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*Review*

# A Systematic Literature Review of the Empirical Research on the Promoting Mechanism of High-Level Financial Opening to Innovative Development of Manufacturing Industry

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**Abstract:** To further enrich the research on the promotion mechanism of high-level financial openness on the innovation of the manufacturing industry, this article summarizes the domestic and foreign research on the impact mechanism of financial openness. Currently, the domestic and foreign studies are mostly based on the characteristics of different financial industries, including the role of opening-up on enterprise innovation and its influence on the bank industry; the effect of foreign direct equity participation on enterprise innovation and its influence on the securities industry; the impact of the host country on the innovation of insured companies and its influence on the insurance industry. Future research directions may include deepening research on the transmission mechanism of high-level financial openness on manufacturing innovation and expanding research methods for the impact mechanism of high-level financial openness on manufacturing innovation development.

**Keywords:** High-Level Financial Openness; Innovative Development of Manufacturing Industry; Promotion Mechanism; Empirical Analysis; Literature Review

## 1. Introduction

The manufacturing industry is an important foundation of the real economy, and a key link in the industrial chain to create value, absorb employment, and drive the development of other industries. In recent years, promoting the transformation and upgrading of the manufacturing industry, the High-quality Development has become the focus of China's economic development. In 2017, the People's Bank of China jointly issued *The Guiding Opinions on Financial Support for the Construction of a Strong Manufacturing Country*, aiming to focus on strengthening financial support for technological innovation, transformation, and upgrading of the manufacturing industry. In 2019, medium and long-term loans and credit loans for manufacturing industry began to be included in the assessment in macro-prudential assessment. In 2020, the National Development Bank set up a special loan of 250 billion RMB to support the development of China's manufacturing industry towards a more intelligent, green, globalized industrial chain and other high-end direction [1]. After the 14th Five Year Plan was proposed, all core technology industries have become main support

targets for banks. Many banks have stepped up their credit policies to favor these technology enterprises. The registration-based IPO system has enabled more growing enterprises to obtain opportunities to go public. Governments at all levels have issued bond issuance policies to meet the diversified financing needs of technological innovation enterprises. At the same time, they also guided funds to support key enterprises to develop emerging industries.

Since the Reform and Opening-up, China began to explore forward for financial opening-up, which can be roughly divided into three stages: the economic start-up period, the economic rise period, and the new period [2]. From 1978 to 2000, the financial liberalization during the economic start-up period. Before the Reform and Opening-up, China implemented a unified system in the financial industry, and in 1978, the Reform and Opening-up officially kicked off the opening-up of China's finance [3]. During this period, China's financial opening mainly involved two aspects: the opening of the financial industry and the reform of the foreign exchange system. In 2001-2016, the period of economic rise, the opening-up was also divided into two stages: in the early stage, we mainly relaxed the market entry restrictions for foreign financial institutions, to attract foreign capital to carry out business and accelerate the construction of China's financial market system; the later stage, mainly enabled the successive opening of two industries, banking and insurance. From 2017 to 2022, as China's position in the international financial market has gradually improved, the focus on finance in the new times can be concluded in four areas: opening-up the financial industry, marketizing the RMB exchange rate, internationalizing RMB, and opening the capital account. Although the capital account opening has further expanded in this period, the government still followed a gradual, prudent, and controllable path to prevent the outbreak of a systemic financial crisis.

The high level of financial openness for the manufacturing industry can improve the existing innovative capital investment, increase external financing channels, and alleviate financing constraints. Yu Bin [4] proposed that, due to the imperfect capital market system in China, the development of financial institutions serving small and medium-sized enterprises (SMEs), and the limited and narrow financing channels for enterprises faced many difficulties in transformation and upgrading. It caused the serious imbalance between the financial industry and the real economy. Financial liberalization is imminent. Based on empirical evidence of financial openness in other countries, scholars have analyzed the impact of liberalization on manufacturing in different financial industries. The financial services provided by the stock and bond markets have a greater role in promoting technological innovation in the manufacturing industry [5]. The improvement of the institutional level of the banking industry can increase the total amount of credit, providing more funds for enterprises to alleviate financing constraints, and promoting technological innovation activities of enterprises to a certain extent [6]. Some scholars have also turned their attention to possible problems in the process of high-level opening-up [7-9]. Financial openness also plays a positive role in promoting the reform of the supply-side structure of finance itself [10].

