

# The Impact of Real Estate on the Credit Risk of China's Commercial Banks

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**Abstract.** Real estate loans account for a relatively high proportion of commercial bank loans, the current stage of the real estate market is depressed, the huge real estate loans on the bank has caused a huge burden, the impact of the bank's credit, uncertain real estate policy will affect both the quality of the stock of real estate loans, but also affect the commercial banks to the real estate industry's credit investment, all of which ultimately affects the risk taking of commercial banks. Based on this, this paper first combs through the real estate central level real estate general tone policy and financing policy since 2023, and then selects the micro panel data of 16 listed banks in China from 2010-2023 to analyze the impact of the stock of real estate loans on banks' credit risk. The results show that a rise in real estate loan stock significantly increases commercial bank credit risk. The research in this paper provides a basis for the government to strengthen real estate policy regulation with comprehensive measures and block the transmission of corporate risks to the financial sector.

**Keywords:** Real estate; financial risk; risk management.

## 1. Introduction

The real estate industry has become an economic pillar for many countries, and its development significantly impacts the national economy [1]. China's real estate market is heavily influenced by policies, and the real estate regulation policy cycle is highly correlated with the real estate cycle [2]. Real estate policies are affected by various factors, including political, economic, cultural, and even socio-psychological aspects [3]. Commercial housing sales are influenced by a series of laws and regulations issued by the state, and real estate-related policies and regulations have a long-term stable relationship with housing price formation [4]. To prevent the exacerbation of real estate market bubbles and promote healthy, compliant market development, the government frequently introduces regulatory policies. Relevant government policies play an important role in real estate market regulation, and the uncertainty of real estate policies significantly impacts the market situation.

Currently, China's macroeconomic operation faces issues such as demand contraction, supply shocks, and weakening expectations. The Central Political Bureau meeting in December 2023 emphasized strengthening counter-cyclical and cross-cyclical adjustments of macro policies, continuing to implement proactive fiscal policies and prudent monetary policies. Monetary policy can influence bank credit leverage through interest rates [5]. Low-interest-rate policies can lead to higher bank credit leverage and increase the probability of bank risks [6]; high-interest-rate policies can reduce housing demand by increasing purchase costs, thereby lowering real estate prices and reducing bank risks. Research on macroprudential policies examines the impact of policy interest rates on bank risk-taking under different conditions, and macroprudential policy tools play a role in reducing excessive bank risk-taking; macroprudential policy supervision can inhibit procyclicality and help smooth the credit cycle [7]. Banks are affected by monetary and macroprudential policies in developing real estate loan businesses. In summary, monetary policy influences real estate prices by adjusting interest rates, thereby regulating the intensity of risks posed to banks by the stock of real estate loans.

In China, the banking sector is the most important credit supplier for real estate enterprises and home buyers. The massive volume of real estate loans also brings credit risks to banks, which could transmit

to the real economy and micro-consumers through bank intermediation. Therefore, researching and analyzing the relationship between real estate loans and bank credit risk is crucial. Given that real estate in China has developed from an emerging sector to a booming one over decades, studying the impact of real estate loan stock on bank credit risk can highlight its rich implications.

## **2. Research Background and Hypothesis**

### **2.1. Industry Overview**

In 2023, the real estate sales market continued to bottom out amidst fluctuations, with land investment and new construction starts remaining sluggish, and the inventory destocking cycle staying high. After a brief recovery in the first quarter, industry sales cooled down again in the second quarter. Although favorable policies were concentratedly released since July 2023, the downward trend in sales has not reversed, and the industry remains in a bottoming-out phase.

In 2023, the domestic real estate market continued to bottom out amidst fluctuations. In the first quarter, due to the release of pent-up demand and the effects of optimized regulatory policies, positive changes appeared in the real estate market, with sales stopping their decline and rising, and the decline in investment narrowing. However, the brief recovery had a weak foundation. After the second quarter, real estate market sales and investment cooled down again. On July 24, 2023, the Central Political Bureau meeting set the tone for the real estate market by "adapting to the major changes in the supply and demand relationship in China's real estate market" and "timely adjusting and optimizing real estate policies." Demand-side easing policies were concentratedly released, but the downward trend in sales has not reversed, and the industry remains in a bottoming-out phase.

