



## Does the foreign negative list system aggravate domestic banking industry risks?

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### ABSTRACT

In the context of the continuous deepening reform of the foreign investment negative list system and the increasing pressure on financial risk prevention and resolution, it is of great significance to study the impact of the foreign investment negative list system on banking risks. This study is conducted on the basis of systematically sorting out the mechanism of the foreign negative list system affecting the risks of domestic banks. Based on the panel data of 27 provinces (cities, districts) in China from 2006 to 2016, and comprehensively adopting the synthetic control method, the difference-in-difference (DID) model, mediating effect model, and other methods, this article systematically examines the impact of the foreign negative list system on Shanghai banking risks. The study found that the implementation of the foreign investment negative list system has significantly reduced the credit risk of the Shanghai banking industry, and this reduction effect has gradually strengthened over time. Additionally, the implementation of the foreign investment negative list system will also significantly reduce the liquidity risk of the Shanghai banking industry; However, the effect of this positive influence is short-lived and subsequently weakens. The analysis of the mechanism of action indicates that the foreign investment negative list system primarily reduces the risk of Shanghai's banking industry by stimulating the inflow of foreign capital and reducing government intervention. However, the effect of improving the level of the rule of law to mitigate commercial bank risk is not apparent. Regarding other influencing factors, the growth of local government financial resources and the increase in new loans have significantly reduced banking risks, while the rise in residents' leverage has substantially increased the level of banking risks.

### KEYWORDS

Negative List of Foreign Investment; Banking Risks; Synthetic Control Method

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## 1. Introduction

In recent years, as China's economic development enters a new phase, with the continuous deepening of supply-side reforms and the ongoing domestic economic transformation, domestic commercial banks are facing significantly increased risk pressures. In April 2018, Hengfeng Bank was taken over by the China Banking and Insurance Regulatory Commission, with non-performing loans reaching up to 150 billion yuan by the end of 2018; in May 2019, Jincheng Bank announced that its net loss for 2018 could be as high as 5 billion yuan; in November 2020, the China Banking and Insurance Regulatory Commission agreed to initiate bankruptcy proceedings for Baoshang Bank. The Central Economic Work Conference in 2021 explicitly demanded "to properly handle the relationship between economic recovery and risk prevention, and to supplement bank capital through multiple channels." In 2022, the scale of non-performing loans still increased. The 20th CPC National Congress put forward the requirements for deepening the reform of the financial system, including building a modern central bank system, strengthening and improving modern financial supervision, and strengthening the financial stability guarantee system. In 2023, the country further emphasized "comprehensively strengthening financial supervision and incorporating all financial activities into supervision in accordance with the law" to ensure the stability and healthy development of the financial market. Currently, risk control in the banking industry has become an important part of the "three tough battles" to prevent and resolve major risks. On the other hand, with the improvement of China's open economic system level, the management of the negative list system for foreign access in certain fields continues to be refined. In September 2013, the Shanghai Free Trade Pilot Zone was the first to pilot the reform of the negative list system for foreign investment access; in 2017, the nationwide reform of the negative list system for foreign investment was also initiated. Specifically, for the financial industry, after the "Special Administrative Measures for Foreign Investment Access (Negative List) 2020 Edition" was announced, China has fully lifted the restrictions on foreign shareholding in banks, securities, futures, and fund management sectors, significantly reducing restrictions on shareholder qualifications such as asset size and operating years, effectively clearing the negative list for foreign access in the financial industry. The Fifth Plenary Session of the 19th CPC Central Committee proposed "to build a higher-level open economic new system, comprehensively improve the level of opening up, and promote the liberalization and facilitation of trade and investment." For a long time, scholars at home and abroad have been divided over whether the entry of foreign capital into the financial industry increases the risk to the host country's banking sector (Ma et al., 2020). With the significant advancement and implementation of China's foreign investment negative list system pilot and the significant improvement in the level of financial industry opening up occurring simultaneously with increased pressure on commercial banking risk, it raises the question: Does the promotion and implementation of the negative list system for foreign investment exacerbate the risk in the domestic banking industry? However, there has been no domestic literature that answers this question or conducts systematic research. Therefore, against the background of the deepening reform of the foreign investment negative list system and significant pressure on financial risk prevention and resolution, this paper's investigation into the impact of the negative list system on banking industry risk is of great significance.

## 2. Literature Review

Research on the impact of the foreign investment negative list system has primarily focused on several aspects. Firstly, its impact on international trade and investment. Given that the negative list system itself is a reform aimed at facilitating international trade and investment, many scholars have analyzed its effects. For instance, Bhattacharya (2007), based on an analysis of the terms of the negative list in trade and economic agreements between Southeast Asian countries and Japan, argues that the implementation of the negative list system is beneficial for the development of regional multilateral trade and investment; Magiera (2011) found that, except for some sensitive industries, the negative list system has facilitated the level of foreign capital utilization in Indonesia;

Lu et al. (2018), using data from 65 detailed industries in the United States from 2000 to 2015, discovered that the negative list model significantly promotes foreign capital inflow to the U.S. Meanwhile, Lu et al. (2023) argued that the promotional effect of the negative list model of Free Trade Agreement (FTA) on multinational corporations' behavior of increasing capital and controlling shares had presented an "inverted U-shaped" relationship with the intensity of industry investment barriers. Xia (2023) believed that, by comparing the "positive list" and "negative list" approaches to investment access, the negative list helped eliminate hidden barriers in the international market and enhanced certainty and predictability of investments. Second, studies on the impact on the foreign investment management system. As the negative list system represents a significant reform of the foreign investment management regime, some scholars have explored its impact on China's traditional foreign investment management system. Han (2014), based on the context of China-US BIT negotiations, believes that the negative list system will pose significant challenges to foreign investment regulation and risk control abilities ; Pang et al. (2014) systematically analyzed the gap between China's foreign investment management system and the negative list management system, suggesting that domestic reforms on foreign investment management should be advanced promptly ; Tian (2018), based on the framework of the foreign investment negative list management model, conducted a systematic analysis of the inadequacies of China's existing foreign investment security review system, recommending an upgrade to the system. Zhao (2020) argued that with the gradual reduction of the negative list for foreign investment, the restricted areas for foreign investment access had been significantly narrowed, but during the implementation process, they might still encounter restrictions imposed by local governments and industries. Third, research on the impact on the service sector. Given that the negative list system focuses on opening up the service industry to foreign investment, numerous scholars have examined its impact. For example, Pei et al. (2014), using data from 17 service industries across 24 countries from 1995 to 2011, found that the negative list system increased foreign participation in intermediate service exports, further fragmenting the global service industry's value chain ; Yang and Xie (2016) observed that although the negative list model has overall enhanced the openness of Shanghai's service industry, further improvements are needed in key areas such as education, healthcare, and aviation services ; Su et al. (2017), based on panel data from 41 countries and the Difference-in-Differences (DID) model, investigated the impact of the negative list system on the international competitiveness of the service industry, finding that the system reduced the competitiveness of the service industry in implementing countries ; Tan et al. (2019), using the Synthetic Control Method, found that the negative list system in the Shanghai Free Trade Zone significantly increased capital inflows to Shanghai's service industry. Xie (2022) conducted a study on the openness of the service industry in free trade zones using frequency analysis and found that the negative list entries for foreign investment access in free trade zones had been continuously reduced, indicating a deepening of the opening-up of the service industry. Li and Zhang (2023) believed that aligning with international high-standard economic and trade rules represented by the negative list was conducive to expanding the scale of China's cross-border service trade imports and exports, improving the quality of foreign trade and attracting foreign investments, and discovering new growth opportunities. Fourth, other scholars have analyzed additional effects of the negative list for foreign investment. For instance, Chen and Luo (2014), based on a dynamic game model's theoretical analysis, argue that the negative list system has a significant policy dividend effect on expanding domestic demand, stabilizing prices, and promoting domestic industry development ; Liu and Liu (2017), using panel data from 15 manufacturing industries, found that the negative list policy significantly facilitated the reduction of pollutant emissions in moderately polluting industries ; Ling et al. (2017), using data from 31 provinces in China and the DID model, discovered that the negative list system primarily promoted industrial structure adjustment in regions through increased investment in the tertiary industry. Yuan et al. (2023) utilized the progressive double difference-in-differences model to study and found that the liberalization of foreign investment caused by the negative list model had significantly improved the employment skill structure of enterprises. Song and Li (2024) conducted a