This paper will review domestic and foreign research on the impact of high-level financial openness on the development of the manufacturing industry innovation, and analyze the impact on the manufacturing industry from the perspective of high-level opening conditions in the banking, securities, and insurance industries. It is expected to further promote relevant empirical research. The remaining structure of this article is arranged as follows: Part 2 introduces the empirical study on the promotion mechanism of high-level opening-up in the banking industry on the innovative

development of the manufacturing industry; Part 3 introduces the research on the promotion mechanism of high-level openness of the securities industry to the innovative development of the manufacturing industry; Part 4 introduces the empirical research on the promotion mechanism of high-level openness of the insurance industry to the innovative development of the manufacturing industry; Part 5 is a brief review.

## 2. The Empirical Study on the Promoting Mechanism of High-Level Opening of Banking Industry on Innovative Development of Manufacturing Industry

At present, domestic and foreign related research mainly focuses on the role of opening-up of the banking industry to firms and its mechanism examination.

The direct effect of foreign bank entry, through increased competition among local banks, as well as the spillover effect it causes on enterprises, is concentrated on optimizing the allocation of credit funds and strengthening the role of debt governance. The former is manifested in easing the financing constraints of innovative enterprises [11]. While the latter is manifested in hardening the budget constraints of state-owned enterprises（SOEs）[12], encouraging them to engage more in technological innovation activities, and improve production efficiency [13, 14]. The empirical results of Bai Jun [15] show that the promotion effect of foreign bank entry on local enterprise innovation is realized through direct effects and spillover effects (increasing competition among local banks). The entry of foreign banks will enhance the efficiency of the host country's banking industry by intensifying market competition [16], and provide a better external financing environment for the innovation of host country enterprises [11]; Foreign banks' entry enhance the ability of host country banks to evaluate enterprise innovation projects through technology spillovers [17], which can provide better financial services for enterprise innovation activities [18]. The empirical analysis by Li Junqing and Xie Fang [19] shows that the entry of foreign banks can significantly increase the R&D investment of host country enterprises. Acharya and Xu [20], Blanco and Wehrheim [21], Zhu Zhujun, et al. [22] analyzed the innovation effect of foreign investment opening in the upstream banking sector on downstream firms from the financing constraint channel. Meanwhile, some scholars also take a trade perspective, along the classic competition and innovation research paradigm in industrial organization theory [23], analyzed the competitive effect, self-selection effect and market scale effect of foreign investment opening in upstream banking sector on firm innovation [24, 25]. In addition, the empirical results of Zhu Zhujun et al. [26] show that the opening-up of foreign capital in the banking industry has a significant positive impact on enterprise innovation, a significant positive impact on invention patents and utility model patents, and no significant impact on design patents. The opening-up of foreign capital in the banking industry has significantly improved indicators such as the number of patents cited, patent versatility, and originality. mechanistically, foreign investment opening in the banking sector has a significant positive effect on enterprise innovation through a positive cost-saving effect. The total effect has an inverted U-shaped relationship with the degree of foreign bank entry and remains in the positive effect range during the sample period. The mechanism test conducted by Sheng Bin and Wang Hao [27] shows that innovation promotion channels are an important mechanism for foreign banks to enter and affect the quality of enterprises' export products. The mechanism test conducted by Yu Xulan and Ma Hanjiang [28] found that foreign banks facilitate the absorption and transformation of international knowledge of Chinese enterprises in the process of foreign trade and FDI introduction by providing convenience for cross-border information

communication, optimizing the credit term structure of enterprises, and improving the service level of the local banking industry, which contributes to the improvement of their independent innovation capabilities.

## 3. The Empirical Study on the Promoting Mechanism of High-Level Opening of Securities Industry on Innovative Development of Manufacturing Industry

At present, domestic and foreign research mainly focuses on the role of capital market opening, foreign direct equity participation in enterprise innovation, and its mechanism testing.

### *3.1. Capital Market Opening*

Opening capital market can diversify investment risks, improve investment efficiency, and promote the expansion of corporate R&D investment; it can also enhance the level of corporate R&D investment by improving corporate governance and the effectiveness of external supervision [29]. Capital market opening can remove the flow barriers in domestic and foreign markets, improve capital allocation and corporate financing constraints, and beneficially promote corporate innovation [30].

