number of board of directors (*board*), the chairman and managing director (*dual*), and the nature of ownership (*state*). In addition, year effects and industry effects were included to control for the impact of different years and industries on the study. All variable names and calculations are shown in Table 1.

Table 1. Variable definition.

Variable Name	Variable Symbol	Calculation Method
enterprise high-quality development	lnTFP	total factor productivity calculated by the LP method
	TFPop	total factor productivity calculated by the OP method
corporate risk-taking level	Risk	standard deviation of industry annually adjusted Roa from period t − 1 to t + 1
	Risk_r	rank difference of industry annually adjusted Roa from period t − 1 to t + 1
innovation input	RD	R&D investment in operating income (%)
innovation output	lnpat1	ln(total number of patent applications + 1)
	lnpat2	ln(number of invention patent applications × 0.5 + number of utility model applications × 0.3 + number of design applications × 0.2 + 1)
innovation Efficiency	INEFF	lnpat2/ln(1 + R&D investment)
enterprise size	size	natural logarithm of total assets
asset–liability ratio	lev	total liabilities/total assets
cash flow ratio	cash	net cash flows from operating activities/total assets
growth rate	grow	operating income growth rate
enterprise value	tobinq	enterprise market capitalization/total assets
enterprise age	age	Ln(year of observation − year of establishment + 1)
shareholding ratio	hold	number of shares held by directors, supervisors and senior management/total shares

Table 1. *Cont.*

Variable Name	Variable Symbol	Calculation Method
number of board of directors	board	total number of directors
chairman and managing director	dual	the chairman of the board of directors who is also the general manager is taken as 1, otherwise it is taken as 0
the nature of ownership	state	state-owned enterprises take the value of 1, non-state-owned enterprises take the value of 0

4.3. Descriptive Statistics

Table 2 reports the statistical results of the variables. The mean value of enterprise high-quality development (*lnTFP*) was 16.218, and the standard deviation was 1.119. The mean value of corporate risk-taking level (*Risk*) was 0.027, and the standard deviation was 0.035, which indicates that there is a large gap in the risk-taking level of different firms, and that some of the firms have large business risks. The mean values of innovation input (*RD*), innovation output (*lnpat*) and innovation efficiency (*INEFF*) are low, the standard deviations are large, and the medians are zero, indicating that there are large differences in the innovation motivation of the sample enterprises, and that less than half of them invest in innovation projects, with the overall level of innovation output being low and innovation efficiency being insufficient.

Table 2. Descriptive statistics.

Variable	Mean	SD	Min	p25	Median	p75	Max	N
lnTFP	16.218	1.119	12.793	15.457	16.114	16.871	20.822	25665
TFPop	14.547	0.929	8.955	13.930	14.452	15.083	19.340	25665
Risk	0.027	0.035	0.000	0.007	0.014	0.031	0.372	25665
Risk_r	0.133	0.107	0.000	0.052	0.101	0.191	0.534	25665
INEFF	0.007	0.028	0.000	0.000	0.000	0.000	0.251	25665
RD	1.943	3.759	0.000	0.000	0.000	3.180	27.730	25665
lnpat1	0.311	1.065	0.000	0.000	0.000	0.000	7.048	25665
lnpat2	0.174	0.677	0.000	0.000	0.000	0.000	5.347	25665
size	21.992	1.278	19.529	21.067	21.814	22.711	25.983	25665
lev	0.413	0.204	0.053	0.249	0.405	0.565	0.884	25665
cash	0.051	0.070	−0.164	0.012	0.051	0.092	0.251	25665
grow	0.195	0.425	−0.531	−0.001	0.124	0.288	2.708	25665
tobinq	2.071	1.323	0.871	1.274	1.650	2.345	8.909	25665
age	2.804	0.389	0.000	2.565	2.833	3.091	4.159	25665
hold	0.140	0.204	0.000	0.000	0.005	0.262	0.994	25665
board	9.699	2.816	2.000	8.000	9.000	11.000	30.000	25665
dual	0.219	0.414	0.000	0.000	0.000	0.000	1.000	25665
state	0.375	0.484	0.000	0.000	0.000	1.000	1.000	25665

Notes: This table presents summary statistics for the variables. Variables are defined in Table 1. Mean and SD represent the average and the standard deviation of each variable; min, p25, median, p75, and max represent the minimum, the first quantile, the median, the third quantile, and the maximum of each variable, respectively; N is the number of sample observations.