Since the implementation of the "centralized land supply" policy in 2021, both land supply volume and market activity have continued to decline. According to data from the China Index Academy, in 2023, the supply and demand scale of residential land in 300 cities nationwide decreased by 22.4% and 23.1% year-on-year respectively, with the land market remaining sluggish. To attract developers to participate in land auctions, high-quality plots have been continuously released across regions. In 2023, the average transaction price per square meter of floor space in 300 cities nationwide increased by 7.6% year-on-year, but transaction premiums continued to decline. Regarding land investment participation, central and state-owned enterprises (SOEs) remained the main force in land acquisition. Local urban investment companies, which previously underwrote projects, are still in the process of digesting their holdings, resulting in reduced participation. Meanwhile, some regionally focused, stable private enterprises actively replenished their land reserves, leading to an increase in their land acquisition spending. Heightened safety awareness among developers and overlapping regional acquisition strategies have led to pronounced differentiation in land auctions. Competition intensified in core cities and sectors, with significant urban disparities persisting in the land market. Beijing, Shanghai, and Hangzhou remained key acquisition targets for developers, with multiple plots selling at maximum bid prices. Certain premium sectors in cities like Guangzhou, Chengdu, Xiamen, and Hefei also saw elevated interest. Meanwhile, land markets in cities like Shenyang, Changchun, Zhengzhou, and Wuxi remained sluggish, with all plots sold at reserve prices. Regarding unsold land, factors such as the release of high-quality plots, local governments' proactive assessment of developers' land acquisition intentions, and lowered bidding thresholds contributed to a 6.9 percentage point year-on-year decline in the national residential land withdrawal rate to 21.8% in 2023. However, the overall rate remains relatively high.

In 2023, starts and completions in the real estate industry continued their divergent trends. The floor space under construction by real estate development enterprises decreased by 7.2% year-on-year to 8.384 billion square meters, and the floor space of new starts decreased by 20.4% year-on-year to 954 million square meters. Driven by the continuous advancement of the "ensure delivery" policy, the floor space of completed buildings increased by 17.0% year-on-year to 998 million square meters.

Affected by the weak willingness to start new projects and the decline in real estate enterprise investment scale, real estate development investment growth continued to decline, and the cumulative monthly decline widened throughout 2023. In 2023, national real estate development investment was 11.09 trillion yuan, a decrease of 9.6% year-on-year.

In terms of sales, the release of pent-up demand in the first quarter of 2023 led to a brief recovery in commercial housing sales. However, the real estate industry was still in a bottoming stage. Sales dropped rapidly in April 2023. From May to June, sales increased slowly month-on-month but still decreased year-on-year. Affected by this, the national commercial housing sales area in the first half of 2023 decreased by 5.3% year-on-year to 595 million square meters. Due to the release of improvement demand and the increased proportion of transactions in high-tier cities, commercial housing sales value in the first half of the year increased slightly by 1.1% year-on-year to 6.31 trillion yuan. After the Central Political Bureau meeting in July 2023 redefined the supply-demand relationship in the real estate industry, policies including "down payment reduction," "interest rate reduction," and "easing of purchase and loan restrictions" were concentratedly released. In September, the commercial housing sales area and sales value saw some recovery compared to August, but the downward trend in sales has not reversed. For the whole year of 2023, national commercial housing sales area and sales value decreased by 8.5% and 6.5% year-on-year, respectively.

## 2.2. Credit Environment

**Table 1.** Sources and Proportion of Funds for Real Estate Development Enterprises in Recent Years

Sources of Funds	2019		2020		2021	
	Amount (billion yuan)	Percentage (%)	Amount (billion yuan)	Percentage (%)	Amount (billion yuan)	Percentage (%)
Domestic Loans	25228.77	14.13	26675.94	13.81	23296.00	11.58
Foreign Investment	175.72	0.10	192.00	0.10	107.00	0.05
Self-raised Funds	58157.84	32.56	63376.65	32.82	65428.00	32.53
Other Funds	95046.26	53.21	102870.31	53.27	112301.00	55.83
Of which: Down Payments & Advance Receipts	61358.88	34.35	66546.83	34.46	73946.00	36.76
Personal Mortgage Loans	27281.03	15.27	29975.81	15.52	32388.00	16.10
Total	178608.59	100.00	193114.90	100.00	201132.00	100.00

**Continued Table** Sources and Proportion of Funds for Real Estate Development Enterprises in Recent Years

Sources of Funds	2022		2023	
	Amount (billion yuan)	Percentage (%)	Amount (billion yuan)	Percentage (%)
Domestic Loans	17388.00	11.67	15595.04	12.24
Foreign Investment	78.00	0.05	47.50	0.04
Self-raised Funds	52940.00	35.54	41989.13	32.94
Other Funds	78573.00	52.74	69827.48	54.78
Of which: Down Payments & Advance Receipts	49289.00	33.08	43202.33	33.90
Personal Mortgage Loans	23815.00	15.99	21489.10	16.86
Total	148979.00	100.00	127459.15	100.00

Data Source: Wind

In 2023, the financing policy support orientation for the real estate industry was evident, but in the short term, the repair of the financing side for real estate enterprises was limited. Affected by factors such as slowing economic growth and insufficient market confidence, residents' willingness to

purchase homes and take loans was weak, real estate enterprises' funds continued to decrease, and real estate enterprises still faced funding pressures.

