THE FACTORS INFLUENCING NON-PERFORMING LOANS IN REGIONAL BANKS: A CASE STUDY OF DONGYING BANK

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6617195743

AN INDEPENDENT STUDY SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION
GRADUATE SCHOOL OF BUSINESS
SIAM UNIVERSITY
2025

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This Independent Study Has Been Approved as a Partial Fulfillment of the Requirements for the Degree of Master of Business Administration

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Title: The Factors Influencing Non-Performing Loans in Regional Banks: A Case Study of Dongying Bank

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Degree: Master of Business Administration

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21 / 11 / 2025

ABSTRACT

Regional disparities in commercial banks' non-performing loan (NPL) ratios not only reduce the efficiency of interregional capital flows but also adversely affect regional financial stability. Furthermore, such imbalances may hinder coordinated economic development across the country. Therefore, studying the influencing factors of commercial banks' NPLs is essential for promoting synergistic growth in regional banking sectors and ensuring the healthy development of China's economy and financial system. The purpose of this study was to explore the influence of industrial structure upgrading, government intervention and financial technology on NPLs. This study used a quantitative methodology, data were collected through an online questionnaire survey for subsequent statistical analysis and interpretation. The survey was administered electronically to 189 employees at Dongying Bank's Jinan branch, yielding 182 valid responses (96.3% response rate) that were subsequently analyzed using SPSS statistical software. The findings confirm that industrial structure upgrading and financial technology exert statistically significant negative effects on bank non-performing loans, while government intervention exert statistically significant positive effects on bank non-performing loans. Furthermore, this study provides actionable recommendations to inform future development: 1) Maintaining steady regional economic growth and promoting industrial transformation and upgrading, 2) strengthening effective government governance and addressing regulatory gaps, and 3) adapting to financial technology innovations to accelerate financial deepening.

Keywords: non-performing loans, industrial structure upgrading, government intervention, financial technology, Dongying Bank

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to my advisor for her invaluable guidance, support, and encouragement throughout my Independent Study. Her insightful comments and constructive criticism have significantly improved the quality of my work.

Additionally, I am grateful to Associate Professor Dr. Jomphong Mongkhonvanit, Dean, Graduate School of Business, for his support and encouragement throughout my studies. His dedication to the graduate program and commitment to excellence have inspired me to strive for academic excellence.

Finally, I would like to extend my appreciation to all the faculty members and staff of Siam University who have contributed to my growth and development as a student. Their unwavering support and encouragement have been a source of inspiration and motivation to me.

Sun Mengzhu

DECLARATION

I, Sun Mengzhu, hereby declare that this Independent Study entitled "*The Factors Influencing Non-Performing Loans in Regional Banks: A Case Study of Dongying Bank*" is an original work and has never been submitted to any academic institution for a degree.

(Sun Mengzhu)

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Chapter 1 Introduction

1.1 Background of the Study

In a market economy, the banking system acts as the lifeblood of the entire economy. A healthy and transparent banking system facilitates the efficient circulation, allocation, and utilization of financial resources, thereby contributing to sustained and stable economic growth. In China, the banking industry holds a central position in economic development. For a long time, the country has relied primarily on indirect financing, meaning the health of the banking sector indirectly reflects the state of the economy (Yang & Zhang, 2021).

However, because commercial banks are inherently enterprises that manage risk, they possess a natural vulnerability. As a result, various financial risks can impact their operations and may even threaten the stability of the banking sector. Among the different risks assumed by banks, credit risk has been the primary type of risk they have faced since their inception. Banks' asset businesses primarily involve loans and investments, with lending being the most core asset activity (Guo & He, 2019). Credit assets held by banks through their lending operations constitute the largest proportion of their financial assets. Nevertheless, since loans extended by banks carry the possibility of non-repayment of principal and interest, banks inevitably assume credit risk in their lending activities.

Credit risk being one of its major challenges, primarily reflected in the non-performing loan (NPL) ratio (Cheng et al., 2019). The NPL ratio is a crucial indicator of a bank's operational efficiency, profitability, and competitiveness (Li et al., 2018). An excessively high NPL ratio across the banking sector can amplify credit market risks and, in severe cases, even trigger a financial crisis. Therefore, both commercial banks and government regulators must pay close attention to NPL management.

Credit risk reduces the probability that banks can recover the principal and interest of credit assets in accordance with loan agreements, thereby diminishing the quality of these assets. In the event of severe defaults, banks may be unable to recover loan principal and interest, leading to significant asset impairment and a sharp increase in the probability of bank failure. Based on the likelihood of loan repayment, banks regularly assess the quality of their credit assets after issuing loans. According to the internationally adopted five-category loan classification system, banks

generally classify their credit assets into five categories: pass, special mention, substandard, doubtful, and loss (Xu & Zheng, 2018). Among these, substandard, doubtful, and loss categories have a higher probability of credit risk default, and these three types of credit assets are collectively referred to as non-performing loans (NPLs). Furthermore, due to close business and financial interactions among banks, NPL issues in one bank can lead to losses in others. Therefore, the problem of non-performing loans not only negatively impacts individual banks but may also threaten the stability and security of the entire banking system. Due to varying levels of corporate creditworthiness and the growing demand for corporate financing, banks are facing a continuous rise in non-performing loans.