study based on the double difference-in-differences model and discovered that the implementation of the "negative list" system had a significant promotional effect on enhancing the innovation capabilities of China's manufacturing enterprises, and it had promoted the improvement of manufacturing enterprises' innovation capabilities through three channels: the spillover effect, competitive effect, and linkage effect of FDI. Overall, research on the effects of the negative list system has mainly been comparative analyses of policy clauses, with empirical studies based on actual data being relatively scarce. Moreover, empirical studies often rely on data from foreign countries, with fewer based on domestic (Chinese) experience. Most empirical research employs the Difference-in-Differences analysis method, which may introduce certain biases in measuring policy effects. Although current research has examined the various impact effects of the foreign investment negative list system, studies on its impact on regional banking industry risk are rarely seen, and quantitative analysis is even less common.

Regarding the impact of foreign entry on banking industry risk, there are broadly three perspectives. First, some scholars believe that the entry of foreign capital into the banking sector benefits the competition efficiency, profitability, and management level of the host country's banking industry, thus reducing the risk of the banking industry in the open country. For example, Bao et al. (2010), using data from 15 Chinese banks, found that foreign entry effectively increased the banks' profitability and enhanced their risk resistance ; Nicholas (2015), in his study on the banking industry in emerging countries, also found that foreign entry effectively improved competition efficiency, acting as a catalyst for financial market stability ; Zhang et al. (2018), using data from 61 Chinese commercial banks, discovered that introducing foreign shareholders could improve governance structure through equity checks and balances, beneficial for reducing banking risk ; Faia et al. (2019), in their study on European commercial banks, found that foreign banks, through competitive effects, brought about profitability improvements, thereby reducing the risk levels of most banks. Song and Qiao (2020) selected four large state-owned commercial banks and eight joint-stock banks in China for their study. They argued that after China entered the stage of comprehensive banking liberalization in 2006, the impact of foreign bank entry under the effect of competition gradually weakened, while the positive influence gradually strengthened. Li et al. (2020) used unbalanced panel data from 160 Chinese banks to analyze the relationship between foreign shareholding and bank risk-taking. They believed that under the combined effect of knowledge spillover and external supervision, foreign shareholding would reduce the risk-taking of Chinese banks. Second, some scholars believe that the entry of foreign banks can exacerbate the risk in the host country's banking industry through channels such as accelerating financial risk transmission, diminishing policy effectiveness, and circumventing financial regulation. For instance, Qiu et al. (2011), based on a study of 22 Central and Eastern European transition countries, found that the risk transmission effect of foreign banks intensified systemic financial risk in Central and Eastern European banking sectors ; Wu et al. (2011), in their study on emerging countries, discovered that foreign bank entry increases the difficulty of controlling macroeconomic policy in the host country, intensifying banking risk ; Hu et al. (2019), based on international experience and domestic reality analysis, argued that China should further build an effective review mechanism for bank foreign entry to reduce the impact of foreign banks on the domestic financial system. Peng and Yang (2023) found through a study of financial data from 129 banks in China that foreign banks have penetrated emerging markets with their advantages to gain a larger market share, posing a challenge to local banking industries and intensifying competition in the host country's financial market. Third, some scholars believe that the impact of foreign entry on domestic banking industry risk is uncertain. For example, Havrylchyk et al. (2011), in their empirical study on banks in Central and Eastern European countries, found that foreign entry did not effectively improve the profit rates and risk levels of banks in those countries ; Claessens (2017) suggested that the impact of foreign banks on host country risk depends more on the country's conditions, with foreign entry improving financial risk in countries with sound financial systems ; Wang et al. (2016), using panel data from 61 countries, found that foreign bank entry and a country's financial risk have a U-shaped relationship ; Ma et al. (2020), using micro-data

from 392 Chinese commercial banks, observed that foreign entry had no significant impact on the risk of large commercial banks, but excessively high foreign shareholding could increase the risk level of small and medium-sized commercial banks. Based on cross-national data from 62 countries and regions, Guan and Luo (2021) found that the impact of foreign bank entry on banking market competition differs due to variations in a country's economic development level. For middle- and low-income countries, an increase in the number and asset ratio of foreign banks would significantly reduce banking market competition. However, for high-income countries, it would significantly enhance banking market competition. Overall, existing research does not provide a consensus on the impact of foreign entry on the risk in the banking industry of the host country, with conclusions varying due to differences in research subjects and risk indicators. As for the impact of the foreign investment negative list system on a country's banking industry risk, there is no objective empirical research.

Based on panel data from 27 provincial regions in China from 2006 to 2016, with the implementation of the negative list system in the Shanghai Free Trade Zone serving as a policy shock, this paper uses a combination of methods, including the Synthetic Control Method and the Difference-in-Differences model estimation, to systematically examine the impact of the negative list system on banking risk in Shanghai. Compared to previous research, this paper advances in two main areas. First, from a theoretical perspective, it focuses on studying the impact of the foreign investment negative list system on banking industry risk and systematically reviews the mechanisms through which the implementation of the negative list system reduces regional banking risk. This provides a foundational analysis framework for subsequent research, addressing a gap in the field. Second, in terms of empirical estimation of policy effects, by comprehensively using the Synthetic Control Method, Difference-in-Differences model estimation, and systematic robustness tests, it examines the policy effects and mechanisms of the negative list, overcoming sample selection bias and policy endogeneity issues prevalent in previous research based on the DID method, making the results more scientifically reliable.

### **3. The Impact Mechanism of the Foreign Investment Negative List System on Banking Industry Risk**

Based on existing literature and the reality of China's foreign investment system reforms over the years, this paper posits that the foreign investment negative list system will reduce the level of risk in China's banking industry through the following channels.

#### ***3.1. The Positive Role of Increased Foreign Investment Inflow into the Financial Sector***

First, the positive role of financial innovation in risk control. Compared to multinational banks and banks with transnational capital flows, domestic commercial banks often lag in product and service variety, profit models, and operating modes. The entry of foreign financial institutions will promote the refinement and standardization of traditional financial services in domestic banks; simultaneously, financial innovations brought by foreign financial institutions will help domestic commercial banks expand their intermediary services and mixed operations, reducing their dependence on traditional deposit and loan businesses (Wang and Zhang, 2018). Second, optimization of risk control technology and governance structure. With the deepening participation in management and increase in the shareholding ratio under the negative list system, modern risk identification, credit evaluation, and systemic risk control technologies from abroad will be more organically integrated into domestic banks (Chang and Sheng, 2014) ; simultaneously, the introduction of modern financial risk control culture and corporate management system frameworks from abroad will optimize the risk management control mechanisms and business processes of domestic banks, effectively enhancing their risk control capabilities. Third, the positive spillover effects of foreign banks. Firstly, as the level of openness in the banking sector increases, the competitive environment faced by domestic banks will significantly change. The advantages of foreign banks in products and services will exert

competitive pressure on domestic banks, prompting them to effectively engage in imitation innovation and business optimization (Nicholas, 2015). Secondly, due to differences in information sources, focal points, and timeliness between foreign and domestic banks, an increase in foreign banks will help domestic banks obtain more comprehensive and precise market information, aiding in their risk assessment and control operations (Wang and Zhang, 2018). Lastly, an increase in foreign banks will lead to more frequent personnel exchanges between foreign and domestic banks. The active movement of personnel is an effective mechanism for the diffusion of information sharing, management philosophies, and risk control experiences between banks (Wang and Zhang, 2018), contributing to the reduction of systemic risk in the banking sector.