5. Research Design and Empirical Results

5.1. Benchmark Regression Results

In order to test hypothesis H1, the following model (8) was constructed. In the model, lnTFP represents the enterprise high-quality development, *Risk* represents the corporate risk-taking level, *Controls* represents all the control variables mentioned above, *Year* represents the year dummy variable, *Industry* represents the industry dummy variable, α_0 is the constant term, α_1 is the regression coefficient, and $\varepsilon_{i,t}$ is the error term.

$$lnTFP = \alpha_0 + \alpha_1 Risk + \sum Controls + \sum Year + \sum Industry + \varepsilon_{\mathrm{i,t}} \tag{8}$$

Table 3 reports the impact of corporate risk-taking level (*Risk*) on enterprise high-quality development (*lnTFP*). The regression results with only explanatory variables in column (1) show that the level of corporate risk-taking has a significant negative relationship with corporate high-quality development; the regression results with control variables in column (2) show that the estimated coefficient of the level of corporate risk-taking is still significantly negative; columns (3) and (4) further control for industry fixed effects and year fixed effects for the regression, and the coefficient of the level of corporate risk-taking (Risk) in column (4) is −0.638. All of the above coefficients are significant at the 1% level, indicating that the level of corporate risk-taking (*Risk*) is −0.638. All of the above coefficients are significant at the 1% level, indicating that the corporate risk-taking level inhibits corporate high-quality development. This is mainly because, if the enterprise raises the level of risk-taking, creditors, in order to avoid risks, raise the financing threshold limit of the enterprise, which may cause the capital chain of the investment project to break; in addition, higher risk-taking will reduce the efficiency of the management of all kinds of resources in the enterprise, resulting in a waste of resources and hindering the high-quality development of the enterprise. Hypothesis H1 is verified.

Table 3. Corporate risk-taking level and corporate high-quality development.

Variable	**(1) lnTFP**	**(2) lnTFP**	**(3) lnTFP**	**(4) lnTFP**
Risk	−3.786 *** (−19.40)	−0.782 *** (−5.87)	−0.527 *** (−4.16)	−0.638 *** (−5.01)
size		0.679 *** (176.42)	0.694 *** (192.28)	0.699 *** (184.97)
lev		0.657 *** (26.36)	0.535 *** (22.37)	0.540 *** (22.12)
cash		0.811 *** (12.66)	1.034 *** (17.19)	0.989 *** (16.25)
grow		0.186 *** (16.07)	0.200 *** (18.57)	0.193 *** (17.78)
tobinq		0.012 *** (4.15)	0.005 (1.61)	0.019 *** (6.02)
age		0.039 *** (3.63)	0.016 (1.63)	0.009 (0.80)
hold		0.053 *** (2.61)	0.045 ** (2.29)	0.050 ** (2.53)
board		−0.009 *** (−5.79)	−0.004 *** (−2.99)	−0.004 *** (−3.07)
dual		−0.004 (−0.50)	−0.018 ** (−2.31)	−0.021 *** (−2.68)
state		−0.036 *** (−3.68)	0.027 *** (2.86)	0.025 *** (2.65)
_cons	16.318 *** (1955.42)	0.836 *** (10.04)	0.344 *** (4.20)	0.209 ** (2.29)
Year Effect	No	No	No	Yes
Industry Effect	No	No	Yes	Yes
N	25665	25665	25665	25665
A-R^2	0.013	0.692	0.745	0.748

Notes: Variables are defined in Table 1; _cons is the constant term; *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively; t-values for coefficients are in parentheses. The following table is identical.

5.2. Endogeneity and Robustness Test

Although the regression results above show that the level of corporate risk-taking has a significant negative impact on the high-quality development of enterprises, there may still be endogeneity and variable selection problems that lead to biased estimated coefficients, which in turn affect the accuracy of the conclusions. Therefore, we further ensure the robustness of the test results through the instrumental variable method (2SLS), the substitution of variables, the replacement of estimation methods, and propensity score matching (PSM).

5.2.1. Instrumental Variable Method (2SLS)

We use the instrumental variables method for endogeneity validation. The mean value of corporate risk-taking (*Riskcity*) and the lagged period of corporate risk-taking (*L. Risk*) for other firms in the same year and city are selected as instrumental variables for corporate risk-taking. The first stage of Table 4 is the regression of the two instrumental variables on corporate risk-taking, and the results show that the coefficients of the instrumental variables are all significantly positive at the 1% level, and the instrumental variables satisfy the correlation requirements. The regression results of the second stage show that the coefficient of corporate risk-taking (*Risk*) is −1.131 and is significant at the 1% level, indicating that corporate risk-taking significantly inhibits high-quality development of the firms. The LM statistic (Kleibergen–Paap rk LM statistic of 1508.40) satisfies the condition of correlation between the instrumental variables and the endogenous variables, which passes the under-identification test; the Wald F test result (Kleibergen–Paap rk Wald F statistic is 2471.47) indicates that instrumental variables are strongly correlated with the endogenous variables, passing the weak instrumental variables test; and the Hansen J statistic is 4.777 and passes the over-recognition test, so the instrumental variables selected in this paper are more reasonable. The above results indicate that Hypothesis H1 still holds after considering the endogeneity issue.