1.2 Questions of the Study

As a vital component of China's banking sector, joint-stock commercial banks play a crucial role in supporting socioeconomic development and facilitating corporate financing. Dongying Bank, as one such joint-stock commercial bank, still faces a relatively high level of non-performing loans (NPLs), which adversely affects its operational performance and competitive position in the industry. Moreover, a continued deterioration in NPLs could trigger a new financial crisis, severely disrupting the stability of the financial sector (Tan & Tuo, 2016). Therefore, managing commercial banks' NPLs remains a critical issue that demands urgent solutions.

Against this backdrop, this study took Dongying Bank as a case study to empirically analyze the key factors influencing its NPLs and proposed targeted preventive measures and recommendations. Accordingly, the research addresses the following key questions:

(1) Does industrial structure upgrading influence NPLs?
(2) Does government intervention influence NPLs?
(3) Does financial technology influence NPLs?

1.3 Objectives of the Study

The 19th National Congress of the Communist Party of China made significant strategic arrangements for deepening financial system reform, emphasizing the importance of safeguarding regional financial stability (Wang & Zhu, 2021). The

sound and stable development of commercial banks across different regions plays a crucial role in maintaining China's overall financial security.

Regional disparities in commercial banks' non-performing loan (NPL) ratios not only reduce the efficiency of interregional capital flows but also adversely affect regional financial stability. Furthermore, such imbalances may hinder coordinated economic development across the country (Ba & Wang, 2015). Therefore, studying the influencing factors of commercial banks' NPLs is essential for promoting synergistic growth in regional banking sectors and ensuring the healthy development of China's economy and financial system.

(1) To explore the influence of industrial structure upgrading on NPLs.
(2) To explore the influence of government intervention on NPLs.
(3) To explore the influence of financial technology on NPLs.

1.4 Scope of the Study

This study conducted a systematic literature review to comprehensively analyze, synthesize, and evaluate domestic and international scholarly works examining the determinants of non-performing assets in commercial banks. Building upon this theoretical foundation, the research specifically focused on non-performing assets in regional commercial banks, and conducted an in-depth analysis of their unique influencing factors and formation mechanisms, with the objective of constructing a theoretical framework and indicator system tailored for assessing non-performing assets in regional banks. Utilizing a quantitative methodology, data were collected through an online questionnaire survey for subsequent statistical analysis and interpretation.

1.5 Significance of the Study

1.5.1 Theoretical Significance

A review of domestic and international literature reveals that scholarly research on non-performing loans (NPLs) in regional commercial banks remains relatively limited. Existing studies predominantly focus on the banking sector as a whole or large commercial banks when examining NPL determinants, often employing similar and restricted sets of indicators. Building upon prior research and incorporating relevant theoretical frameworks, this study systematically develops a theoretical

model to analyze the factors influencing NPLs at Dongying Bank. It investigates the formation mechanisms of NPLs in regional commercial banks, with particular emphasis on the pathways through which various factors in the constructed model affect NPL accumulation. By empirically validating the findings, this research provides a valuable supplement to the existing theoretical foundation.

1.5.2 Practical Significance

Identifying the influencing factors of non-performing loans (NPLs) holds multifaceted value for commercial banks. At the operational management level, precise NPL monitoring provides critical decision-making references for management, enabling timely adjustments to credit policies and optimization of asset allocation. In terms of market competitiveness, lower NPL levels significantly enhance investor confidence and strengthen the bank's market credibility, creating favorable conditions for acquiring quality clients and business expansion. From a financial stability perspective, effective asset quality control helps mitigate regional financial risks and maintains a healthy financial ecosystem.

Particularly during this crucial phase of economic transformation and upgrading, commercial banks that consistently reduce NPLs through improved risk management systems and innovative NPL disposal methods can not only enhance their operational efficiency and core competitiveness but also provide stronger financial support for serving the real economy and promoting high-quality economic development. This approach both implements the national financial security strategy and fulfills the intrinsic requirements for sustainable banking development.

1.6 Definition of Key Terms

(1) Non-performing loans

Non-performing loans refer to substandard loans or overdue loans that have not been repaid. When a borrower fails to repay the principal and interest of a commercial loan according to the original loan agreement, or when there are indications that the borrower is unlikely to repay the loan as scheduled, there is a high probability that the loan will be classified as non-performing by the bank.

(2) Industrial structure upgrading

Industrial structure upgrading refers to the transformative process wherein a nation or region, through technological advancement, optimized resource allocation,

and institutional innovation, transitions its industrial system from traditional modes characterized by low value-added, low technological content, and high energy consumption/pollution to modern industrial paradigms featuring high value-added, advanced technology, and green low-carbon attributes during economic development.