**From the perspective of capital inflows,** Xie Fang and Guo Na [31] have demonstrated that equity capital inflows significantly increase the R&D investment of host country enterprises, while debt capital inflows have a negative impact. The empirical evidence of Moshirian et al. [32] suggests that relaxing financial restrictions, strengthening risk sharing between domestic and foreign investors, and improving corporate governance are channels to allow stock market liberalization to promote technological innovation. Xie Fang [33] empirically found that the liberalization of the stock market promotes enterprise innovation by easing financing constraints, enhancing risk sharing, and improving corporate governance.

**From the qualified foreign institutional investors (QFII) perspective**, Luong et al. [34] found that overseas institutional investors have a positive impact on enterprise innovation. Bena et al. [35] empirically found that foreign institutional investors have significantly improved the company's innovation output by guiding company value investment through discipline and supervision measures. Research by Jiang Wenjun [36] shows that QFII shareholding has a strong technology spillover effect, and institutional investors from countries with high innovation levels are more able to help enterprises enhance their innovation capabilities. The empirical results of Jiang Shuiquan et al. [37] show that the shareholding ratio of QFII is positively correlated with enterprise innovation investment, and the marginal effect of QFII shareholding on enterprise innovation investment is better. Liu Ye and Meng Hantong [38] found that both QFII shareholding and enhanced shareholding checks and balances can promote enterprise innovation investment; Increased environmental uncertainty will inhibit the promotion of QFII to enterprise innovation investment; QFII increases enterprise innovation investment by easing enterprise financing constraints.

**From the perspective of the Shanghai Shenzhen Hong Kong Stock Connect**, Ma Yanyan et al. [39] found that the land port connection is conducive to the promotion of enterprise research and development scale; The stimulation of the Stock Connect to R&D is mainly achieved by reducing credit dependence [40], improving the role of external supervision [41], and increasing the level of TFP. It can improve the level of R&D by solving the productivity paradox. Feng Ruoyang and Wen Jun [42] found that the Stock Connect system has improved the level of technological innovation of

SOEs; It can alleviate the financing constraints faced by SOEs, promote SOEs to increase their R&D investment and improve the level of technological innovation. It can provide more opportunities for long-term institutional investors to enter by improving the stock liquidity of SOEs, and improve the technological innovation level of SOEs. Qi Di [43] found that after the implementation of the Stock Connect, the target company significantly increased its R&D investment and patent output [44], improving enterprise innovation performance. Zhu Lin and Yi Zhihong [45] found that after the implementation of the Stock Connect trading system, the innovation level of the target enterprise significantly increased; Managers' professional anxiety [46, 47] plays a mediating and moderating role. The information environment of listed companies has regulatory effects. Huang Jianqiao et al. [48] found that the Stock Connect significantly improved the level of enterprise innovation output, and this effect is more significant in enterprises with a high degree of separation of ownership, low shareholding ratio of institutional investors, poor information environment, and high financing needs. Jia Lihuan and Xiao Xiang [49] found that the Stock Connect can promote high-quality development of enterprises by reducing agency costs and increasing innovation investment. Research by Sun Zeyu and Qi Baolei [50] shows that the Stock Connect system improves innovation performance by enhancing management's willingness to innovate and improving enterprise innovation capabilities. The empirical study by Liu Yang and Zang Rihong [51] shows that the implementation of the SH-HK Stock Connect trading system has a significant promoting effect on enterprise innovation, which is manifested in increasing the willingness of enterprises to innovate and improving the level of innovation input and output. Wu Yuxuan and Dong Li [52] demonstrated empirically that the Stock Connect policy can promote enterprise technological innovation by optimizing the level of corporate governance of the target enterprise and reducing the I and II types of agency costs in corporate governance [53, 54]. Based on the above research, Li Chengming et al. [55] found in their mechanism analysis that the Stock Connect can help industrial policies attract more enterprise R&D investment, and help improve the utilization efficiency of the investment. Lv Xiaojun et al. [56] found that the Stock Connect significantly promoted the quality of enterprise innovation, manifested by the gradual shift in the patent structure toward high-quality invention patents, as well as the increase in patent citation rates.