### *3.2. The Positive Impact of Increased Foreign Investment Inflow into Non-Financial Sectors*

A comparison of the Shanghai Free Trade Zone's negative list from 2013 to the national version in 2020 reveals that besides the significant reduction in the financial sector's negative list, major reductions were seen in modern manufacturing (from 63 items to 3) and modern service industries (with most industries outside education, culture, and sports seeing reductions of over 70%). Modern manufacturing, being a crucial direction for China's industrial transformation and upgrade and a longstanding advantage in foreign capital utilization, will benefit from the influx of high-end foreign production factors, helping to climb up the value chain and enhance industrial competitiveness for economic high-quality development, contributing to a decrease in banks' non-performing loan rates and systemic risk control. In the service sector, significantly opening up productive service industries like transportation, leasing, and business services, and information technology services aligns with the development direction of modern service industry upgrading, facilitating the transformation and innovative development of China's manufacturing industry, stabilizing the real economy, and reducing commercial bank risks.

### *3.3. The Positive Impact of Reducing Government Intervention and Improving the Efficiency of Market Resource Allocation*

Implementing the negative list system represents a significant reform in the foreign investment access system, transforming the previous review system for foreign investment entry into a record-filing management system for investments outside the negative list, granting foreign enterprises national treatment before access. This will significantly reduce government administrative interventions in foreign enterprises; on the other hand, the implementation of the negative list system is also a transformation and innovation of the government's economic and social management functions, requiring the government to respect the market and the leading role of enterprises more (Pei et al., 2014). Reducing inappropriate government interventions in the economic field will significantly alleviate problems such as inefficient state-owned enterprises' bad debts, risks in local financing platforms, and other administratively intervened inefficient loans. This will also facilitate market or lower-cost methods to clear "zombie companies," reorganize bad assets, thus reducing commercial banks' non-performing loans and regional financial risks (Zhu and Li, 2019).

### *3.4. The Positive Impact of Enhancing Policy Transparency and Promoting the Improvement of the Rule of Law*

For a long time, China's foreign investment approval work involved departments such as the National Development and Reform Commission, the Ministry of Commerce, the People's Bank of China, local government departments, and many legal and policy clauses. After implementing the foreign investment negative list system, the extensive opening outside the list will involve the integration and optimization of functions of relevant departments and many legal clauses, enhancing the transparency and standardization of policy clauses, promoting

the legal system level of government departments, and optimizing the regional business environment, ultimately profoundly changing China's market management model and even the national governance model (Liu, 2018). On one hand, research by Qiu and Yin (2011) shows that with the continuous improvement of related legal systems in Eastern European countries, the positive impact of foreign banking on the performance of the banking industry in Eastern European countries becomes increasingly significant; this implies that with the continuous improvement of the rule of law in China, the stabilizing effect of foreign banks on the domestic banking industry might become more evident. On the other hand, with the improvement of the rule of law in the region, local governments will have a stronger regulatory consciousness and legal behavior when participating in local financial risk disposal, significantly enhancing the ability and efficiency in handling regional financial risks (Hu and Gou, 2020).

### *3.5. The Positive Impact of Enhancing In-process and Post-event Supervisory Capacity, Forcing Financial Regulatory Reform*

The implementation of China's foreign investment negative list system significantly opens up many industries to foreign investment and lowers the entry thresholds for some sectors, treating domestic and foreign enterprises equally under a record-filing management system, which poses higher demands on the government's in-process and post-event supervisory capabilities. Besides the aforementioned policy and regulatory system reforms, government departments' supervisory capabilities and administrative efficiency will be forced to improve effectively (Guo, 2018). The substantial opening of the financial industry's negative list poses higher challenges to regulatory authorities in the financial sector. Specifically, the significant reduction in the financial industry's negative list poses new challenges to domestic financial risk control, forcing domestic financial regulatory authorities to enhance financial supervision efficiency and risk control capabilities (Pang et al., 2014). Along with the improvement in administrative departments' in-process and post-event supervision capabilities and financial industry regulatory authorities' risk control capabilities, the macro and microenvironment for domestic banking industry risk control will improve, thereby reducing financial industry risk.

## **4. Estimation Method, Variable Selection, and Data Description**

### *4.1. Estimation Method*

This paper primarily investigates the impact of the foreign investment negative list system on regional banking industry risk. Since the management of the foreign investment negative list was first implemented in the Shanghai Free Trade Zone (FTZ) and then gradually extended with the establishment of more FTZs, while other non-FTZ pilot areas continued to use the traditional foreign investment management model. Moreover, since the "pre-entry national treatment plus negative list system" implemented in the foreign sector of China's FTZs is the core reform of the FTZ policy and an important goal for policy experimentation and development construction of each FTZ, this paper considers the implementation of the foreign investment negative list management model in the FTZs as a quasi-natural experiment. It adopts a counterfactual estimation method proposed by Abadie and Gardeazabal (2003) — the Synthetic Control Method (SCM) for examination. The core idea of implementing SCM in this paper is to view the Shanghai region as the treatment group and regions that did not establish FTZs or implement the negative list system during the study period as the control group. By creating a weighted average of the control group samples, a synthetic Shanghai that was not affected by the foreign investment negative list system is constructed. Comparing the actual banking industry risk in Shanghai with that of the synthetic Shanghai (counterfactual) yields the net effect of the foreign investment negative list system on banking industry risk in Shanghai.

The specific synthetic control estimation model analysis construction is as follows:

Focusing on the changes in regional banking industry risk, this article, referencing the selection of banking risk indicators by Ma et al. (2020), uses the non-performing loan rate (NPL) of the regional banking industry as the measurement indicator. The sample spans from 2006 to 2016. It is assumed that the NPL rate of the banking industry in  $M + 1$  provinces (cities, districts) during the years  $t \in [2006, 2016]$ , wherein  $P_{it}^N$  represents the non-performing loan rate (NPL) of the banking industry in the  $m$ th province (city, district) within the range  $m$  belonging to  $[1, M]$ , in a given year  $t$ , assuming the foreign investment negative list management model was not adopted; wherein,  $P_{it}^I$  represents the non-performing loan rate of the banking industry in region  $m$  in year  $t$  when the foreign investment negative list management model is adopted. It is now assumed that region  $m$  began to fully implement the foreign investment negative list system in the year  $T_0 = 2014$ , and the region's banking non-performing asset rate may have significant differences before and after 2014. This is because between the years  $[2006, 2013]$ , the non-performing loan rate of the banking industry in the region was basically unaffected by the foreign investment negative list system, that is  $P_{it}^N = P_{it}^I$ . However, after the establishment of the free trade zone and the implementation of the foreign investment negative list system, that is, during  $[2014, 2016]$ , let  $\delta_{it} = P_{it}^I - P_{it}^N$  denote the change in the non-performing loan rate of the banking industry brought about by the foreign investment negative list system to region  $m$  in year  $t$ . For the regions implementing the foreign investment negative list system as a pilot in the free trade zones, this paper can observe their non-performing loan rate  $P_{it}^I$ , but the hypothetical non-performing loan rate  $P_{it}^N$  for the region without the implementation of the foreign investment negative list system is not observable. To this end, this paper estimates  $P_{it}^N$  based on the factor model proposed by Abadie and Gardeazabal (2003).

$$P_{it}^N = \eta_t + \theta_t Z_i + \lambda_t \mu_i + \varepsilon_{it} \quad (1)$$