(3) Government intervention

Government intervention refers to the deliberate actions taken by government authorities or regulatory agencies through administrative measures, policy instruments, or legal frameworks to actively engage in economic activities or market operations.

(4) Financial technology

Financial technology refers to an emerging technological sector that innovatively transforms traditional financial services through cutting-edge technologies such as big data, artificial intelligence, blockchain, and cloud computing, thereby enhancing financial efficiency, optimizing user experience, reducing operational costs, and mitigating risks.

Chapter 2 Literature Review

2.1 Theoretical Foundation

2.1.1 Financial Fragility Theory

While Financial Fragility Theory was not initially applied to explain credit relationships, modern research has focused predominantly on the credit market. Among early scholars, Minsky and Kregel produced pioneering work in this area, examining the theory's application from the perspectives of firms and banks, respectively (Minsky, 1995; Kregel, 1997). Theory of Financial Fragility posits that the financial sector's inherent high-leverage operation makes it susceptible to shocks from regulatory failures, moral hazard, and economic cycles. This inherent vulnerability can result in severe consequences, including financial crises, debt crises, widespread corporate bankruptcies, soaring prices or deflation, and high unemployment.

Minsky (1995) was the first to develop a systematic explanation for the fragility of the credit market, forming the "Financial Fragility Hypothesis." From the perspective of firms, he posited that borrowing enterprises can be classified into three categories based on their financial conditions: The first category is hedge borrowers. These firms have expected revenues that can cover both principal and interest at each stage of the loan period. As a result, they possess sufficient funds to repay their debts and are considered low-risk; The second category is speculative borrowers. After obtaining loans, these firms may, for an initial period, have revenues insufficient to cover their debt obligations. However, over the entire duration of the loan, their total expected income is enough to repay the full debt. They still carry a debt gap and are exposed to uncertainties and risks; The third category is Ponzi borrowers. These firms engage in projects with long payback periods, generating insufficient revenue in the short term to cover even the interest due. To sustain operations, they resort to rolling over financing, continually increasing borrowing to repay prior interest obligations.

To elaborate on Minsky's Financial Fragility Theory, Kregel (1997) proposed the "Margin of Safety" concept. From the banking perspective, he viewed the interest commitment guarantee from borrowing firms as the bank's margin of safety. Banks primarily rely on a firm's past credit performance rather than its future expected income when making lending decisions. During economic expansions, prosperous firms exhibit strong earnings and solid credit histories, leading banks to lower their

margin of safety standards and increase lending. This behavior consequently expands their exposure to credit risk. When the economy contracts, defaults become more widespread, significantly increasing the risk of loan losses for banks.

In summary, the studies of Minsky (1995) and Kregel (1997) reveal that the former analyzed financial fragility primarily from the perspective of enterprises, while the latter placed greater emphasis on the banking sector. When the economy shifts from prosperity to recession, both speculative and Ponzi borrowers are likely to encounter difficulties, and the margins of safety in banking undergo significant changes, thereby giving rise to financial fragility.

2.2.2 Information Asymmetry Theory

Information Asymmetry Theory was integrated into economics at a relatively early stage. It evolved from contract theory, challenging the traditional economic assumption of perfect information. In the 1970s, American economist George Akerlof initiated systematic research into information asymmetry, using the used car market as an example. Subsequently, Michael Spence, Joseph Stiglitz, and James Mirrlees further expanded the theory by exploring incentive design, principal-agent problems, and adverse selection, respectively (Chen et al., 2022). Their contributions continuously enriched the theory, which by the late 20th century had gradually developed into the field of information economics.

Information asymmetry refers to a situation in which parties involved in a market transaction have unequal access to information, whether in terms of quantity, quality, or timing of acquisition. While transactions in product and factor markets involve the exchange of goods for money, financial market transactions are based on credit. As a result, the problem of information asymmetry is more pronounced in financial markets. The party at an informational disadvantage is prone to adverse selection before a transaction, while the party with an information advantage is more likely to engage in moral hazard after the transaction (Lu & Ou, 2012).

2.2 Non-Performing Loan (NPL)

Non-performing loans generally refer to substandard loans or overdue loans that have not been repaid. When a borrower fails to repay the principal and interest of a commercial loan according to the original loan agreement, or when there are indications that the borrower is unlikely to repay the loan as scheduled, there is a high

probability that the loan will be classified as non-performing by the bank (Wang, 2017).

There are certain differences in the definition of non-performing loans among various international financial institutions and countries. The International Monetary Fund (IMF) proposes the following definition: "A loan is considered non-performing when payments of interest and/or principal are past due by 90 days or more, or when interest payments of 90 days or more have been capitalized, refinanced, or delayed by agreement. It is also classified as non-performing if payments are less than 90 days overdue, but there are strong reasons to doubt that the loan can be fully repaid" ((International Monetary Fund, 2004). In contrast, the Basel Committee on Banking Supervision (BCBS) does not specify a fixed number of days past due for a loan to be classified as "non-performing." Instead, it provides a broader definition, considering loans as non-performing when "the loan is past due and the bank has not taken any action to recover it, or when the bank determines that the borrower is unable to repay the full amount" (Basel Committee on Banking Supervision, 2002).