### *3.2. Direct Foreign Equity Participation*

Yang Dewei [57] empirically shows that foreign shareholding is significantly and negatively correlated with enterprise technological innovation. Based on the research conducted by Guadalupe et al. [58], Boubakri et al. [59], and others, Li Wengui and Yu Minggui [60] argue that foreign shareholding can bring benefits such as improving corporate governance and technology spillovers for enterprises to carry out innovation activities, but the empirical test results are not significant. Based on the research conducted by Choi et al. [61] and Luong et al. [34], Zhong Xi et al. [62] empirically demonstrated that foreign shareholding will promote firms' innovation performance. Internationalization strategy plays a partially mediating role. The gap in business expectation enhances the promoting effect of foreign ownership on enterprise innovation performance, while redundant resources weaken this promoting effect. Di Lingyu et al. [63] found that foreign shareholders' equity participation significantly improves the level of R&D investment in SOEs. When the source of foreign capital is relatively developed, and foreign shareholders take strategic cooperation as the main motivation for equity participation, their equity participation has a more

significant effect on improving the level of R&D investment in SOEs.

## 4. The Empirical Study on the Promoting Mechanism of High-Level Opening of Insurance Industry on Innovative Development of Manufacturing Industry

At present, domestic and foreign research mainly focuses on the role of the host country's insurance industry in enterprise innovation and its mechanism testing.

**In terms of technology insurance**, Sun Hongtao [64] argues that the support of the U.S. intellectual property insurance for technology innovation is demonstrated by the wide range of subjects protected by intellectual property insurance [65], spreading liability and promoting the progress of patented technologies, and protecting small companies from the oppressive litigation of large companies [66]. Xu Xiaohui [67] elaborated on the approach of how technology insurance reduces technology risks from aspects such as technology personal insurance, technology property insurance, and the synchronization of insurance and management. Wang Xianglan [68] clarified that technology insurance can effectively resolve and transfer the technological risks faced by enterprises in their independent innovation activities. Ma Yanxin [69] demonstrated that growing input on insurance has a significant promoting effect on the improvement of technological innovation capabilities of industrial enterprises. Ge Yu and Wang Yuxin [70] believe that technology insurance can spread the risks of scientific and technological innovation, compensate for the losses, accumulate funds, and supervise the risks of scientific and technological innovation. Wang Lei and Gu Mengdi [71] provided a systematic theoretical framework for research on technology insurance. Tiller and Bedigian [72], Weixian Xue et al. [73] have empirically studied the impact of technology insurance on innovation and profitability of technology companies. Shen Fei et al. [74] empirically demonstrated that patent enforcement insurance enhances enterprise technological innovation by reducing technology spillover losses [75] and external financing constraints [76]. Research by Qiu Yangdong [77] shows that the incentive effect of the patent insurance pilot policy on enterprise innovation is reflected in encouraging enterprises to increase R&D investment.

**In terms of director and executive liability insurance**, Jensen [78] believes that director liability insurance will have a significant impact on directors' behavior and decision-making, thereby affecting enterprise resource allocation and enterprise innovation. D&O Insurance improves corporate governance through both External Oversight [79] and Signaling [80, 81]. Ling Shixian and Bai Ruifeng [82] empirically tested the impact of directors' liability insurance on enterprise innovation and the path of its governance function. Hu Guoliu et al. [83] empirically demonstrated that purchasing D&O insurance can help strengthen the promotion of small and medium-sized investor protection on technological innovation of enterprises. Fang Junxiong and Qin Xuan [84] found a significant positive correlation between D&O insurance and company innovation. Li Conggang and Xu Rong [85] empirically found that the introduction of D&O insurance significantly improved the innovation output and efficiency of enterprises, consistent with the incentive effect hypothesis [86]. Hu Guoliu et al. [87] empirically examined the impact of D&O insurance on enterprise independent innovation from the perspective of manager risk tolerance [88]. Xia Tongshui and Zang Xiaoling [89] empirically investigated the impact of D&O insurance on firms' technological innovation and the moderating role of equity structure in it. Zhai Shuping et al. [90] explored the impact and mechanism of D&O insurance on enterprise innovation efficiency based on the incentive and supervision hypothesis [91] and the moral hazard hypothesis. Ling Shixian and Liu Ao [92] empirically examined the impact of