Table 4. Instrumental variable regression results (2SLS).

Variable	First Stage Risk	Second Stage lnTFP
Riskcity	0.093 *** (3.60)	
L. Risk	0.715 *** (76.05)	
Risk		−1.131 *** (−5.90)
Control variables	Yes	Yes
Year Effect	Yes	Yes
Industry Effect	Yes	Yes
LM statistic		1508.40
Wald F statistic		2471.47
Hansen J statistic		4.777
N	24737	24737
A-R^2	0.534	0.750

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively; Riskcity and L. Risk are instrumental variables; the LM statistic, Wald F statistic, and Hansen J statistic are used for testing the under-identification, weak-identification, and over-identification of instrumental variables, respectively.

5.2.2. Replacing the Dependent Variable

The baseline model is re-estimated using total factor productivity (*TFPop*) measured via the OP method as a proxy variable for measuring the high-quality development of firms. The regression results in column (1) of Table 5 show that the estimated coefficient for the level of firm risk-taking is significantly negative at the 1% level. This indicates that after replacing the explanatory variable, the level of corporate risk-taking significantly inhibits the high-quality development of firms, and the conclusions of the previous test are robust.

Table 5. Robustness test.

Variable	Replacing Dependent Variable (1) TFPop	Replacing Explanatory Variable (2) lnTFP	Fixed-Effects Model (FE) (3) lnTFP	Propensity Score Matching (PSM) (4) lnTFP
Risk	−0.526 ***		−0.158 **	−0.685 ***
	(−4.12)		(−2.12)	(−4.48)
Risk_r		−0.370 ***		
		(−9.88)		
_cons	4.069 ***	0.275 ***	2.236 ***	0.259 **
	(44.67)	(3.03)	(17.93)	(2.39)
Control variables	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes
N	25665	25665	25665	18223
A-R^2	0.572	0.746	0.616	0.748

Notes: TFPop is a substitution variable for high-quality development (lnTFP), Risk_r is a substitution variable for corporate risk-taking (Risk).

5.2.3. Replacing Explanatory Variable

The baseline model is re-estimated using the rank difference in industry-year-adjusted Roa from period $t - 1$ to $t + 1$ as a proxy variable for the level of corporate risk-taking. The regression results in column (2) of Table 5 show that the estimated coefficient for the level of corporate risk-taking (*Risk_r*) is significantly negative at the 1% level. This indicates that, after replacing the explanatory variable, the level of corporate risk-taking significantly inhibits the high-quality development of the firm, and the conclusions of the previous test are robust.

5.2.4. Changing Estimation Method

In order to test the impact of different estimation methods on the above conclusions, the fixed-effects model (FE) is used to further control the individual effects of enterprises for re-estimation, and the regression results in column (3) of Table 5 show that the estimated coefficients of the level of enterprise risk-taking are significantly negative at the 5% level. This indicates that after changing the estimation method, the level of corporate risk-taking significantly inhibits the high-quality development of firms, and the conclusions of the previous test are robust.

5.2.5. Propensity Score Matching (PSM)

The PSM method is utilized to match the sample data to test whether there are systematic differences in the data in terms of the level of corporate risk-taking. The specific approach is as follows: firstly, if the enterprise risk-taking is greater than its industry annual median (Tredt) as an explanatory variable when the value of the sample enterprise risk-taking is greater than its industry annual median, it is recorded as 1, and otherwise it is recorded as 0; secondly, we select the enterprise size, asset–liability ratio, cash flow ratio, growth rate, enterprise value, age of the enterprise, the proportion of supervisory shareholding, the number of boards of directors, the two positions, the nature of property rights, etc., as matching covariates, using the nearest-neighbor principle to match the subject sample 1:1 with a caliper range of 0.05; and finally, we re-regress the matched sample. The regression results in column (4) of Table 5 show that corporate risk-taking significantly inhibits corporate high-quality development, and the previous conclusions are robust.