Under prevailing regulatory standards, non-performing loans (NPLs) in commercial banks are defined as loans where the borrower has either failed to make scheduled principal or interest payments in accordance with the loan contract terms, or has explicitly demonstrated unwillingness or inability to fulfill repayment obligations (Li, 2020).

The stable operation of the financial system is closely linked to its development environment. Embedded within social, institutional, economic, and cultural contexts, it is influenced and constrained by these factors, often constituting a complex and multifaceted process shaped by numerous intertwined elements. As regional financial institutions, local commercial banks focus on serving local economic development. Their operations are not only susceptible to constraints from the regional industrial structure but are also highly influenced by local government policies and financial technology (Li, 2016). Therefore, in the process of financial transactions, the formation of nonperforming loans should be analyzed within the broader contexts of politics, economy, culture, and society.

2.2.1 Industrial Structure Upgrading and NPLs

With economic development, the labor force has gradually shifted toward the secondary and tertiary industries. Industrial sophistication has advanced from lower to higher levels, with horizontal industrial expansion contributing to a steady increase in

per capita income (Zhang, 2018). Meanwhile, vertical industrial development drives technological upgrading, transforms traditional industries, and extends existing industrial value chains and added value. These dynamics promote high-quality, rational, and healthy economic growth. Industrial structure upgrading refers to the transformative process wherein a nation or region, through technological advancement, optimized resource allocation, and institutional innovation, transitions its industrial system from traditional modes characterized by low value-added, low technological content, and high energy consumption/pollution to modern industrial paradigms featuring high value-added, advanced technology, and green low-carbon attributes during economic development (Liu & Song, 2015).

The asset operations of China's regional financial institutions are predominantly concentrated within their respective localities, making regional industrial structure a significant determinant of bank asset quality (Wang et al., 2018). According to the annual reports published by the China Banking and Insurance Regulatory Commission, non-performing loans of China's commercial banks in recent years have been concentrated primarily in the primary and secondary industries, particularly in agriculture, forestry, animal husbandry, fisheries, and manufacturing. The non-performing loan ratio in these sectors has remained at a high level of around 4%. Among them, the manufacturing sector carries the largest balance of non-performing loans, amounting to approximately 500 billion yuan, far exceeding that of other industries. This indicates that the regional industrial structure has become a significant factor influencing the asset quality of commercial bank loans. Taking city commercial banks as the research subject, Li (2020) employed the ratio of non-agricultural to agricultural output value and the ratio of tertiary to secondary industry output value as measurement indicators. The empirical findings demonstrate that industrial structure upgrading contributes to reducing NPL levels in city commercial banks.

Industrial upgrading primarily influences NPLs of regional commercial banks through optimizing credit demand structure by cultivating higher-quality borrowers with greater development potential, as these enterprises typically exhibit stronger profitability and debt-servicing capacity (Zhang & Chen, 2012), while also mitigating systemic risks through a more diversified industrial structure that helps cushion against credit risks arising from volatility in any single industry sector, thereby enhancing the stability of bank asset quality.

2.2.2 Government Intervention and NPLs

Government intervention refers to the deliberate actions taken by government

authorities or regulatory agencies through administrative measures, policy instruments, or legal frameworks to actively engage in economic activities or market operations (Hu & Yao, 2015). This intervention aims to address market failures, maintain economic stability, and achieve public interests or specific policy objectives.

The accelerated urbanization in China has imposed significant economic pressure on local governments. To bridge fiscal revenue gaps, these governments often attract local commercial banks to extend more "directed" loans by offering incentives such as premium investment opportunities and implicit benefits, primarily to fund infrastructure projects. Consequently, the functioning of local financial market mechanisms is severely constrained by government actions. Such intervention disrupts the voluntary financial contractual relationship between banks and their clients, forcing regional commercial banks to bear implicit burdens at little or no cost, which can easily lead to the persistent accumulation of non-performing loans (Guo et al., 2020). Studies by scholars such as Gu and Zhang (2021) have consistently demonstrated that excessive government intervention exacerbates non-performing loan (NPL) risks by reducing financial efficiency. Zhang et al., (2022) argued that political incentives and performance evaluation pressures compel local government officials to blindly pursue regional GDP growth, thereby significantly distorting resource allocation. Generally, government intervention driven primarily by fiscal deficit pressures and career advancement motives indirectly influences commercial banks' resource allocation, consequently intensifying NPL risks.