Throughout 2023, supportive policies for real estate industry financing were continuously released. However, constrained by factors such as slowing economic recovery and insufficient market confidence, industry sales failed to stabilize and stop declining, and real estate enterprises still faced significant funding pressure. In 2023, the funds actually received by real estate development enterprises decreased by 13.6% year-on-year, with the decline narrowing by 12.3 percentage points compared to the previous year. Among these, domestic loans saw limited repair due to continuous favorable financing policies, decreasing by 9.90% year-on-year, a smaller decline compared to other funding sources. After a brief recovery in commercial housing sales in 2023, the market cooled down again, causing the cumulative year-on-year growth rate of "Other Funds" (mainly down payments, advance receipts, and personal mortgage loans), which account for the highest proportion in real estate development funding sources, to turn negative in June 2023. For the whole year, it decreased by 11.13% cumulatively, a significant narrowing of 18.90 percentage points compared to the previous year. Pressure on the sales side remained unabated, and real estate enterprises still faced funding pressures.

## **2.3. Policy Environment**

### **2.3.1. Overall Policy Tone.**

Since 2023, amid economic slowdown, regulatory policies have maintained a relaxed stance with increasing intensity to prevent systemic risks in the real estate sector and ensure stable, healthy market development. Favorable policies targeting both supply and demand sides of the real estate market have been introduced successively. The July meeting of the Political Bureau of the CPC Central Committee set the tone for optimizing real estate policies by acknowledging significant shifts in market supply-demand dynamics. Subsequently, measures such as lowering loan interest rates, reducing down payment ratios, and implementing “recognizing housing ownership rather than loan history” policies were rolled out. On the financing front, concrete measures have been implemented to bolster financial support for the real estate sector. These include meeting the reasonable financing needs of real estate enterprises regardless of ownership structure, the “three no-less-than” requirements, new regulations on commercial property loans, and the establishment of urban real estate financing coordination mechanisms. All these policies signal strong support for real estate developers' financing needs. However, restoring market confidence is expected to take time, requiring continued monitoring of policy transmission effects and subsequent market reactions.

In early 2023, the central government maintained its “housing for living, not speculation” principle as the main policy tone, implementing city-specific measures to promote a virtuous cycle and healthy development in the real estate sector while continuing accommodative regulatory policies. Subsequently, the government work report during the Two Sessions explicitly stated the need to effectively prevent and resolve risks among leading real estate developers and promote stable development in the real estate sector. That same month, local supportive policies followed suit, with some key second-tier cities like Changsha and Xiamen optimizing their purchase and sales restriction policies. In April, the Political Bureau meeting reiterated the importance of “housing for living, not speculation” and the “three guarantees” (ensuring basic living standards, employment, and financial stability). By July, the Political Bureau meeting set the tone for timely adjustments to real estate policies in light of significant shifts in market supply and demand dynamics, paving the way for subsequent regulatory easing measures. Subsequently, relevant ministries intensified efforts: the Ministry of Housing and Urban-Rural Development introduced the “recognize housing, not loans” policy, prompting swift responses from first- and second-tier cities to adjust first-home recognition criteria; the People's Bank of China promoted reductions in commercial mortgage rates for existing first homes and lowered minimum down payment ratios for both first and second homes. In October, the State Council executive meeting reviewed and approved Document No. 14, proposing to increase the construction and supply of affordable housing. The Central Financial Work Conference reiterated

the need to tailor policies to local conditions, effectively utilize policy tools, better support housing demand for basic and upgrading needs, accelerate the construction of three major projects including affordable housing, and establish a new model for real estate development. Overall, to boost confidence in the real estate market, a series of demand-side easing policies have been released. However, against the backdrop of slow macroeconomic recovery and persistently weak household income expectations, restoring market confidence is expected to take considerable time. The effectiveness of policy transmission and subsequent market reactions warrant close observation.

**Table 2.** Central Government's Overall Policy Direction for the Real Estate Sector Since 2023

Time	Policy Source	Main Content
January 2023	The People's Bank of China and the former China Banking and Insurance Regulatory Commission	Establish a dynamic adjustment mechanism for first-home mortgage interest rate policies. In cities where the sales prices of newly built commercial residential properties decline for three consecutive months on both a month-on-month and year-on-year basis, local authorities may temporarily maintain, lower, or remove the minimum interest rate floor for first-home mortgages.
March 2023	National People's Congress and Chinese People's Political Consultative Conference	Effectively prevent and mitigate risks among high-quality leading real estate developers, improve their asset-liability structures, prevent disorderly expansion, and promote stable development in the real estate sector. Strengthen the housing security system, support basic and upgrading housing needs, address housing challenges for new urban residents and young people, and accelerate the renovation of aging residential communities and dilapidated housing.
April 2023	Central Political Bureau	Effectively prevent and defuse risks in key sectors, and coordinate efforts to reform and mitigate risks in small and medium-sized banks, insurance, and trust institutions. Uphold the principle that “housing is for living in, not for speculation,” implement city-specific policies, support essential and upgrading housing needs, ensure the delivery of completed projects, safeguard people's livelihoods, maintain stability, and promote the steady and healthy development of the real estate market.
April 2023	Central Bank	To effectively prevent and mitigate risks among high-quality leading real estate developers, improve their asset-liability profiles, and diligently ensure the delivery of completed buildings, safeguard people's livelihoods, and maintain stability. Tailor policies to local conditions to support both basic and upgrading housing needs, accelerate the refinement of financial policies for the housing rental sector, and facilitate a smooth transition of the real estate industry toward a new development model.
July 2023	Central Political Bureau Meeting	The meeting proposed that in light of the new situation where China's real estate market has undergone significant changes in supply and demand dynamics, real estate policies should be adjusted and optimized in a timely manner. Tailored measures should be implemented in different cities to effectively utilize the policy toolkit, better meet residents' essential and upgrading housing needs, and promote the stable and healthy development of the real estate market. Simultaneously, efforts should be intensified to expand the construction and supply of affordable housing, actively advance the renovation of urban villages and the development of dual-purpose public infrastructure for both civilian and emergency use, and revitalize and repurpose various types of idle properties. Effective measures should be taken to prevent and resolve local government debt risks, formulate and implement