6. Impact Mechanism Test

6.1. Mechanism Test of Innovation Efficiency

In order to test hypotheses H2, H2a, and H2b, based on the method of testing the mediating effect, models (9) and (10) are constructed to verify the mechanism of innovation efficiency (*INEFF*), innovation input (*RD*), and innovation output (*lnpat*) in the process of enterprise risk-taking level inhibiting the high-quality development of enterprises. In these models, *INEFF* stands for innovation efficiency, *RD* stands for innovation input, lnpat stands for innovation output, and lnpat1 and lnpat2 are used in the regression analysis to represent different innovation output measures, while the meanings of other variables are the same as those in the baseline model (8).

$$INEFF/RD/lnpat = \beta_0 + \beta_1 Risk + \sum Controls + \sum Year + \sum Industry + \varepsilon_{i,t} \quad (9)$$

$$lnTFP = \theta_0 + \theta_1 Risk + \theta_2 INEFF/RD/lnpat + \sum Controls + \sum Year + \sum Industry + \varepsilon_{i,t} \quad (10)$$

Table 6 reports the mechanism of the influence of innovation efficiency (*INEFF*) in the inhibitory effect of the level of corporate risk-taking (*Risk*) on the high-quality development of firms (*lnTFP*). Column (1) is verified in Table 3, column (2) has innovation efficiency as a dependent variable and the corporate risk-taking level as an explanatory variable, and the regression coefficient of the level of corporate risk-taking is −0.037 and is significant at the 1% level, which indicates that corporate risk-taking reduces the innovation efficiency of firms. Column (3) adds innovation efficiency to column (1), and the coefficients of the level of corporate risk-taking and innovation efficiency are −0.632 and 0.167, respectively, and are significant at least at the 5% level. It is proven that innovation efficiency plays a mediating role in the level of corporate risk-taking affecting the high-quality development of firms. Hypothesis H2 is verified.

Table 6. Mechanism of influence of innovation efficiency.

Variable	(1) lnTFP	(2) INEFF	(3) lnTFP
Risk	−0.638 *** (−5.01)	−0.037 *** (−5.99)	−0.632 *** (−4.96)
INEFF			0.167 ** (2.05)
size	0.699 *** (184.97)	0.001 *** (4.13)	0.699 *** (184.93)
lev	0.540 *** (22.12)	−0.006 *** (−4.57)	0.541 *** (22.16)
cash	0.989 *** (16.25)	0.002 (0.67)	0.989 *** (16.24)
grow	0.193 *** (17.78)	0.000 (0.92)	0.193 *** (17.77)
tobinq	0.019 *** (6.02)	0.001 *** (2.98)	0.018 *** (5.99)
state	0.009 (0.80)	−0.006 *** (−7.57)	0.010 (0.89)
hold	0.050 ** (2.53)	−0.000 (−0.24)	0.050 ** (2.54)
board	−0.004 *** (−3.07)	0.000 (0.36)	−0.004 *** (−3.07)
dual	−0.021 *** (−2.68)	0.000 (0.01)	−0.021 *** (−2.68)
state	0.025 *** (2.65)	0.000 (0.06)	0.025 *** (2.65)

Table 6. *Cont.*

Variable	(1) lnTFP	(2) INEFF	(3) lnTFP
_cons	0.209 ** (2.29)	−0.010 * (−1.80)	0.210 ** (2.31)
Individual Effect	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes
N	25665	25665	25665
A-R^2	0.748	0.045	0.748

6.2. Complementary Tests: Mechanism Tests for Innovation Inputs and Innovation Outputs

Table 7 reports the mechanism of the influence of innovation input (*RD*) and innovation output (*lnpat*) in the inhibitory effect of the level of corporate risk-taking (*Risk*) on the high-quality development of firms (*lnTFP*). The regression results in column (1) show that the regression coefficient of corporate risk-taking is 2.111 and is significant at the 5% level, indicating that the level of corporate risk-taking promotes firms' innovation inputs; column (2) adds the mediator variable innovation input on the basis of the baseline model, and the regression results show that the coefficients of the level of corporate risk-taking and the coefficients of innovation inputs are −0.567 and −0.034, respectively, and both are significant at the 1% level. This proves that the level of enterprise risk-taking inhibits the high-quality development of enterprises by promoting innovation input, and innovation input plays a mediating role in the relationship between the two. The reason for this is that the corporate risk-bearing level improves the independent decision-making ability of the enterprise's management, but the decision-making of the innovation project requires scientific and reasonable comprehensive evaluation, and the blind increase in innovation investment caused by the risk-bearing level creates a waste of the enterprise's resources and reduces the efficiency of the use of production factors, and is not conducive to the high-quality development of the enterprise. Hypothesis H2a is verified.