Local government intervention can also exert positive effects on the non-performing loans (NPLs) of regional banks. For instance, when a major local enterprise encounters financial distress, banks may simultaneously withdraw credit, which could lead to the abrupt collapse of the enterprise and immediately turn its loans into non-performing assets. By stepping in to coordinate and organize collective loan extensions or rollovers, the local government can buy the enterprise valuable time to restructure or explore new markets, thereby avoiding the immediate default of a large-scale loan (Zhang & Peng, 2017). Furthermore, through initiatives such as attracting investments, establishing industrial parks, and offering subsidies and policy support, local governments actively foster emerging industries like digital economy, new energy, and advanced manufacturing. These efforts help cultivate a pool of new and promising high-quality clients for banks, optimize the structure of bank lending, and fundamentally reduce the potential for future NPL generation.

2.2.3 Financial Technology and NPLs

Financial technology refers to an emerging technological sector that innovatively transforms traditional financial services through cutting-edge technologies such as big data, artificial intelligence, blockchain, and cloud computing, thereby enhancing financial efficiency, optimizing user experience, reducing operational costs, and mitigating risks (Sun et al., 2017).

Based on Information Asymmetry Theory, there is an imbalance in the access to information between transacting parties. The party with relatively insufficient information is often at a disadvantage in market economic activities, leading to adverse selection. This constitutes a major reason why local commercial banks face relatively high moral hazard and credit risk. Meanwhile, numerous scholars argue that financial development helps mitigate information asymmetry. The fundamental driver of financial development is financial innovation (Xie, 2019). Levine (1997) was among the first to observe a mutually reinforcing relationship between financial development and technological innovation: financial development relies on technological advances, while technological innovation, in turn, progresses through the process of financial development. By enhancing the tracking, quantification, and monitoring of client creditworthiness, speculative financing demand is reduced. This approach transforms a one-time game between lenders and borrowers into a repeated game. Motivated by the pursuit of long-term benefits, clients have a stronger incentive to proactively establish and maintain a positive credit record to secure ongoing access to loans, thereby effectively lowering the non-performing loan ratio of rural commercial banks.

Wang (2017) posited that applying financial technology to financial infrastructure could significantly enhance its service quality and efficiency. Generally, robust infrastructure enabled financial institutions to collect and process information more rapidly and effectively, thereby improving both the efficiency of credit allocation and the quality of lending. Specifically, client credit-sharing platforms built on financial technology technologies - such as artificial intelligence, big data, and cloud computing - expanded the coverage of credit information collection and improved the accuracy of credit assessments by comprehensively capturing existing client data and mining potential insights (Li, 2020). These platforms established an effective mechanism for recording and disseminating credit information, mitigated information asymmetry, and provided commercial banks with critical tools to manage and prevent credit default risks.

2.3 Conceptual Framework

The research framework of this study is illustrated in Figure 2.1. The process begins by identifying factors that influence non-performing loans (NPLs) in regional banks. Through reviewing relevant literature and theoretical foundations, key factors affecting NPLs are identified. Building on this and considering the specific context of Dongying Bank, hypotheses regarding the influencing factors of NPLs are proposed.

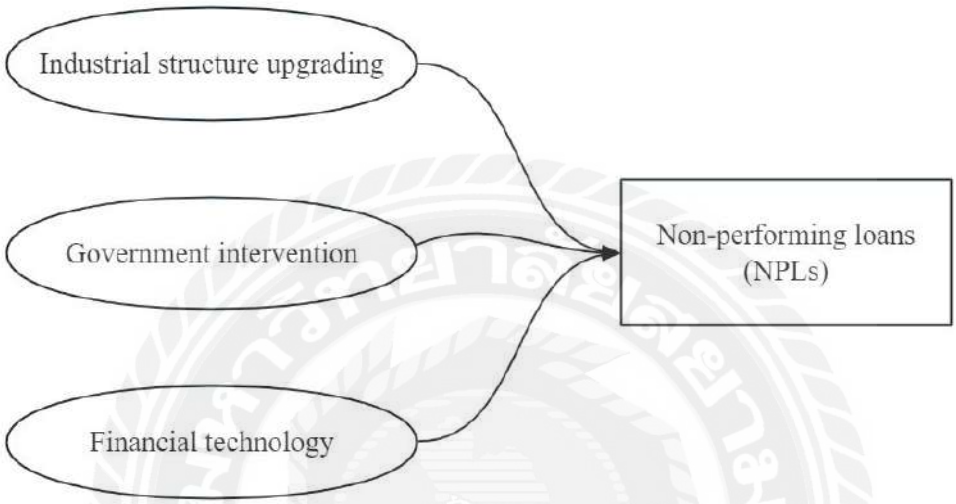

Figure 2.1 Conceptual Framework

Chapter 3 Research Methodology

3.1 Research Design

This study examined the determinants of non-performing assets in regional banks, building upon prior analysis to develop an influential factor model. Utilizing a quantitative methodology, data were collected through an online questionnaire survey for subsequent statistical analysis and interpretation. The structured questionnaire incorporated two key components: demographic information about respondents (including gender, age, marital status, educational background, and tenure at the bank) to ensure representative sampling across critical variables, followed by a substantive section employing a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree" to measure key constructs. After rigorous reliability and validity testing, the survey was administered electronically to 189 employees at Dongying Bank's Jinan branch, yielding 182 valid responses (96.3% response rate) that were subsequently analyzed using SPSS statistical software.