		comprehensive debt resolution plans, strengthen financial supervision, and steadily advance reforms and risk mitigation for high-risk small and medium-sized financial institutions.
July 2023	Ministry of Housing and Urban-Rural Development	We must continue to consolidate the stabilization and recovery of the real estate market, vigorously support housing demand for both first-time buyers and those seeking improved housing, and further implement policy measures such as reducing down payment ratios and loan interest rates for first-time home purchases, offering tax and fee reductions for upgrading to improved housing, and adopting a “recognize the property, not the loan” approach for personal housing loans. We will continue to ensure the delivery of completed buildings, accelerate project construction and handover, and effectively safeguard the legitimate rights and interests of the people.
August 2023	Ministry of Housing and Urban-Rural Development, People's Bank of China, China Banking and Insurance Regulatory Commission	Three departments jointly issued the “Notice on Optimizing the Criteria for Determining the Number of Housing Units in Personal Housing Loans” to advance the implementation of the policy measure “recognizing housing units but not loans” for first-home purchases. The notice clarifies that when a household (including the borrower, spouse, and minor children) applies for a loan to purchase a commercial housing unit, if no household member owns a complete housing unit in the local area—regardless of whether they have previously purchased housing using loans—financial institutions shall implement housing credit policies as if it were a first-home purchase. This policy serves as a tool within the “one city, one policy” toolkit, available for cities to adopt autonomously.
August 2023	Ministry of Finance, State Taxation Administration, Ministry of Housing and Urban-Rural Development	Extend the application period for the individual income tax refund policy on home replacement purchases. Taxpayers who sell their existing home and repurchase a home on the market within one year after the sale of their existing home shall be eligible for a refund of the individual income tax paid on the sale of their existing home. The application deadline for this preferential policy has been extended from December 31, 2023, to December 31, 2025.
October 2023	State Council	The State Council executive meeting reviewed and approved the “Guiding Opinions on Planning and Constructing Affordable Housing” (State Council Document No. 14 [2023]) (hereinafter referred to as “Document No. 14”). Document No. 14 sets forth two major objectives: First, to increase the construction and supply of affordable housing; Second, to promote the establishment of a new model for the transformation and development of the real estate industry, allowing commercial housing to return to its commodity attributes, meet the demand for improved housing, promote stable land prices, stable housing prices, and stable expectations, and drive the transformation and high-quality development of the real estate industry.
October 2023	Central Financial Work Conference	The meeting proposed fostering a virtuous cycle between finance and real estate, strengthening regulatory systems for real estate enterprises and capital oversight, improving macroprudential management of real estate finance, meeting the reasonable financing needs of real estate enterprises of all ownership types without discrimination, implementing tailored policies for different cities to effectively utilize the policy toolkit, better supporting housing demand for basic and upgrading needs, accelerating the construction of three major

		projects including affordable housing, and establishing a new model for real estate development.
January 2024	Ministry of Housing and Urban-Rural Development and China Banking and Insurance Regulatory Commission	Notice on Establishing a Coordination Mechanism for Urban Real Estate Financing This notice establishes an efficient, transparent, and standardized coordination platform for urban real estate financing, aiming to address current challenges faced by real estate enterprises in their financing processes. These challenges include information asymmetry, restricted financing channels, high financing costs, and difficulties in securing financing for certain projects. Financing support will be provided on a project-by-project basis, with tailored approaches for different cities and projects. Local authorities should expedite the formation of “whitelists” and detailed implementation plans to accelerate the effective implementation of these policies.