Wherein,  $\eta_t$  represents the year fixed effects affecting the non-performing loan rate of the banking industry in all provinces (cities, districts);  $Z_i$  represents control variables that are not affected by the foreign investment negative list system;  $\theta_t$  represents a vector of unknown parameters,  $\mu_i$  indicates the unobservable regional fixed effects, and  $\lambda_t$  denotes the unobservable common factor vector,  $\varepsilon_{it}$  is the unobservable short-term shock. Specifically, this paper selects the average growth rate of bank loans over the past three years in each target province and district and the non-performing loan rate lagged by three periods as the predictive control variables. To examine the impact of the FTZ foreign investment negative list system on the regional banking industry's non-performing loan rate, this paper weights the regions that did not enter the FTZ pilot to simulate the characteristics of the regions that implemented the foreign investment negative list system, thereby estimating the non-performing loan rate  $P_{it}^N$  assuming the region did not implement the foreign investment negative list system. To this end, a weight vector  $W^* = (w_2^*, \dots, w_{m+1}^*)$  of dimension  $(M \times 1)$  is calculated, which satisfies  $M, W_j \geq 0$ , and  $w_2 + \dots + w_{M+1} = 1$ . Each specific value of the vector  $W$  corresponds to an outcome variable value for a region without the implementation of the foreign investment negative list, representing a possible synthetic control combination. After weighting, the following can be obtained:

$$\sum_{m=2}^{M+1} w_m P_{mt} = \eta_t + \theta_t \sum_{m=2}^{M+1} w_m Z_m + \lambda_t \sum_{m=2}^{M+1} w_m \mu_m + \sum_{m=2}^{M+1} w_m \varepsilon_{mt} \quad (2)$$



Assuming there exists a vector  $(w_2^*, \dots, w_{m+1}^*)$  such that:

$$\sum_{m=2}^{M+1} w_m^* P_{m,2006} = P_{1,2006}, \quad \sum_{m=2}^{M+1} w_m^* P_{m,2006} = P_{1,2006}, \quad \dots \quad \sum_{m=2}^{M+1} w_m^* P_{m,2014} = P_{1,2014},$$

$$\sum_{m=2}^{M+1} w_m^* P Z_m = Z_1$$

If  $\sum_{n=1}^{T_0} \lambda_t$  is non-singular, then:

$$P_{it}^N - \sum_{m=2}^{M+1} w_m^* P_{mt} = \sum_{m=2}^{M+1} w_m^* \sum_{s=1}^{T_0} \lambda_s (\sum_{n=1}^{T_0} \lambda_n)^{-1} \lambda_s' (\varepsilon_{ms} - \varepsilon_{1s}) - \sum_{m=2}^{M+1} w_m^* (\varepsilon_{ms} - \varepsilon_{1s}) \quad (3)$$

In this, the mean of the right side of equation (3) will tend to approach 0. Therefore, for  $T \leq t \leq 2016$ , this paper

can use an unbiased estimate of  $\sum_{m=2}^{M+1} w_m^* P_{mt}$  to simulate and approximate  $P_{it}^N$ , and  $\hat{\delta}_{it} = P_{it}^I - \sum_{m=2}^{M+1} w_m^* P_{mt}$  can

serve as an unbiased estimate of  $\delta_{it}$ .

#### 4.2. Variables and Data Description

For measuring the risk of the regional banking industry, this paper, drawing from the practices of many scholars (Ma et al., 2020), uses the non-performing loan rate (npl) of the regional banking industry as a measure. Due to its simplicity and widespread use in banking risk control practices, npl is used as the primary measure of risk in this empirical analysis. Also, considering that npl primarily measures the credit risk faced by commercial banks, and that commercial banks face various risks, this paper, following the method of Wang et al. (2018), selects the loan-to-deposit ratio (slr) of regional commercial banks as an indicator of liquidity risk, to more robustly examine the impact of the foreign investment negative list system on banking industry risk.

As introduced by the Synthetic Control Method, to better fit the changes in the npl of the banking industry in the Shanghai region, this paper needs to select a convex combination from other provinces and districts not implementing the negative list system to construct a synthetic Shanghai. This requires selecting indicators that can most effectively reflect the development of the financial industry and the trend of banking risk changes in Shanghai. After repeated testing and comparison, this paper selects five indicators as synthetic variables: the real GDP growth rate (gdp), the proportion of the financial industry's GDP to the regional GDP (fin), the leverage ratio of the regional household sector (rlev), the leverage ratio of the regional non-financial corporate sector (elev), and the fiscal self-sufficiency rate (gov). The real GDP growth rate (gdp) is reflected by the GDP growth rate at constant regional prices. Since the regional GDP growth rate is an important manifestation of the local macro growth trend, and macroeconomic cyclic fluctuations have a significant impact on banks' npl (Li and Suo, 2009). The proportion of the financial industry's GDP to regional GDP (fin) reflects the overall situation of the regional financial industry. Since Shanghai is China's most developed financial center, with the most advanced financial market system construction and financial reform measures, this paper selects this indicator from other regions to match with Shanghai. Following the approach of Ma et al. (2016), this paper measures the regional household sector's leverage ratio (rlev) by the proportion of household loans to GDP, and the regional non-financial corporate sector's leverage ratio (elev)

by the debt balance of the non-financial sector and its proportion to GDP; following the method of Zhu et al. (2020), this paper measures the fiscal self-sufficiency rate (gov) by the ratio of local government fiscal revenue to fiscal expenditure. Since the rise in the leverage ratio of the non-financial sector will significantly increase the debt burden of the region's structure and residents, increase the risk of closure of the real economy, and thus worsen the liquidity risk and solvency risk of financial institutions (Ma et al., 2016); at the same time, the fiscal pressure of local governments will also have a direct impact on regional credit resource allocation and financial risk (Zhu et al., 2020). Table 1 shows the comparison of synthetic indicators between Shanghai and synthetic Shanghai before 2014. The comparison between the second and third columns of Table 1 reveals that the fit between synthetic Shanghai and Shanghai is high, essentially meeting the requirements of the Synthetic Control Method.

**Table 1.** Fit between Shanghai and Synthetic Shanghai in Terms of the Mean Values of Synthetic Variables.

Synthetic Indicator	Shanghai	Synthetic Shanghai
gdp	1.052265	1.343918
fin	10.98	11.70614
rlev	0.288049	0.26421
elev	0.6850611	0.7442154
gov	0.8925714	0.877951

This paper primarily investigates the impact of the foreign investment negative list system on banking industry risk. On June 28, 2017, the National Development and Reform Commission and the Ministry of Commerce released the "Catalogue for the Guidance of Foreign Investment Industries (2017 Revision)", which explicitly proposed the Special Administrative Measures for Foreign Investment Access (Negative List for Foreign Investment Access), marking the implementation of the foreign investment negative list system nationwide. Prior to this, the country had established free trade zone pilots in three batches across 11 provinces and regions to conduct pilot reforms of the foreign investment negative list. On September 29, 2013, the China (Shanghai) Free Trade Zone was established; on April 21, 2015, Tianjin, Guangdong, and Fujian regions started their free trade zone pilots; and on April 1, 2017, Liaoning, Henan, Zhejiang, Shaanxi, Hubei, Chongqing, and Sichuan also established free trade zones. Considering that the Shanghai Free Trade Zone has the longest establishment time, the best foundation for financial industry reform and development, and the pilot of the foreign investment negative list system, this paper selects Shanghai as a typical case study to explore the impact of the foreign investment negative list system on banking industry risk. Meanwhile, considering that the establishment of the Shanghai Free Trade Zone was approaching the end of 2013 and that the implementation effect of the foreign investment negative list policy also had certain lag, this paper regards 2014 as the initial year when Shanghai fully implemented the negative list policy. In terms of the selection of the research period, since the Banking Regulatory Commission started to gradually disclose the official non-performing loan rate to the public after its establishment in 2003, and the divestment of non-performing assets from the four major state-owned commercial banks by the four major asset management companies from 1999-2005 also caused a significant deviation in the non-performing loan rate data during this period (Li and Suo, 2009), this paper selects 2006 as the starting year. On the other hand, since the foreign investment negative list system was rolled out nationwide in 2017, and the number of pilot free trade zone provinces significantly increased later, to expand the choice of fitting samples, the study period is selected up to 2016. Moreover, since the free trade zones in Tianjin, Guangdong, and Fujian started the pilot of the negative list system in 2015, and due to the lack of data in the Tibet region, the corresponding areas are not included in the empirical estimation. Therefore, the subjects of

this study are the 27 provinces (cities, districts) of China, excluding Hong Kong, Macao, and Taiwan, from 2006 to 2016.