3.2 Population and Sample

Dongying Bank Jinan Branch was officially established on March 23, 2015, as a subsidiary of Dongying Bank Co., Ltd. The branch operates businesses approved by Chinese banking regulatory authorities, including deposits, loans, and bill discounting. In 2023, it launched the innovative financial product "Keying E-Loan" and formed a dedicated team to provide comprehensive credit services for technology-based enterprises. This study selected Dongying Bank Jinan Branch as a case for examining the influencing factors of non-performing loans in regional banks, primarily for the following reasons: as the provincial capital and regional economic center of Shandong, Dongying's industrial structure combines both traditional industrial foundations and emerging industrial development characteristics, which effectively reflects the asset quality pressures and risk profiles faced by regional banks during economic transition. Additionally, since its establishment in 2015, the branch has accumulated nearly a decade of mature business experience. The branch has continuously introduced innovative financial products and established professional teams to develop financial services, making it a suitable sample for observing the impact of financial technology and business innovation. The survey respondents consisted of 189 employees directly involved in credit approval, risk management, and customer service.

3.3 Hypothesis

In response to the limitation in existing literature on non-performing loan influencers, which primarily focuses on the macro-national level or single factors and lacks a comprehensive examination of the multidimensional drivers of regional banks, this study proposes the following hypotheses:

H1: Industrial structure upgrading has a significant negative effect on NPLs.
H2: Government intervention has a significant positive effect on NPLs.
H3: Financial technology has a significant negative effect on NPLs.

3.4 Research Instrument

Based on the research objectives and hypotheses of this study, the following questionnaire content was determined.

The first section covers the respondents' basic information, including gender, age, marital status, educational background, and tenure at the bank.

The second section constitutes the main body of the questionnaire. It employs a five-point Likert scale, with responses ranging from "Strongly Agree" to "Strongly Disagree," to facilitate respondents' assessment of importance based on their personal perceptions. Corresponding scores of 5, 4, 3, 2, and 1 are assigned to these options. Given the relatively large number of items, the statements are designed to be succinct and logically coherent, enabling respondents to make accurate and efficient judgments, The specific scale items, are shown in Table 3.1 below, and the complete questionnaire is provided in the Appendix.

Table 3.1 Measurement Scale for Influencing Factors of NPLs

Variables	No.	Measurement item
Industrial structure upgrading	1	The rapid development of high-tech industries and modern services in our region has reduced our bank's credit reliance on traditional high-energy-consumption sectors.
	2	The effective exit of "zombie enterprises" in the region has diminished the sources of potential non-performing assets for our bank.
	3	The widespread improvement in corporate profitability driven

		by industrial upgrading has strengthened the overall debt repayment capacity of our corporate clients.
	4	The refinement and clustering of local industrial chains have lowered the operational volatility of enterprises that have received credit from our bank.
Government intervention	5	Some of our bank's credit decisions are influenced by local government industrial policies or administrative guidance.
	6	The bank-enterprise matching events organized by local government have sometimes led our bank to extend loans to enterprises that do not meet our internal risk control standards.
	7	To align with local development plans, our bank's loan portfolio has become highly concentrated, thereby increasing the potential risk of our asset portfolio.
	8	In order to maintain local employment or social stability, our bank is sometimes required to continue providing credit support to certain financially distressed local enterprises.
Financial technology	9	The automated post-loan management system has enhanced our bank's efficiency in monitoring the use of loan funds, thereby preventing fund diversion.
	10	The big data-based enterprise profiling and rating system has made our credit decisions more objective and reduced human judgment errors.
	11	The digitized loan process has mitigated moral hazard by preventing individual relationship managers from relaxing risk control standards to meet performance targets.
	12	The precision marketing enabled by financial technology has lowered our customer acquisition costs, allowing us to focus more on loan quality rather than quantity.
NPLs	13	Our bank implements strict and consistent standards for the recognition of non-performing assets.
	14	The current level of non-performing asset exposure is generally aligned with our previous risk predictions.
	15	Our bank has implemented effective controls over asset risks that may arise from related-party transactions.
	16	The accuracy of our bank's credit asset classification results is reliable.

3.5 Reliability and Validity Analysis of the Questionnaire

3.5.1 Reliability Analysis of the Questionnaire

The internal consistency and stability of a survey questionnaire determine the quality of the scale. Based on established models and scales from both domestic and

international sources, this study developed its own scale by focusing on the topic of non-performing loans in regional banks. In academic research, Cronbach's α coefficient is generally used to assess the reliability of the data. The value ranges between 0 and 1, with higher values indicating greater internal consistency. Specifically, a value between 0.7 and 0.8 indicates high reliability; a value between 0.8 and 0.9 indicates very high reliability; and a value above 0.9 suggests extremely high reliability.