Source: United Credit Rating

### 2.3.2. Financing Policies.

Since late 2022, favorable financing conditions have been continuously released, with supportive policies maintaining momentum. In January 2023, relevant authorities drafted the Action Plan for Improving the Balance Sheets of High-Quality Real Estate Developers, while also refining certain parameters of the “three lines and four thresholds” policy for 30 pilot real estate companies. Current policy support clearly targets both supply and demand sides of the industry. Breakthroughs across multiple fronts—from bank credit support and bond financing assistance to easing restrictions on equity financing—will help alleviate credit constraints and optimize overall liquidity. In March, the expanded scope of REITs development offered new avenues for revitalizing commercial assets and enhancing liquidity. Entering June, alongside monetary easing, the National Association of Financial Market Institutional Investors issued guidelines supporting bond issuance for private enterprises, encouraging qualified private firms to explore diversified credit enhancement financing. In July, positive signals continued as the central government's policy stance on real estate underwent significant shifts. The People's Bank of China and the China Banking and Insurance Regulatory Commission jointly extended two core financing policies from the “16 Financial Measures,” promoting the orderly resolution of real estate developers' risks. In August, the China Securities Regulatory Commission (CSRC) announced that real estate listed companies would no longer face restrictions on refinancing due to share prices below par value, net asset value, or losses. That same month, the central bank extended the implementation period of the loan support plan for ensuring property delivery and increased financial backing for housing rentals, urban village renovations, and affordable rental housing construction. In October, the Central Financial Work Conference reiterated the need to foster a virtuous cycle between finance and real estate, emphasizing tailored policy tools for different cities and proposing to meet the reasonable financing needs of real estate enterprises regardless of ownership structure. In November, the PBOC and the China Banking and Insurance Regulatory Commission jointly convened a symposium with financial institutions alongside the CSRC. The meeting proposed the “three no-less-than” principles to implement the Central Financial Work Conference's directive on meeting the reasonable financing needs of real estate enterprises under different ownership structures. This extended policy reach to non-state-owned real estate enterprises, addressing the inclusive financing gaps faced by private developers under the financing support framework. In January 2024, new regulations on commercial property loans and the urban real estate financing coordination mechanism were among several financial support policies for the real estate sector issued. Table 3 summarizes key real estate financing policies since 2023.

Overall, while multiple favorable financing policies for real estate developers have been introduced since 2023, industry risks remain unresolved. Financial institutions maintain relatively weak expectations toward developers, particularly private ones, limiting the actual beneficiaries of these financing incentives. Substantial improvement in the financing environment for developers will

depend on factors such as a genuine restoration of market confidence, a shift in expectations, enhanced sales and cash collection capabilities among developers, and the resolution of industry risks.

**Table 3.** Real Estate Financing Policies Since 2023

Time	Policy Source	Main Content
January 2023	People's Bank of China, China Banking and Insurance Regulatory Commission	Relevant departments have drafted the Action Plan for Improving the Balance Sheets of High-Quality Real Estate Developers. Targeting high-quality developers that focus on their core business, operate in compliance, possess sound qualifications, and hold systemic importance, the plan prioritizes advancing 21 key tasks across four areas: “asset activation,” “debt rollover,” “equity supplementation,” and “expectation enhancement.” This aims to guide the balance sheets of high- debt rollover,“ ”equity supplementation,“ and ”expectation enhancement.“ This initiative guides high-quality developers toward restoring their balance sheets to safe levels through 21 specific tasks: - Reasonably extending the transition period for the real estate loan concentration management system - Refining the ”three lines and four thresholds" rules for the 30 pilot developers - Enhancing certain parameter settings while maintaining the overall framework of the rules
January 2023	People's Bank of China, China Banking and Insurance Regulatory Commission	Establish a dynamic adjustment mechanism for first-home mortgage interest rates
February 2023	Securities and Exchange Commission	Launching Pilot Programs for Private Real Estate Investment Funds
March 2023	Securities and Exchange Commission	Propose advancing the regular issuance of REITs, prioritizing support for urban and rural commercial projects such as department stores, shopping malls, and farmers' markets. Ensure the issuance of infrastructure REITs for community commercial projects that safeguard basic public welfare. Simultaneously, optimize the municipal registration process and improve issuance and information disclosure systems.
March 2023	National Development and Reform Commission	Strengthen preliminary project development, support the issuance of infrastructure REITs for consumer infrastructure, and support the issuance of REITs for qualified private investment projects.
July 2023	Central Bank, Financial Regulatory Administration	Regarding two policies outlined in the “Notice on Strengthening Financial Support for the Stable and Healthy Development of the Real Estate Market” jointly issued by the People's Bank of China and the former China Banking and Insurance Regulatory Commission in November 2022, their applicability period is extended. First, for existing financing of real estate enterprises, financial institutions are encouraged to engage in autonomous negotiations with real estate enterprises based on commercial principles, while ensuring the security of creditors' rights. Support should be