Table 7. Mechanisms of influence of innovation inputs and innovation outputs.

Variable	(1) RD	(2) lnTFP	(3) lnpat1	(4) lnTFP	(5) lnpat2	(6) lnTFP
Risk	2.111 ** (2.39)	−0.567 *** (−4.64)	−1.372 *** (−5.80)	−0.630 *** (−4.94)	−0.823 *** (−5.52)	−0.628 *** (−4.93)
RD		−0.034 *** (−32.02)				
lnpat1				0.007 *** (2.97)		
lnpat2						0.012 *** (3.63)
size	0.053 ** (2.38)	0.701 *** (187.42)	0.164 *** (14.82)	0.698 *** (183.88)	0.053 *** (7.89)	0.699 *** (184.60)
lev	−3.811 *** (−26.64)	0.411 *** (16.83)	−0.245 *** (−4.89)	0.541 *** (22.20)	−0.148 *** (−4.58)	0.542 *** (22.19)
cash	−2.681 *** (−7.95)	0.898 *** (15.09)	0.019 (0.15)	0.989 *** (16.25)	0.057 (0.70)	0.989 *** (16.24)
grow	−0.445 *** (−8.18)	0.178 *** (16.88)	−0.020 (−1.02)	0.193 *** (17.79)	0.012 (0.97)	0.193 *** (17.77)
tobinq	0.461 *** (16.78)	0.034 *** (10.83)	0.050 *** (6.27)	0.018 *** (5.92)	0.018 *** (3.48)	0.018 *** (5.95)
state	−1.022 *** (−13.88)	−0.025 ** (−2.17)	−0.196 *** (−6.39)	0.011 (0.91)	−0.138 *** (−6.98)	0.011 (0.95)

Table 7. *Cont.*

Variable	(1) RD	(2) lnTFP	(3) lnpat1	(4) lnTFP	(5) lnpat2	(6) lnTFP
hold	1.847 ***	0.112 ***	−0.042	0.050 **	−0.016	0.050 **
	(12.74)	(5.91)	(−0.81)	(2.55)	(−0.46)	(2.54)
board	0.003	−0.004 ***	−0.005	−0.004 ***	−0.001	−0.004 ***
	(0.38)	(−3.05)	(−1.37)	(−3.05)	(−0.27)	(−3.06)
dual	0.433 ***	−0.006	0.034*	−0.021 ***	0.014	−0.021 ***
	(7.76)	(−0.84)	(1.68)	(−2.71)	(1.05)	(−2.70)
state	−0.160 ***	0.020 **	0.098 ***	0.024 ***	0.014	0.025 ***
	(−3.06)	(2.11)	(4.35)	(2.58)	(0.96)	(2.63)
_cons	0.986 *	0.242 ***	−2.988 ***	0.228 **	−0.794 ***	0.218 **
	(1.81)	(2.69)	(−12.09)	(2.50)	(−5.22)	(2.40)
Individual Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes
N	25665	25665	25665	25665	25665	25665
A-R^2	0.426	0.759	0.063	0.748	0.041	0.748

The regression results in column (3) indicate that the level of corporate risk-taking weakens firms' innovation output, while the regression results in column (4) prove that the level of corporate risk-taking inhibits the high-quality development of firms through the weakening of innovation output, and that innovation output plays a mediating role in the influence of the relationship between the two. Columns (5) to (6) use lnpat2 as a measure of innovation output, and the conclusions reached are consistent with columns (3) to (4), which use lnpat1 as a measure of innovation output. The reason for this lies in the limited ability of enterprises to bear risks, and excessive risk-taking leads to enterprises being prone to impulsiveness and aggressiveness, and the problem of weak operation and management ability. However, innovation activities are inherently uncertain and need to be evaluated through a comprehensive balance of risks and opportunities, and the impulsive and aggressive behaviors of enterprises may lead to higher costs of innovation and a higher likelihood of errors or failures, resulting in a waste of all resources of the enterprise, lowering the level of outputs of innovation results, and negatively affecting the overall performance of the enterprise, which is not conducive to the high-quality development of the enterprise. Hypothesis H2b is verified.