## 5. Empirical Results and Analysis

### 5.1. Baseline Results from Synthetic Control Estimation

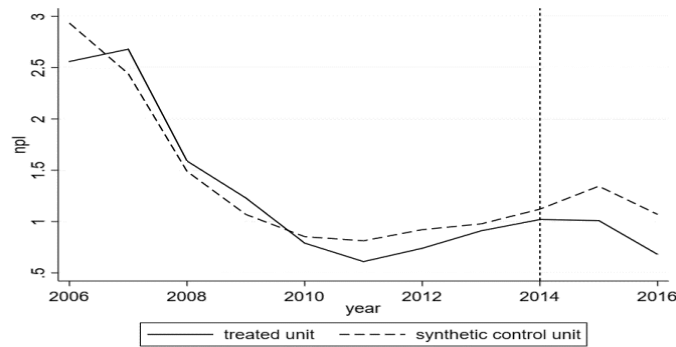
By controlling for predictive variables and fitting through the synthetic control method, this paper constructs a convex combination of a synthetic Shanghai from regions outside Shanghai, with the specific weights of the related regions presented in Table 2. According to the table, the weights for Zhejiang, Chongqing, Beijing, and Jiangsu are 0.304, 0.291, 0.252, and 0.153, respectively, with the weights for other regions being zero. Zhejiang and Jiangsu are geographically very close to Shanghai, and they also share similarities with Shanghai in terms of institutional culture, economic development, and the level of service industry development. The reason for the relatively large weights of Beijing and Chongqing is that, as economically developed municipalities like Shanghai, Beijing has a level of service industry development and financial industry maturity that are quite similar to those of Shanghai; Chongqing, also a municipality, has economic growth rates and population size characteristics that are similar to Shanghai's. Therefore, including them as the main matching regions in the combination is appropriate.

**Table 2.** Composition of Regional Weights for Synthetic Shanghai.

Province	Weight	Province	Weight	Province	Weight
Beijing	0.252	Anhui	0	Sichuan	0
Hebei	0	Jiangxi	0	Guizhou	0
Shanxi	0	Shandong	0	Yunnan	0
Inner Mongolia	0	Henan	0	Tibet	0
Liaoning	0	Hubei	0	Shaanxi	0
Jilin	0	Hunan	0	Gansu	0
Heilongjiang	0	Guangxi	0	Qinghai	0
Jiangsu	0.153	Hainan	0	Ningxia	0
Zhejiang	0.304	Chongqing	0.291	Xinjiang	0

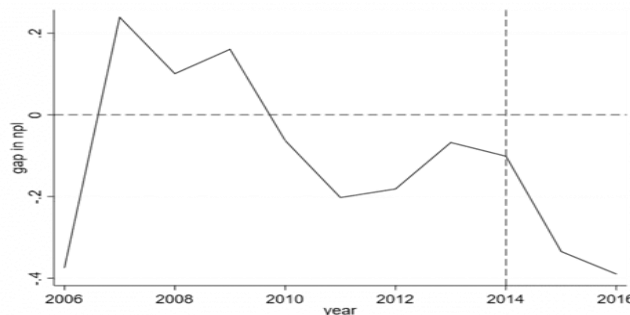
This paper plots the changes in the non-performing loan rate of the banking industry in Shanghai and synthetic Shanghai from 2006 to 2016 in Figure 1. Herein, the solid line represents the changes in the non-performing loan rate of the banking industry in real Shanghai, while the dashed line represents the changes in the non-performing loan rate of the banking industry in synthetic Shanghai. Comparing the changes in the two curves reveals that, except for a few individual years, the fit between synthetic Shanghai and real Shanghai was high before 2014, indicating that synthetic Shanghai accurately reflected the characteristics of the changes in the non-performing loan rate of Shanghai's banking industry before the implementation of the foreign investment negative list system. This paper predicts that after 2014, with the in-depth implementation of the foreign investment negative list system, there will be a significant difference in the non-performing loan rate of the banking industry between Shanghai and synthetic Shanghai. As shown in Figure 1, starting from 2014, the gap in the non-performing loan rate of the banking industry between Shanghai and synthetic Shanghai began to significantly widen, with the non-performing loan rate of synthetic Shanghai being significantly lower than that of real Shanghai, and the gap between the two widening

over time. This, to some extent, confirms the theoretical expectation of this paper that the implementation of the foreign investment negative list significantly reduced the non-performing loan rate of Shanghai's banking industry. This is because, with the implementation of the foreign investment negative list system within the Shanghai Free Trade Zone and the replication and promotion of foreign investment management experience across the entire region of Shanghai, positive effects such as improved administrative efficiency of local governments, policy transparency, and the entry level of high-quality foreign investment have gradually emerged (Lu et al., 2018), which are conducive to the effective reduction of banking industry risk by the foreign investment negative list system.



**Figure 1.** Predicted Non-performing Loan Rate of Shanghai and Synthetic Shanghai, 2006-2016.

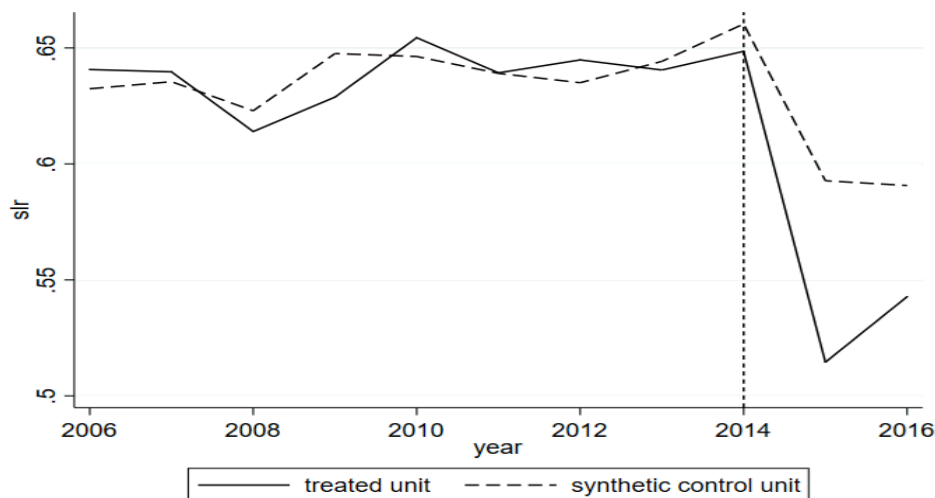
To more clearly reflect the actual impact of the foreign investment negative list system on the non-performing loan rate of Shanghai's banking industry, this paper calculates the trend over time of the gap in the non-performing loan rate between real Shanghai and synthetic Shanghai before and after the comprehensive implementation of the negative list system, namely the "treatment effect." Specifically, see Figure 2, where the horizontal dashed line represents the reference value of 0. As shown in Figure 3, except for 2006, when a significant gap existed between synthetic Shanghai and actual Shanghai due to differences in the non-performing loan divestiture process among regions, the gap between the two before 2014 fluctuated around 0, with overall small fluctuations. Starting in 2014, the gap began to show a trend of continuous widening, and by 2016, the gap between the two had approached -0.4, meaning that the foreign investment negative list system significantly reduced the non-performing loan rate in Shanghai's banking industry by 0.4 percentage points. Based on the amount of outstanding loans of 5.95 trillion RMB in Shanghai announced by the Shanghai Banking Regulatory Bureau in 2016, the implementation of the foreign investment negative list system reduced the absolute value of non-performing loans in Shanghai's banking sector by 23.8 billion RMB; considering that the overall level of the non-performing loan rate in Shanghai's banking industry was only 0.68% at the end of 2016, the promotion effect of the foreign investment negative list system on reducing the non-performing loan rate in Shanghai's banking industry is even more evident. Meanwhile, comparing the effect of the negative list system on reducing banking risk at different times, the effect was most significant in 2015, and the magnitude of risk reduction in the banking sector weakened in 2016.