		actively provided through measures such as extending existing loans and adjusting repayment arrangements to facilitate project completion and delivery. For loans maturing before December 31, 2024, extensions exceeding the original term by up to one year are permitted without adjusting the loan classification. The loan classification reported to credit reporting systems shall remain consistent with this extension. Second, for supporting financing extended to projects backed by special loans before December 31, 2024, risk classifications shall not be downgraded during the loan term: lending entities that assumed debt after the new-old debt distinction shall be managed as qualified borrowers. For newly issued supporting financing that becomes non-performing, relevant institutions and personnel may be exempted from liability if they have fulfilled their due diligence obligations.
August 2023	Securities and Exchange Commission	Listed real estate companies are exempt from restrictions on share price falling below issue price, net asset value, or incurring losses when conducting refinancing.
August 2023	Central Bank	Implement the “16 Financial Measures” effectively to maintain stable and orderly real estate financing, while increasing financial support for housing rentals, urban village renovations, and the construction of affordable rental housing. The loan support program for ensuring the delivery of completed buildings will be extended through the end of May 2024, while the rental housing loan support program will be steadily rolled out in pilot cities. Tailored policy tools will be deployed to better meet residents' essential and upgrading housing needs, ensuring the delivery of completed buildings, safeguarding people's livelihoods, and maintaining stability. These efforts will promote the steady and healthy development of the real estate market.
January 2024	People's Bank of China National Financial Regulatory Administration	For real estate developers with sound operations and promising prospects, nationwide commercial banks may also extend commercial property loans to repay existing real estate-related loans and publicly traded bonds held by the enterprise and its group holding company (including consolidated subsidiaries), provided such lending is conducted within controllable risk parameters and commercially sustainable.
January 2024	Ministry of Housing and Urban-Rural Development, National Financial Regulatory Administration	Establish a municipal real estate financing coordination mechanism in prefecture-level and above cities to promptly assess local real estate market conditions and financing needs, and coordinate solutions to difficulties and issues in real estate financing. Based on the development status of real estate projects and the qualifications, creditworthiness, and financial standing of project developers, compile a list of real estate projects eligible for financing support in accordance with principles of fairness and impartiality. This list shall be shared with financial institutions within the administrative region.

Source: United Credit Rating

## 2.4. Research Hypothesis

Previous scholars have examined the relationship between real estate credit and systemic banking risks. From a price volatility perspective, rising real estate prices increase property values, prompting individuals to redirect deposits toward real estate investments. This subsequently expands banks' real estate credit portfolios. When banks' loan-to-deposit ratios reach certain thresholds, liquidity risks emerge due to short-term borrowing financing long-term lending. From a macroeconomic perspective, extreme external conditions can trigger declines in the value of outstanding real estate loans. Falling property prices reduce future revenues for developers, potentially leading to bankruptcies and increased loan default rates. Simultaneously, they raise default rates on personal mortgages [8]. Rising default rates amplify capital losses for banks, with severe cases potentially causing bank failures. Similarly, during economic downturns, rising unemployment reduces consumer demand, diminishing the value of outstanding real estate loans and ultimately triggering bank risks [9].

According to People's Bank of China statistics, real estate loans have accounted for over 20% of financial institutions' RMB lending in the past decade—a high proportion. Turbulence in the real estate market inevitably introduces new risk points for financial institutions. Should the real estate market experience significant fluctuations, this risk will propagate throughout the commercial banking system, transforming into operational risk. If a large volume of credit funds cannot be repaid on time, it will generate substantial non-performing and bad debts, forcing the banking system to bear enormous financial risks [10]. Therefore, against this backdrop, this paper explores the impact of the real estate market on commercial banks' credit risk. This research contributes to the mitigation and governance of financial risks in China, accelerates the establishment of a new development paradigm, and promotes the advancement of high-quality financial development. Based on this, this paper proposes the hypothesis: An increase in the outstanding loan balance in the real estate market will increase banks' credit risk.

## 3. Research Design

### 3.1. Data Sources and Processing

Based on data availability and representativeness, this study plans to select Chinese banks as the sample. Given the selected time period of 2010–2023, some listed banks had relatively recent IPO dates. Therefore, data from 116 banks were selected for empirical analysis. Micro-level data for calculating the risk-weighted assets to total loans ratio—a key indicator of bank credit risk—primarily originates from the CSMAR database. Partially missing data was supplemented by referencing relevant banks' statistical annual reports. Macroeconomic variable data is sourced from the Wind database.

### 3.2. Description of Key Variables

(1) Explanatory Variables. The real estate loan stock (Fdc) is measured by the ratio of a bank's outstanding real estate loans to its total loan balance. This ratio quantifies the relative size of real estate lending within a bank's overall loan portfolio, thereby examining the impact of real estate loan stock on systemic risk within the banking system.

(2) Dependent Variable. The dependent variable, credit risk (Wra), measures a bank's credit risk. It is calculated as risk-weighted assets divided by total loans, where total risk-weighted assets = balance sheet assets  $\times$  risk weight + off-balance sheet assets  $\times$  conversion factor  $\times$  risk weight. This reflects the level of passive risk exposure for commercial banks.

(3) Control Variables. Beyond real estate factors, banks' credit risk is influenced by numerous other variables. To comprehensively analyze commercial banks' risk dynamics, additional control variables are necessary. Drawing from existing literature, this study selects net interest margin (NIM), loan-to-deposit ratio (LTR), and fiscal pressure (G) as control variables to examine systemic risk changes. Table 4 below details these variables.