6.3. Bootstrap Method Test

In order to further verify the robustness of the mediating effects of the above three mechanism variables between corporate risk-taking and high-quality development, we re-verify them through the nonparametric percentile Bootstrap method and the bias correction method, and the results of the tests are shown in Table 8. The results of Groups (1) to (3) in Table 8 represent the mediating effect test results of innovation efficiency (*INEFF*), innovation input (*RD*), and innovation output (*lnpat*), respectively. Under the Bootstrap method, we set the random sample size to 1000 and the confidence level to 95%. Overall, it can be seen that the upper and lower bounds of the confidence interval of the mediation effect generated by innovation efficiency, innovation input, and innovation output are less than 0 and do not contain 0, which indicates that the mediation effect of the three variables is significant and the obtained regression results are robust.

Table 8. Test results based on the Bootstrap method.

Intermediary Variable		Effect Type	Coefficient	Standard Error	Confidence Interval (P)	Confidence Interval (BC)
(1)	INEFF	indirect effect	−0.014 **	0.005	[−0.023, −0.005]	[−0.024, −0.006]
		Direct effect	−0.463 ***	0.139	[−0.730, −0.188]	[−0.726, −0.172]
		total effect	−0.477 ***	0.139	[−0.746, −0.203]	[−0.740, −0.187]
(2)	RD	indirect effect	−0.189 ***	0.035	[−0.261, −0.124]	[−0.261, −0.124]
		Direct effect	−0.477 ***	0.141	[−0.749, −0.195]	[−0.750, −0.195]
		total effect	−0.667 ***	0.150	[−0.949, −0.363]	[−0.945, −0.352]
(3)	lnpat	indirect effect	−0.029 *	0.014	[−0.621, −0.006]	[−0.656, −0.007]
		Direct effect	−0.723 **	0.273	[−1.280, −0.224]	[−1.276, −0.224]
		total effect	−0.752 **	0.273	[−1.300, −0.255]	[−1.303, −0.256]

Note: Confidence intervals (P) and confidence intervals (BC) are estimates from the nonparametric percentile and bias-corrected nonparametric percentile Bootstrap methods, respectively.

7. Heterogeneity Discussion

In order to further discuss the heterogeneity of the impact of the corporate risk-taking level on corporate high-quality development, the benchmark model is regressed in groups according to the corporate internal characteristics, such as industry attributes, scale size, and capital intensity size, respectively.

7.1. Heterogeneity of Industry Attributes

The sample enterprises are categorized into manufacturing and non-manufacturing industries. The results of the heterogeneity test in columns (1) to (2) of Table 9 show that in the manufacturing enterprise group, the level of corporate risk-taking has a significant inhibitory effect on high-quality development, while in the non-manufacturing enterprise group, the level of corporate risk-taking no longer has an inhibitory effect on high-quality development. This may be because the differences in the production characteristics and risk-bearing capacity between manufacturing and non-manufacturing enterprises prompted the heterogeneity in the efficiency of innovation resource allocation. Manufacturing enterprises can enjoy more than the transformation and upgrading of support policies, with sufficient collateralized security items. Most of the enterprises have the advantage of economies of scale, meaning that their financing ability and risk-bearing capacity are stronger, which is conducive to promoting enterprise technological innovation output. Therefore, compared with non-manufacturing enterprises, the risk-taking level of manufacturing enterprises has a more obvious impact on their high-quality development.

Table 9. Heterogeneity test.

	Manuf	**Non-Manuf**	**Small**	**Large**	**Low**	**High**
Variable	**(1)** **lnTFP**	**(2)** **lnTFP**	**(3)** **lnTFP**	**(4)** **lnTFP**	**(5)** **lnTFP**	**(6)** **lnTFP**
Risk	−1.036 *** (−7.43)	0.038 (0.15)	−0.854 *** (−5.37)	−0.313 (−1.52)	0.300 ** (2.11)	−0.641 *** (−5.24)
_cons	0.369 *** (3.85)	0.658 *** (3.65)	0.660 *** (2.86)	0.017 (0.12)	0.762 *** (8.40)	−0.084 (−0.88)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
N	17742	7923	11992	13673	13128	12537
A-R^2	0.760	0.730	0.439	0.653	0.831	0.827

Note: Manuf and Non-manuf represent manufacturing and non-manufacturing firms, respectively; Small and Large represent small-scale and large-scale firms, respectively; Low and High represent low-capital-intensity and high-capital-intensity firms, respectively.