**Figure 2.** Difference in Non-performing Loan Rate Between Shanghai and Synthetic Shanghai, 2006-2016.

## 5.2. Robustness Test

### 5.2.1. Robustness test of banking industry risk measured by the loan-to-deposit ratio.



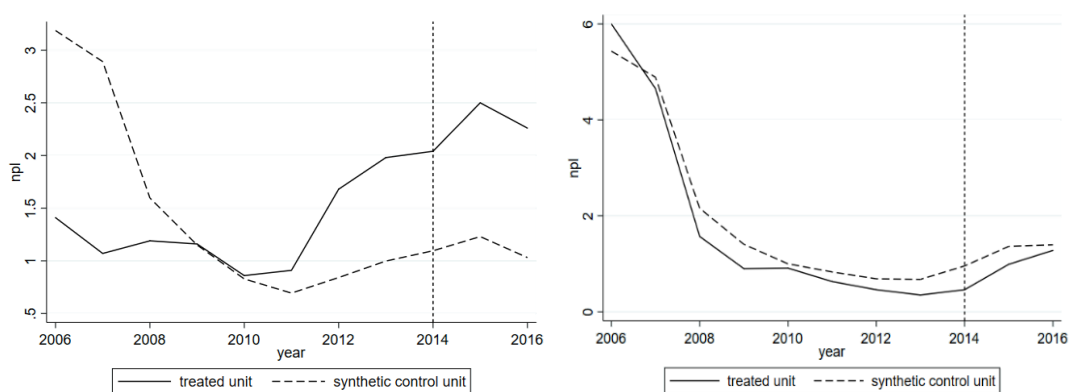
**Figure 3.** Predicted Loan-to-Deposit Ratio of Shanghai and Synthetic Shanghai, 2006-2016.

Since the non-performing loan rate primarily reflects the level of credit risk in commercial banks and other dimensions of banking industry risk are difficult to measure, this paper uses the banking industry's loan-to-deposit ratio as another measure of regional banking industry risk level to conduct a robustness test on whether the foreign investment negative list system effectively reduces the risk in Shanghai's banking industry. Figure 3 shows the changes in the loan-to-deposit ratio of the banking industry between Shanghai and synthetic Shanghai from 2006 to 2016. The solid line represents the changes in the loan-to-deposit ratio of the banking industry in real Shanghai, and the dashed line represents the changes in the loan-to-deposit ratio of the banking industry in synthetic Shanghai. As the figure shows, before 2014, the fit between synthetic Shanghai and real Shanghai was extremely high, indicating that the synthetic analysis accurately captured the changes in the loan-to-deposit ratio of Shanghai's banking industry. After 2014, the gap between synthetic Shanghai and real Shanghai began to significantly widen, with the loan-to-deposit ratio data of real Shanghai starting to be significantly lower than that of synthetic Shanghai. This also means that the foreign investment negative list system significantly reduced the liquidity risk of the banking industry in the Shanghai region. The dynamic gap change analysis found that the gap between the two was largest in 2015, with an absolute value reaching 0.08. This indicates that the effect of the foreign investment negative list system on reducing banking industry risk has a certain time lag. Moreover, a dynamic analysis of the impact effect found that this positive effect reached its maximum in the second year (2015) after the policy was fully implemented, and then it reduced, which is similar to the results analyzed in Figure 2. This might be because, although the early reforms of the foreign investment negative list system in the Shanghai Free Trade Zone effectively attracted foreign investment in the financial industry and had a certain positive impact on reducing banking industry risk, the early financial reforms and other supporting reforms in the Shanghai Free Trade Zone were still relatively lagging (Yin and Long, 2019), unable to continuously and effectively play the positive role of the foreign investment negative list system in optimizing the institutional environment and enhancing the level of financial regulation, and the positive impact on reducing banking industry risk would also weaken over time.

### 5.2.2. Placebo Test with Treatment Group Switching

Following the placebo test approach used in the robustness tests by Abadie and Gardeazabal (2003) and

Abadie et al. (2015), this study further conducts a robustness test by switching the treatment group. The basic idea of this test is as follows: select regions similar to Shanghai but without the implementation of the foreign investment negative list system, and use the synthetic control method to compare the region with a synthetic version of it. If significant reductions in banking risk also occur after 2014 in such a region, it might be due to factors other than the negative list system having a significant risk-reducing effect on commercial banks; conversely, if the level of banking risk in such a region does not decrease after 2014, it indirectly supports the credibility of the conclusions of this study. Generally, placebo tests often choose regions within synthetic Shanghai that have a larger weight (Abadie et al., 2015), as regions with larger weights are more likely to reflect the economic development and banking risk dynamics of Shanghai. Based on the choice of synthetic weights in Table 2, this paper selects Zhejiang and Chongqing for the placebo test, with specific results shown in Figure 4. The left graph in Figure 4 shows the changes in the non-performing loan rate of the banking industry between Zhejiang and synthetic Zhejiang, and the right graph shows the changes for Chongqing and synthetic Chongqing. The graphs show that neither Zhejiang nor Chongqing experienced a significant drop in the actual non-performing loan rate below the fitted non-performing loan rate after 2014. Although the actual non-performing loan rate in Chongqing was slightly lower than the synthetic one in 2014, the difference between the two showed a gradually decreasing trend and approached being negligible by 2016; the actual non-performing loan rate in Zhejiang was significantly higher than the fitted rate. This suggests that the reduction in the non-performing loan rate in the banking industry of the Shanghai region was due to the implementation of the foreign investment negative list system, rather than other coincidental common factors.

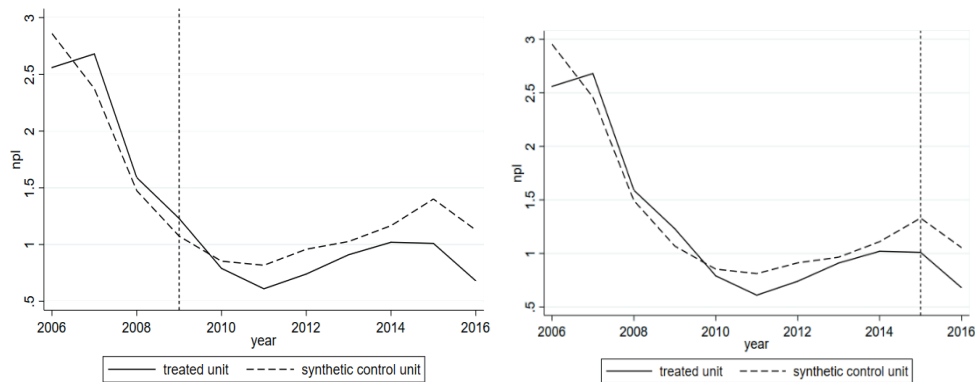


**Figure 4.** Placebo Test for the Treatment Group Transformation (Zhejiang, Chongqing).

### 5.2.3. Placebo Test with Change in Time Point

To further eliminate the possibility of randomness or manipulation in selecting 2014 as the time point, this study conducts a placebo test with a change in the time point. The basic idea of this test is as follows: select a year in which the foreign investment negative list system was not implemented as the time point, and analyze the real banking risk in the Shanghai region compared to the synthetic banking risk. If it is found that the fit of the two curves is significant before this point and they begin to diverge significantly after this point, it would suggest that the synthetic control method's selection of the time point might have involved some randomness or manipulation, and it cannot be concluded that the external negative list system caused a significant reduction in regional banking risk. This paper chooses two time points, one before and one after 2014, for placebo testing. The left and right graphs in Figure 5 respectively reflect the changes in the non-performing loan rate of the banking industry between real Shanghai and synthetic Shanghai under two different scenarios: advancing and delaying the policy time point. As the graphs show, neither in 2009 nor in 2015 do we observe a sudden change in the non-performing loan rate of the banking industry similar to what is depicted in Figure 1. In both graphs, a clear divergence between the actual and synthetic non-performing loan rates occurs in 2014, and this divergence trend continues to widen, which is

consistent with the analysis at the 2014 time point in Figure 1. This further proves that the comprehensive implementation of the foreign investment negative list system in 2014 significantly reduced the non-performing loan rate in Shanghai's banking industry.