**Table 4.** Variable Declaration

	Variable name	Symbol	Variable Definition
Dependent Variable	Credit risk	Wra	Risk-weighted assets to total loans ratio
Explanatory Variables	Outstanding real estate loans	Fdc	Real Estate Loan Balance / Total Loan Balance
	Enterprise Scale	Size	Take the logarithm of the company's total assets.
	Debt-to-Asset Ratio	Lev	Ratio of Total Assets to Total Liabilities
Control Variables	Return on Equity	Roe	The ratio of a bank's net profit to its net assets
	Net interest margin	Nim	Net Interest Income / Interest-Earning Assets $\times$ 100%
	Loan-to-deposit ratio	Ltdr	Total Loans Outstanding / Total Deposits Outstanding $\times$ 100%
	Fiscal pressure	Gov	Fiscal Expenditures / Fiscal Revenues $\times$ 100%
	GDP per capita	Rpgdp	Take the logarithm of the per capita GDP of cities
	Population size	Population	Take the logarithm of the urban population

### 3.3. Model Specifications

The baseline model specifications for this paper are as follows:

$$Wra_{i,t} = \beta_0 + \beta_1 Fdc_{i,t} + \beta_2 X_{i,t} + \delta_i + \eta_t + \varepsilon \quad (1)$$

Here,  $i$  denotes the sample bank,  $t$  represents the year, and  $X$  indicates the control variables.  $\delta_i$  and  $\eta_t$  denote the firm and year fixed effects, respectively, while  $\varepsilon$  is the random error term.  $Wra_{i,t}$  represents the credit risk of bank  $i$  at time  $t$ , and  $Fdc_{i,t}$  denotes the stock of local real estate loans held by bank  $i$  at time  $t$ . The primary estimated coefficient of interest in this paper is  $\beta_1$ . When  $\beta_1 > 0$ , it indicates that an increase in the stock of real estate loans elevates the bank's credit risk.

## 4. Empirical Findings and Analysis

### 4.1. Descriptive Statistics

**Table 5.** Descriptive statistics

Variable	observed	mean	Standard	minimum	maximum
Wra	1624	1.282	0.229	0.855	2.174
Fdc	1624	0.099	0.058	0.028	0.357
Size	1624	22.189	1.193	19.953	25.685
Lev	1624	0.4764	0.1876	0.1014	0.8923
Roe	1624	0.0619	0.1306	-0.6303	0.3582
Nim	1624	2.221	0.478	0.530	3.480
Ltdr	1624	79.115	13.456	47.43	6.56
Gov	1624	1.175	0.087	1.052	1.343
Rpgdp	1624	11.2517	0.6057	9.5831	12.2234
Population	1624	6.2914	0.5240	4.7185	7.4748

According to the descriptive statistics presented in this paper, the mean credit risk of the sample banks is 128.2%, fluctuating within a range of 88.5% to 217.4% with a standard deviation of 22.9%. This indicates significant variation in credit risk across different banks. Additionally, the mean Fdc value is 9.9%, with a minimum of 2.8% and a maximum of 5.8%. This indicates minimal variation in real estate credit scale, suggesting relative stability in this metric that permits meaningful analysis. The descriptive statistics largely align with expectations.

## 4.2. Benchmark Regression

This study examines the impact of local implicit debt risks on the credit availability of enterprises within the region based on Model (1), with regression results presented in Table 6. Column (1) of Table 1 reports results including only independent variables without controlling for firm and year fixed effects, where the estimated coefficient for Fdc is positive and significant at the 1% confidence level. Column (2) of Table 1 adds control variables, while Column (3) further incorporates bank fixed effects and year fixed effects. The estimated coefficient for Fdc remains significantly positive across all columns. Thus, the hypothesis is supported: an increase in the stock of real estate market loans elevates banks' credit risk.

**Table 6.** Baseline regression results

Dependent Variable	(1) Wra	(2) Wra	(3) Wra
Fdc	8.4844*** (6.68)	8.1391*** (13.83)	9.9232*** (13.46)
Controls	NO	YES	YES
Micro FE	NO	YES	YES
Year FE	NO	NO	YES
N	1624	1624	1624
adj.R <sup>2</sup>	0.6352	0.6609	0.8078

Note: \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. The values in parentheses below represent the t-values of the regression coefficients. The same applies to all tables below.

## 4.3. Endogeneity Issues

Although this study controls for firm-level and city-level covariates in the benchmark regression model and further incorporates firm-level and firm-year fixed effects to mitigate the influence of other unobservable factors as much as possible, the results still face endogeneity issues. On the one hand, as proposed in the research hypothesis, the stock of real estate loans affects systemic risk in the banking system. On the other hand, the occurrence of systemic banking risk also influences banks' issuance of real estate loans. To address these potential endogeneity issues, this paper attempts to identify instrumental variables for the stock of real estate loans to mitigate estimation biases that may arise from endogeneity. Following Zhao Can (2020)'s methodology for constructing instrumental variables and building upon Waxman (2020)'s research, this paper employs land transaction prices as an instrumental variable for real estate loans [11].