7.2. Heterogeneity in Firm Size

Taking the annual industry median of enterprise size as the boundary, the sample enterprises are divided into two groups for regression. The results of the heterogeneity test in columns (3) to (4) of Table 9 show that in the small-scale enterprise group, the level of corporate risk-taking has a significant inhibitory effect on high-quality development, while in the large-scale enterprise group, the inhibitory effect of the level of corporate risk-taking on high-quality development is not obvious. This may be because small-scale enterprises have fewer vertical layers, full autonomy, more transparent risks, more flexible and rapid innovation activities, and higher motivation to innovate; moreover, small-scale enterprises have greater volatility in risk-taking, and are more sensitive to the impact on the quality of enterprise development, whereas large-scale enterprises tend to lack the motivation to innovate and the speed of innovation is slow. Therefore, the impact of the level of risk-taking on the quality of enterprise development is not obvious.

7.3. Capital Intensity Heterogeneity

Capital intensity is the amount of assets required to generate a unit of sales and can be expressed as the asset intensity ratio. Specifically defined, capital intensity (capint) = total assets/revenue. In this section, the sample firms are divided into two groups for the regression using the annual industry median for capital intensity as the boundary. The results of the heterogeneity test in columns (5) to (6) of Table 9 show that, in the group of firms with higher capital intensity, corporate risk-taking significantly inhibits high-quality development, while in the group of firms with lower capital intensity, corporate risk-taking exhibits a more significant facilitating effect on high-quality development.

This is mainly due to the fact that, compared with enterprises with lower capital intensity, enterprises with higher capital intensity have higher levels of risk-taking; these enterprises are more inclined to rely on their capital stock, human capital accumulation, and technological accumulation as heterogeneous resources to carry out innovative activities and venture capital activities; and the growth of enterprise profits relies on a large amount of capital investment and the renewal of advanced equipment. Therefore, the impact of an excessive corporate risk-taking level on the quality of its development is significant. On the other hand, less capital-intensive enterprises have a relatively low level of risk-taking and remain focused on the crude growth of factor inputs, contributing to a certain extent to an increase in total factor productivity, and thus to an improvement in their otherwise low quality of development.

8. Research Conclusions and Management Insights

8.1. Research Conclusions

Based on the innovation perspective, this paper takes A-share non-financial listed companies from 2007 to 2021 as the research sample to investigate the impact and mechanism of corporate risk-taking level on the high-quality development of enterprises. The empirical results show the following. (1) The level of corporate risk-taking significantly inhibits the high-quality development of enterprises. (2) Mechanism analysis shows that the level of corporate risk-taking significantly reduces the innovation efficiency of enterprises, which in turn inhibits the high-quality development of enterprises, and the innovation efficiency plays an intermediary role in the relationship between the two. Further investigation reveals that the level of enterprise risk-taking promotes enterprise innovation input, which in turn inhibits enterprise high-quality development; moreover, the level of corporate risk-taking also weakens enterprise innovation output, which in turn inhibits enterprise high-quality development—that is to say, innovation input and innovation output also play a mediating role in the relationship between the two. (3) Heterogeneity analysis shows that the level of corporate risk-taking inhibits the high-quality development of enterprises, which is influenced by internal characteristics such as industry attributes and enterprise size and capital intensity, and is more significant in manufacturing enterprises, small-sized enterprises, and high capital-intensity enterprises, while it is not significant in non-manufacturing enterprises and large-scale enterprises, and it has a facilitating role in low-capital-intensity enterprises.

8.2. Theoretical Contributions

The main theoretical contributions of this study are twofold:

The first is that the trade-offs and choices of enterprises in the face of both high levels of expected returns and large fluctuations in expected returns from investment projects have an important impact on total factor productivity, and this study proves that the negative impact of expected return fluctuations, a risk factor, on the quality of enterprise development exceeds the positive impact of high levels of expected returns on the quality of enterprise development. It further provides new evidence to clarify the role of the "double-edged sword" of corporate risk-taking.

Secondly, based on the innovation perspective, this study has constructed a comprehensive research model containing enterprise risk-taking, innovation input, innovation output, innovation efficiency, and high-quality development, which shows that due to the simultaneous existence of the two influencing mechanisms of "enterprise risk-taking, innovation input, and high-quality development" and "enterprise risk-taking, innovation output, and high-quality development", the difference between the performance of both of them is the fundamental reason for the role of innovation efficiency in the relationship between corporate risk-taking and high-quality development of the enterprise, and it will provide a new theoretical perspective for future research on the risk-taking behaviors of enterprises and the quality of the development of enterprises.