**Figure 5.** Placebo Test for the Time Node Transformation (2009, 2015).

### 5.2.4. Robustness Test of DID Estimation

In estimating policy effects, due to a more scientific and reasonable selection of the reference group, the synthetic control method is generally more effective than DID estimation. However, considering the singularity of the synthetic control method previously discussed, to further validate the robustness of the estimation results, this study also employs DID estimation to empirically estimate the system effect of the foreign investment negative list in the Shanghai Free Trade Zone.

Under the DID model setting, the econometric estimation framework of this paper is as follows:

$$Y_{i,t} = \alpha + \beta_1 D_i T_t + \beta_2 D_i + \beta_3 T_t + \beta_n Z_{i,t} + \varepsilon_{i,t} \tag{4}$$

In equation (4),  $Y_{i,t}$  represents the level of banking industry risk (non-performing loan rate) in region  $i$  in year  $t$ .  $D_i$  is a dummy variable used to measure whether region  $i$  belongs to the treatment group; in this study, regions where the foreign investment negative list system is implemented are considered the treatment group (in this case, Shanghai), and regions without the implementation of the foreign investment negative list are seen as the reference group.  $T_t$  is also a dummy variable, where years after the implementation of the foreign investment negative list system are assigned a value of 1; otherwise, it's 0. The estimated coefficient of the interaction term  $D_i T_t$ ,  $\beta_1$ , is the core parameter of interest in this paper, namely, the impact of the implementation of the foreign investment negative list on regional banking industry risk. At the same time, to avoid bias in the econometric results due to omitted variables, referring to the analysis of banking industry non-performing loan risk factors by Wang and Ye (2018), this paper introduces related control variables  $Z_{i,t}$ , mainly regional GDP growth rate (gdp), government fiscal self-sufficiency rate (gov), household leverage ratio (rlev), and commercial bank loan growth rate (loa), etc. Besides,  $\delta_i$ ,  $\gamma_t$  respectively represent regional fixed effects, year fixed effects, to control the impact of other unknown factors. Similarly, to exclude the impact of other Free Trade Zone pilots and the nationwide implementation of the foreign investment negative list system in 2017, the sample selection still encompasses the 27 provinces (cities, districts) of mainland China from 2006-2016.

Table 2 presents the estimation results based on formula (4). Column (1) shows the impact of the foreign investment negative list system on the risk of Shanghai's banking industry without the inclusion of national control variables, time, and national fixed effects. The coefficient of the core variable  $D \times T$  is negative at the 1% significance level. This indicates that, compared to regions where the foreign investment negative list was not implemented, the negative list system significantly reduced the non-performing loan rate in Shanghai's banking industry. The estimation results in Columns (2), (3), and (4) are based on Column (1), with time fixed effects, time

and regional fixed effects, and time and regional fixed effects plus control variables included in the model, respectively. Overall, the coefficient of  $D \times T$  is consistently significant and negative across different equations at least at the 10% level, indicating that the foreign investment negative list system contributes to the reduction of regional banking industry risk. Simultaneously, based on the estimation results of the control variables in Column (4), this paper briefly analyzes the impact of other factors on regional banking industry risk. The estimated coefficient for GDP growth rate (gdp) is positive but not statistically significant, which contradicts traditional theory. This may be because, following the subprime crisis, the economic growth of many regions has been driven by high investment and high government debt, which instead puts pressure on banking industry risk. The estimated coefficient for government fiscal self-sufficiency rate (gov) is significantly negative, meaning that an improvement in local government's own financial resources helps reduce regional banking industry risk, similar to the conclusions of Zhu et al. (2020).

**Table 3.** DID Estimation of the Effects of the Foreign Investment Negative List System.

Variable Name	(1)	(2)	(3)	(4)
$D \times T$	-0.573*** (0.122)	-0.330* (0.186)	-0.378* (0.206)	-0.240** (0.102)
gdp				0.029 (0.068)
gov				-1.884*** (0.551)
rlev				2.273** (0.909)
loa				-0.116*** (0.355)
Time Fixed	No	Yes	Yes	Yes
Region Fixed	No	No	Yes	Yes
Sample Size	297	297	297	297
R2	0.18	0.66	0.66	0.72

Note: Numbers in parentheses are standard errors of regression coefficients. \*\*\*, \*\*, and \* respectively indicate significance levels at 1%, 5%, and 10%. The same applies below.

This is because, with the local government's own abundant financial resources, the impulse to intervene in bank credit through administrative means is reduced, minimizing or avoiding the risk arising from non-market allocation of banking credit resources. The estimated coefficient for household leverage ratio (rlev) is significantly positive, meaning an increase in the household sector's leverage ratio increases banking industry risk, which aligns with theoretical expectations. This is due to, with the rapid development of the real estate market and fluctuations in housing prices in recent years, the rapidly increasing leverage ratio of the household sector also puts significant pressure on commercial banks' risk (Ma, 2016). The estimated coefficient for the growth rate of bank loans (loa) is significantly negative, indicating that loan growth significantly reduces the non-performing loan rate. This is because, with the strengthening of risk control in the banking industry in recent years, new loans to some extent dilute the proportion of non-performing loans in banks.

### 5.3. Extended Analysis of the Mechanism of Action

Based on the empirical results presented earlier, the foreign investment negative list system indeed reduced the risk level in Shanghai's banking industry. However, what mechanisms or channels does the foreign investment



negative list system use to reduce the risk in Shanghai's banking industry?

**Table 4.** Test Results of the Mechanism of Action of the Negative List System for Foreign Investment.

Variable Name	Foreign Investment Inflow (fdi)			Reduction in Government Intervention (sgov)			Rule of Law Level (law)		
	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	fdi	npl	npl	sgov	npl	npl	law	npl	npl
D×T	488.81** *	-0.327**	-0.271*	1.847** *	-0.327**	-0.167	0.576	-0.327**	-0.318**
	(31.54)	(0.172)	(0.155)	(0.551)	(0.172)	(0.152)	(0.392)	(0.172)	(0.171)
fdi			-0.00005 (0.0002)						
sgov						-0.086 (0.062)			
law									-0.004** (0.002)
Constant	172.93** *	1.957***	1.941***	1.933	1.957***	2.125***	4.580** *	1.957***	1.979***
Term	(40.27)	(0.662)	(0.686)	(1.475)	(0.662)	(0.649)	(1.202)	(0.662)	(0.663)
Time Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	297	297	297	297	297	297	297	297	297

According to the analysis of the mechanisms through which the foreign investment negative list system reduces banking industry risk in this paper, the system likely reduces regional banking industry risk through four main channels: stimulating foreign capital inflow, reducing government intervention, improving regional rule of law, and forcing improvements in regulatory capacity. Therefore, to test the action mechanisms of these channels, this paper adopts the three-step verification method proposed by Baron and Kenny (1986) to study the aforementioned mechanisms. Considering the difficulty of measuring regional regulatory capacity indicators, this paper mainly verifies the mechanisms of action through three channels: foreign capital inflow, reduction of government intervention, and improvement of the rule of law.