Table 3.2 Questionnaire Reliability Analysis Results

Scale	Items	Cronbach's α
Industrial Structure Upgrading	4	0.809
Government Intervention	4	0.845
Financial Technology	4	0.824
Non-Performing Loan	4	0.784

According to the reliability coefficients of each scale, the Cronbach's alpha values for industrial structure upgrading, government intervention, financial technology, and non-performing loan are 0.809, 0.845, 0.824, and 0.784, which is above the 0.7 threshold. This indicates a high level of overall reliability for the questionnaire.

3.5.2 Validity Analysis of the Questionnaire

Most scholars currently evaluate the validity of survey questionnaire data through validity analysis. This approach effectively measures the relevance of the data to the research topic, which is fundamental to any follow-up analysis. This study employed the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity to verify the validity of the questionnaire.

Table 3.3 Questionnaire Validity Analysis Results

KMO measure		0.825
Bartlett's test of sphericity	Approximate Chi-Square	4217.474
	Degrees of freedom	327
	Sig.	0.000

As shown in Table 3.3, the KMO measure of sampling adequacy is 0.825, indicating a good structural validity of the questionnaire. Furthermore, Bartlett's test of sphericity yields a significance level that is infinitely close to zero, leading to the rejection of the null hypothesis. This result further confirms the validity of the

questionnaire, justifying the proceeding to subsequent analyses

3.6 Data Collection

To ensure the scientific validity and accuracy of the survey data analysis, the questionnaires were administered through an online platform. A total of 189 questionnaires were distributed and 189 were returned. After excluding invalid and unusable responses, 182 valid questionnaires remained, accounting for 96.3% of the total collected. The criteria for identifying invalid questionnaires were as follows: completion time less than 100 seconds, all answers concentrated in a single option, or responses showing obvious repetition patterns.

3.7 Data Analysis

The analysis in this study was conducted by employing SPSS to process the valid sample data collected from the questionnaires. Descriptive statistics were conducted on the participants' demographic information to analyze the frequency distribution of these variables. Correlation analysis was employed to examine the degree of association between variables. The correlation coefficient ranges from -1 to 1, with a higher absolute value indicating a stronger relationship between the two variables. Finally, multiple regression analysis was employed to examine the extent of the impact of the three independent variables on non-performing assets, the dependent variable.

Chapter 4 Findings

4.1 Demographic Characteristics of Respondents

In Table 4.1, the demographic characteristics of the respondents reveal a gender distribution skewed towards female respondents, with 79 males (43.4%) and 103 females (56.6%). Age distribution analysis indicates a predominance of young and middle-aged participants, where the 26-35 age group constitutes the largest cohort (72 respondents, 39.6%), followed by the 36-45 group (54 respondents, 29.7%). The below-25 (34 respondents, 18.7%) and above-46 (22 respondents, 12.0%) groups demonstrate relatively balanced proportions.

Marital status data shows a significantly higher proportion of unmarried respondents, with 109 single participants (59.9%) compared to 73 married ones (40.1%). Educational attainment displays a distinct pattern of higher qualifications, where bachelor's degree holders form the largest subgroup (82 respondents, 45.1%). The combined percentage of master's degree (58 respondents, 31.9%) and doctoral degree holders (35 respondents, 19.2%) exceeds 50%, while those with sub-bachelor qualifications account for merely 7 respondents (3.8%).

The distribution of employee tenure shows that the largest group consists of those with 2-5 years of experience (36.3%), constituting nearly two-fifths of the total sample, followed by employees with 5-10 years of experience (25.8%). Overall, staff with more than two years of tenure account for 82.3% of the total sample, which reflects a stable and experienced workforce base in the branch, while also indicating a meaningful proportion (17.7%) of newly recruited employees.

Table 4.1 Demographic Analysis Results

Survey Items	Category	Number of people	Percentage (%)
Gender	Male	79	43.4
	Female	103	56.6
Age	Below 25 and 25	34	18.7
	26-35	72	39.6
	36-45	54	29.7
	46 and above 46	22	12.0
Marital Status	Married	73	40.1
	Single	109	59.9

Education Level	Below bachelor's degree	7	3.8
	Bachelor's degree	82	45.1
	Master's degree	58	31.9
	Doctoral degree	35	19.2
Tenure at the bank	Below 1 year	32	17.7
	2-5 years	66	36.3
	5-10 years	47	25.8
	Above 10 years	37	20.2

4.2 Correlation Analysis

Table 4.2 Correlation Analysis Results

Dimension	Industrial Structure Upgrading	Government Intervention	Financial Technology	NPLs
Industrial Structure Upgrading	1			
Government Intervention	0.317**	1		
Financial Technology	0.341**	0.437**	1	
NPLs	-0.403**	0.446**	-0.379**	1
Notes: NPLs means non-performing loans **Representing significance at the 1% level respectively				

This study examined the correlation between industrial structure upgrading, government intervention, financial technology, and non-performing loans (NPLs) in the banking sector. The results reveal statistically significant relationships among these variables at the 1% level. Specifically, industrial structure upgrading demonstrates a strong negative correlation with NPLs (coefficient = -0.403), while government intervention shows a significant positive association with NPLs (coefficient = 0.446). Similarly, the development of financial technology exhibits a negative correlation with NPLs (coefficient = -0.379).