8.3. Management Implications

The above conclusions expand the academic research on the economic consequences of the level of corporate risk-taking, which is of great practical significance for enterprises to rationally make decisions on risky projects and for regulators to effectively promote the high-quality development of the real economy. We make the following policy recommendations from the perspective of the firms themselves and from the perspective of the regulators:

Firstly, enterprises should continuously monitor their management to avoid the short-sighted behavior of management. Risk-taking is an important investment decision reflecting the degree of compatibility between the interests of management and shareholders. Based on the perspective of catering theory, when enterprise shareholders or external irrational investors provide persistent erroneous overestimations of the profitability of the investment project, the enterprise management, in order to cater to the interests of the shareholders and investors, will increase the implementation of risky investment projects favored by the shareholders and investors and will make the wrong investment decisions. This kind of short-sighted investment decision-making behavior will overestimate the expected profitability of the enterprise, waste many different types of enterprise resources, and have a very negative impact on the efficiency of the use of resources, hindering the high-quality development of the enterprise. Therefore, enterprises should take into account the investors' willingness to invest, reasonably evaluate the expected return of the investment project and the volatility of the expected return, scientifically assess the risk associated with the project investment, and continuously supervise the investment behavior of management so that they can make scientific and reasonable investment decisions on risky projects and avoid short-sighted investment behavior.

Secondly, enterprises should reduce the degree of information asymmetry between enterprises and investors; when enterprises make investment choices for risky projects, they should incorporate all risk information into the consideration index system, scientifically assess the risks of investment projects, realize the effective allocation of resources, and promote the enhancement of total factor productivity, which in turn enhances the quality of enterprise development. Enterprises should continuously improve the level of corporate governance, control the level of corporate risk-taking, reduce the agency problem and moral hazards in the process of innovative investment, and thus reduce the negative impact of the above factors on the quality of enterprise development.

Thirdly, enterprises need to use innovation as an important driving force to promote high-quality economic development, to achieve high-efficiency innovation outputs with low-cost innovation inputs, and to improve the efficiency of innovation, and there is a need to effectively prevent the blindness of risky investments from hampering this initiative. Enterprises should build a performance appraisal mechanism centered on innovation performance, increase investment in innovation funds, improve the efficiency of asset allocation, promote the output of innovation results, and effectively prevent a "lack of efficiency" due to innovation or reduce the industry's innovation performance as a cost, hindering the high-quality development of enterprises.

Finally, regulatory bodies should optimize and improve the policy environment to promote enterprise innovation, maximize vitality-oriented enterprise innovation, improve the level of enterprise innovation output, and develop effective incentive policies. The innovation results become the "source" to support the high-quality development of enterprises by stimulating the enthusiasm and synergistic effects of inventors, investors, and transformers of innovations.

8.4. Research Limitations

The research in this paper is based on China's A-share listed companies, and this sample selection has certain limitations, as the adaptability of this research to non-listed companies requires further investigation and research. Financial listed companies belong to high-risk industries, and the scope of business is not the real economy, and thus for the applicability of the conclusions of this study to these companies to be achieved, further tests are also required.

Investment in China's real economy has certain special characteristics: the stock market is relatively immature, enterprises have limited sources of financing, risky investment is generally affected by financing constraints, and under the premise of limited enterprise resources, the factors considered in the selection of investment projects are mainly related to trade-offs between risk and return, which may be somewhat different from those in developed countries in Europe and the United States.

8.5. Future Challenges

The current state of China's economy and the limitations of the sample selection in this study indicate certain directions for our future research. In the future, we will examine small enterprises in other countries at different stages of development as samples, analyze the specific conditions of the degree of innovation input capacity, innovation output capacity, and innovation efficiency level of enterprises in different countries, further explore the impact of the level of enterprise risk-taking on total factor productivity and the mechanism of its role, and explore the differences in the conclusions of this study in terms of the different national attributes of the enterprises, the different levels of development, and the different levels of capital intensity.

We discussed the mechanism of the role of innovation factors in the relationship between enterprise risk-taking and the quality of enterprise development, but did not fully explore the impact of government regulations and external environmental factors on the research problem, which is of great theoretical and practical significance for further expanding the research, which will help enterprises to improve the efficiency of their resource utilization, scientifically choose an investment plan, and optimize their financial behavior, promoting the high-quality development of enterprises. The relationship between the national institutional environment and the level of corporate risk-taking in the transition period is also an important topic for us to explore in the future.

We only explored the influence mechanisms of the three innovation factors of innovation input, innovation output, and innovation efficiency regarding the research problem, ignoring the other stages of innovation; in the future, we will try to carry out relevant research on the formation of comprehensive evaluation indexes for the whole process of innovation.

To summarize, the above research ideas are important challenges for us to address in further expanding our research.

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