Specifically, the first step verifies the impact of the foreign investment negative list system on the three effects:

$$fdi_{i,t}(sgov_{i,t}, law_{i,t}) = \gamma + \varphi_1 D_i T_t + \varphi_2 D_i + \varphi_3 T_t + \varphi_n X_{i,t} + \omega_{i,t} \tag{5}$$

The second step, verify the impact of the foreign investment negative list system on regional banking industry risk:

$$npl_{i,t} = \alpha + \beta_1 D_i T_t + \beta_2 D_i + \beta_3 T_t + \beta_n Z_{i,t} + \varepsilon_{i,t} \tag{6}$$

The third step involves incorporating the DID term and the three effects simultaneously into the regression equation for estimation:

$$npl_{i,t} = \nu + \theta_1 D_i T_t + \theta_2 fdi_{i,t}(sgov_{i,t}, law_{i,t}) + \theta_3 D_i + \theta_4 T_t + \theta_n Z_{i,t} + \mu_{i,t} \tag{7}$$

Herein, "fdi" represents the inflow of foreign direct investment in various regions, measured by the amount of new actual foreign direct investment in each region; "sgov" represents the reduction in government intervention in

various regions, and "law" represents the level of rule of law in various regions. Since measuring these two-level indicators involves a certain degree of subjectivity and covers a wide range of dimensions, Fan and Wang's "China Provincial Marketization Index Report" (2018) provides sub-indices for "reducing government intervention in enterprises" and "maintaining a legal environment for the market" for the years 2008-2016 for various provinces and regions. This paper directly uses their indices to measure these two factors. Considering data availability, the econometric estimation sample here includes 27 provinces (cities, districts) in China, excluding Hong Kong, Macao, and Taiwan, for the years 2008-2016.

Table 4 displays the test results for the mechanisms of action of the foreign investment negative list system. First, equations (5)-(7) report the verification results for the channel of foreign capital inflow due to the foreign investment negative list system. It can be observed that in equation (5), the coefficient of  $D \times T$  is significantly positive, indicating that the negative list system significantly encouraged foreign capital inflow. In equation (6), the coefficient of  $D \times T$  is significantly negative, showing that the foreign investment negative list significantly reduced the risk level of Shanghai's banking industry. However, in equation (7), although the coefficient of  $D \times T$  is negative, its significance level is significantly reduced, and the coefficient for *fdi* is not significant. This implies that the foreign investment negative list system significantly reduced the banking industry risk in the Shanghai region by promoting foreign capital inflow. Research by Tan et al. (2019) also found that with the implementation of the foreign investment negative list system in the Shanghai Free Trade Zone, the level of foreign capital inflow (especially in the service sector) in the Shanghai region significantly increased, facilitating various effects of foreign enterprises in reducing banking industry risk. Second, equations (8)-(10) report the verification results for the channel of reducing government intervention by the foreign investment negative list. In equation (8), the coefficient of  $D \times T$  is significantly positive, indicating that the negative list system helps reduce government intervention; in equation (10), the coefficients for both  $D \times T$  and *sgov* are not significant. This indicates that the foreign investment negative list system significantly reduced the banking industry risk in Shanghai by reducing government intervention. Research by Lu et al. (2018) showed that, accompanied by the promotion of the foreign investment negative list system and pilot experience in the Shanghai Free Trade Zone, the efficiency and transparency of Shanghai's administrative approval significantly optimized, and the government management efficiency and business environment significantly improved. Third, equations (11)-(13) report the verification results for the channel of improving the rule of law by the foreign investment negative list system. In equation (11), the coefficient of  $D \times T$  is positive but not significant, suggesting that the foreign investment negative list system's role in enhancing the rule of law in the region is not significant. However, in equation (13), the coefficient of  $D \times T$  is significantly negative, and compared to the coefficient of  $D \times T$  in equation (12), it does not show a significant decrease, and the effect of law on reducing non-performing loans is also very significant. This means that the effect of the foreign investment negative list system in reducing banking industry risk in Shanghai through the rule of law channel is not significant. This is because, although the establishment of the Shanghai Free Trade Zone (including most regions with foreign investment negative list system reforms domestically) has seen improvements in macro-institutional reforms and administrative efficiency, the implementation of specific institutional reform terms and the reforms of supporting financial legal systems are still not adequate (Liu, 2018; Lu et al., 2019; Liu, 2020), making the effect of the foreign investment negative list system in reducing banking industry risk through the rule of law channel not optimistic.

## 6. Conclusion and Policy Implications

As the number of pilot Free Trade Zones continues to increase, China significantly opens up its foreign capital sector, and the effort to prevent and resolve major risks progresses, the impact of the foreign investment negative list system on China's banking industry risk has become a real issue of social concern. Based on panel data from 27

provinces (cities, districts) in China from 2006 to 2016 and employing a comprehensive use of synthetic control method, Difference-in-Differences (DID) model, and mediation effect model, this study systematically investigates the mechanism and effect of the foreign investment negative list system on the risk of Shanghai's banking industry. The study finds that the implementation of the foreign investment negative list system significantly reduced the credit risk (non-performing loan rate) of Shanghai's banking industry, and this reducing effect gradually strengthened over time; simultaneously, the implementation also significantly reduced the liquidity risk (loan-to-deposit ratio) of Shanghai's banking industry, but this positive effect was short-lived, reaching its peak in the second year after full implementation before weakening thereafter. Analysis of the mechanism shows that the foreign investment negative list system primarily reduces banking industry risk in Shanghai through stimulating foreign capital inflow and reducing government intervention, with no clear effect through improving the rule of law in commercial banks. Other factors, such as the growth in local government finances and an increase in new loans, significantly reduced regional banking industry risk, while an increase in household leverage significantly raised the level of banking industry risk.

Based on the above conclusions, this study suggests the following policy implications:

First, continue to vigorously promote the pilot reform of the foreign investment negative list system and attract high-quality foreign capital inflow. The study finds that the foreign investment negative list system can effectively reduce the risk level of Shanghai's banking industry by stimulating continuous foreign capital inflow. This means that Free Trade Zones and local governments nationwide should continue to promote foreign investment system reforms that include pre-admission national treatment plus a negative list, further lower market entry barriers, effectively build a market-oriented, rule-of-law, and internationalized business environment, and vigorously attract high-quality foreign investment in the financial sector and other modern service industries to positively mitigate domestic banking industry risk.

Second, continuously optimize the supporting system reform of the foreign investment negative list system and enhance the risk management capacity of foreign investment in the financial industry. The study finds that the effect of the foreign investment negative list system in reducing banking industry risk is evident in the short term but still needs optimization in the long term. This means that Free Trade Zones and local governments should not only expand their opening up but also continuously strengthen the post-event supervision capacity of government departments, enhance the supervision capacity of foreign investment in the financial industry, build a systematic and supporting regulatory system for the foreign investment negative list, and effectively leverage the foreign investment negative list system to press for the construction of a domestic financial risk control system.

Third, fully leverage the positive role of the foreign investment negative list system in improving resource allocation and reducing commercial banking risk to effectively mitigate domestic banking industry risk. The study shows that government intervention in credit resources is a significant cause of rising banking industry risk, and the foreign investment negative list system can effectively reduce regional banking industry risk by reducing government intervention. This means local governments should fully respect the market-oriented resource allocation spirit of the "free if not forbidden by law" principle of the foreign investment negative list system, comprehensively promote the transformation and innovation of government's economic and social management functions, reduce excessive intervention in various micro-economic entities including banks, enhance the transparency and standardization of administrative policy terms, and promote the legalization level of government management departments to help effectively mitigate risks in the banking industry and the entire financial system.

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## Conflict of interest

All the authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

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