D&O insurance on enterprise innovation, and examined the interaction between management compensation incentives and directors' liability insurance. Research by Wang et al. [93], Zhang Zenglian and Xu Fangyuan [94] shows that D&O insurance promotes high-quality development of enterprises by reducing agency costs and improving innovation capabilities. Fei Shen et al. [95] demonstrated that D&O insurance affects enterprise innovation through management risk appetite, management level, and incentive mechanisms. Zhao Guoyu and Liang Huiping [96] explored the role and path of director liability insurance in enterprise innovation from the perspective of External Investors. The empirical study by Zhou Donghua et al. [97] shows that the purchase of directors' liability insurance can significantly improve the level of enterprise risk taking [98] and enhance the innovation ability of enterprises. In addition, Xiao Xiaohong and Pan Ye [99] examined the impact of D&O insurance on green innovation. Gao Kai et al. [100] studied the relationship between D&O insurance and enterprise green innovation from the perspective of executive decision making and behavior.

**In terms of environmental pollution liability insurance,** Ning Jinhui et al. [101] demonstrated empirically that applying for environmental liability insurance [102] can promote the improvement of enterprise innovation capabilities, and it plays a positive role in enterprise innovation governance. Environmental liability insurance improves the innovation ability of enterprises by easing financing constraints. Environmental liability insurance has a more significant effect on promoting the innovation level of non-SOEs.

**In terms of insurance fund holdings,** research by Luong et al. [34] and Liu Dongjiao et al. [103], insurance fund shareholding promotes the efficiency of enterprise innovation by improving the quality of internal control.

## 5. Brief Review

(1) **In terms of empirical research on the promotion mechanism of high-level opening-up of the banking industry to the innovative development of the manufacturing industry**, currently, relevant domestic and foreign research mainly focuses on the role of opening-up of the banking industry to foreign countries in enterprise innovation and its mechanism testing, among which, there are many mechanisms testing such as financing constraint effect, cost saving effect, trade promotion effect, and industry competition effect. However, it is rare to examine mechanisms such as the correlation effect of foreign banks and the network expansion effect of foreign banks. At the same time, existing studies have focused on simple mediating effect tests, while simple regulatory effect tests and threshold effect tests are relatively rare; The tests of complex mediating effects, complex regulatory effects, and complex threshold effects are relatively rare. In addition, the perspectives of heterogeneity testing are not rich enough. To sum up, empirical research on the promotion mechanism of high-level opening-up of the banking industry on the innovative development of the manufacturing industry at home and abroad needs to be further expanded.

(2) **In terms of empirical research on the driving mechanism of high-level openness in the securities industry for the innovative development of the manufacturing industry,** at present, relevant studies at home and abroad mainly focus on the role of capital market opening and foreign direct equity participation on enterprise innovation along with its mechanism tests. Among which, there are more tests on the mechanisms of financing constraint effect, technology spillover effect, improving corporate governance effect, while the tests on the mechanisms such as stock liquidity

effect, debt structure optimization effect, innovation willingness effect, internationalization strategy effect are less frequently examined. Besides, simple intermediation effect tests are the focus of existing studies, while simple regulation effect tests and threshold effect tests are rare. Complex intermediation effect, complex regulation effect and complex threshold effect tests are rare. In addition, the perspective of heterogeneity tests is not rich enough. In summary, the empirical research on the mechanism of promoting the development of manufacturing innovation by high level of opening-up of securities industry at home and abroad needs to be further expanded.

(3) **In terms of empirical research on the promotion mechanism of high-level opening-up of the insurance industry to the innovative development of the manufacturing industry,** at present, the relevant domestic and foreign research mainly focuses on the role of the insurance industry in the host country in enterprise innovation and its mechanism testing. Among them, there are more studies on the effects of technology insurance and director and executive liability insurance, while relatively few studies are on the effects of environmental pollution liability insurance and insurance fund shareholding. At present, there are studies at home and abroad that have rarely examined the mechanism of the impact of foreign insurance on enterprise innovation, especially these mechanisms such as the technology insurance personal insurance effect, the technology insurance property insurance effect, the technology insurance cooperative development effect, the director and executive liability insurance effect, the environmental pollution liability insurance effect, and the linkage effect of foreign insurance companies. At the same time, existing studies have focused on simple mediating effect tests, while simple regulatory effect tests and threshold effect tests are relatively rare; The tests of complex mediating effects, complex regulatory effects, and complex threshold effects are relatively rare; In addition, the perspectives of heterogeneity testing are not rich enough. To sum up, empirical research on the driving mechanism of high-level opening-up of the insurance industry on the innovative development of the manufacturing industry at home and abroad has just begun.

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