Table 7 reports the results of the two-stage instrumental variable regression, where Column (1) presents the results of the first-stage regression, while Column (2) shows the results of the second-stage regression. The first-stage regression indicates that the coefficient estimate for the instrumental variable is significantly positive at the 1% level, suggesting that higher land transaction prices correlate with increased real estate loans, thereby confirming the validity of the instrumental variable. The second-stage regression results reveal that the coefficient for fdc remains significantly positive at the 5% level, maintaining the original finding.

**Table 7.** Endogeneity Test

Dependent variable	(1) I Wra	(2) II Wra
Fdc		11.9800** (2.29)
IV	0.0260*** (9.38)	
Controls	YES	YES
Micro FE	YES	YES
Year FE	YES	YES
N	1624	1624
adj.R <sup>2</sup>	0.7052	0.6839

#### 4.4. Robustness Tests

(1) Replacing the Dependent Variable. Considering potential measurement errors in regression coefficients due to variable selection, this study replaces the dependent variable with the ratio of real estate loans to total assets for regression analysis. The regression results are shown in Column (1) of Table 8 below. The outstanding balance of real estate loans (Fdc) is significantly positive at the 1% level. These regression results indicate that the relationship between the outstanding balance of real estate loans and bank credit risk remains significant even after replacing the measurement method of the explanatory variable.

(2) Eliminating interference from exceptional years. To prevent the COVID-19 pandemic outbreak in 2020 from affecting estimation results, the bank samples for that year were excluded. Column (2) of Table 8 shows that the outstanding balance of real estate loans (Fdc) is significantly positive at the 1% level, consistent with the previous findings.

**Table 8.** Robustness Test

Dependent variable	(1) Wra (1)	(2) Wra
Fdc	20.9876*** (11.33)	11.75733*** (10.81)
Controls	YES	YES
Micro FE	YES	YES
Year FE	YES	YES
N	1624	1508
adj.R <sup>2</sup>	0.7731	0.6683

#### 4.5. Heterogeneity Test

The Bank of China, China Construction Bank, Industrial and Commercial Bank of China, Agricultural Bank of China, and Bank of Communications are collectively known as the five major state-owned commercial banks. They exhibit stronger overall profitability and demonstrate greater efficiency in absorbing non-performing loans through capital reserves or loan loss provisions, possessing more avenues for resolving non-performing assets. Additionally, the proportion of real estate enterprise loans differs significantly between the Big Five and non-Big Five banks, with the former allocating a relatively lower share of funds to real estate developers. Therefore, this paper conducts grouped regression analysis on 116 sample banks, separating the Big Five state-owned commercial banks from the remaining 111 sample banks to examine the differing impacts of real estate enterprise loan proportions on each group. The results in Table 9 indicate that real estate enterprise loans do not significantly impact the credit risk of the five major state-owned commercial banks. However, they exert a significant negative effect on the credit risk of the other 111 commercial

banks. This suggests that the five major banks possess stronger risk-bearing capacity due to their substantially larger asset scales compared to other banks. Considering that these five banks implement stricter credit review processes and possess more robust risk management capabilities, an increase in the proportion of real estate enterprise loans does not notably affect their credit risk.

**Table 9.** Heterogeneity Test

Dependent variable	(1)	(2)
	Wra Five major commercial banks	Wra Other banks
Fdc	16.3827 (0.47)	10.2749*** (5.08)
Controls	YES	YES
Micro FE	YES	YES
Year FE	YES	YES
N	320	1304
adj.R <sup>2</sup>	0.8731	0.6473

## 5. Conclusions and Implications

This paper first reviews the overall policy stance and financing-related measures in China's real estate sector since 2023. It then utilizes annual microdata from 116 Chinese banks spanning 2010–2023 to conduct a fixed-effects regression analysis examining the impact of real estate loan stock changes on systemic banking risks. The findings reveal that an increase in real estate loan stock significantly elevates banks' credit risk.

Based on these findings, relevant policy recommendations are proposed. First, in the short term, to prevent a bubble burst, the central bank should lower the reserve requirement ratio to release more funds for corporate and consumer loan demand, facilitate the clearance of existing real estate inventory, and revitalize the market. On the asset side, adopt measures for gradual asset decomposition and disposal to release risks in an orderly manner, prevent moral hazard from liquidity injections, refine the policy framework, and enhance regulatory effectiveness. Second, to prevent overall bubble collapse, lower reserve requirement ratios, increase personal mortgage lending, and accelerate corporate bond issuance after fully assessing developers' credit risks. Third, the long-term solution lies in achieving stable housing prices through institutional reform. Uphold the principle that “housing is for living in, not for speculation,” vigorously develop the housing rental market, and redirect demand toward rental housing through relevant fiscal, tax, and financial measures. Reform the financing system for real estate developers, reduce credit allocation to them, and increase issuance of long-term credit bonds to prevent a positive feedback loop between financial volatility and housing price fluctuations. Implement and refine the REITs system to establish direct financing mechanisms. Steadily advance real estate tax reform while comprehensively considering its incremental impact on local finances, increased burden on residents, and potential negative effects on the banking system.

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