4.3 Multiple Regression Analysis

Table 4.3 Multiple Regression Analysis Results

	Non-standardized coefficient		Standardized coefficient	t	p	R^2	Adjusting R^2	F
	B	Standard Error	Beta					
(Constant)	0.425	0.131	-	3.244	0.000	0.637	0.631	64.377
Industrial Structure Upgrading	-0.432	0.114	-0.369	-3.789	0.000			
Government Intervention	0.358	0.044	0.442	8.316	0.000			
Financial Technology	-0.513	0.122	-0.327	-4.205	0.000			

This study used multiple regression analysis to examine the impact of industrial structure upgrading, government intervention, and financial technology on bank non-performing loans (NPLs). The results demonstrate that the model possesses statistically significant explanatory power overall ($F=64.377$, $p<0.001$), accounting for 63.1% of the variation in NPLs ratios (adjusted $R^2=0.631$).

Industrial structure upgrading exhibits the most pronounced negative effect on NPLs ($\beta=-0.369$, $p<0.001$); government intervention shows a significant positive influence ($\beta=0.442$, $p<0.001$); financial technology development displays a negative association with NPLs ($\beta=-0.327$, $p<0.001$). The empirical findings of this study indicate that promoting industrial structure upgrading and developing financial technology are effective measures for addressing non-performing loans in regional banks. In contrast, optimizing the methods and boundaries of government intervention calls for further scrutiny in future research.

Chapter 5 Conclusion and Recommendation

5.1 Conclusion

The rise in the non-performing loan (NPL) ratio undermines the core competitiveness of commercial banks and hinders the stable development of the social economy. Following the subprime mortgage crisis, the NPL ratios of various types of regional banks in China have shown significant divergent trends. Therefore, while understanding the overall situation of the industry is essential, achieving refined management of non-performing loans requires an in-depth analysis of the influencing factors behind the NPLs of regional banks. Based on the analysis in this study, the following main conclusions are drawn:

This study selected Dongying Bank as the research subject and analyzed the formation mechanisms and influencing factors of non-performing loans from both theoretical and empirical perspectives. Theoretically, based on Financial Fragility Theory and Information Asymmetry Theory, this study reviewed relevant literature and constructed a theoretical model framework for the formation and influencing factors of non-performing loans in regional banks from three dimensions: Industrial Structure Upgrading, Government Intervention, and Financial Technology.

In the empirical section, this study adopted a quantitative analysis approach, utilizing survey data from employees of Dongying Bank Jinan Branch. Through correlation and regression analysis, the theoretical model and research hypotheses were systematically tested, leading to the following main conclusions:

First, industrial structure upgrading has a significant negative impact on the non-performing loan ratio of regional banks. This indicates that the optimization and transformation of the regional economic structure can effectively reduce credit risk in the banking system. As traditional high-energy-consumption and high-liability industries are gradually replaced by technology-intensive and service-oriented industries, the overall debt repayment capacity and operational stability of enterprises improve, thereby reducing the generation of non-performing assets at the source. This finding is consistent with the research conclusions of Li (2020).

Second, government intervention has a significant positive impact on the non-performing loan ratio of regional banks. This reflects that, in the process of promoting economic development or maintaining social stability, local governments

may influence bank credit decisions through administrative guidance or policy directives, leading to the allocation of some credit resources to less efficient or policy-risky sectors. Although such intervention may support localized growth in the short term, it increases the potential risks of bank assets in the long run and is detrimental to the healthy functioning of the credit market. This finding is consistent with the research conclusions of Gu and Zhang (2021) and Zhang et al. (2022).

Third, financial technology development has a significant negative impact on the non-performing loan ratio of regional banks. This demonstrates that the deepening application of digital technology in the financial field significantly enhances banks' risk management capabilities. This finding is consistent with the research conclusions of Wang (2017). Financial technology enables banks to assess client creditworthiness more accurately and optimize credit processes, thereby effectively curbing the formation of non-performing loans at the operational level.

5.2 Recommendation

5.2.1 Maintaining Steady Regional Economic Growth and Promoting Industrial Transformation and Upgrading

Local government authorities should capitalize on strategic opportunities by identifying optimal pathways for economic restructuring, leveraging local resource endowments and comparative advantages to tailor industrial layout optimization. Through modernizing traditional industries and cultivating promising specialty sectors, they can develop new economic growth drivers to propel regional development.

On one hand, local government departments should seize the strategic window of opportunity by accurately identifying the direction for economic restructuring and transformation. Building on local resource endowments and inherent development advantages, they should optimize the industrial layout in a context-specific manner. By upgrading traditional industries and cultivating promising, distinctive sectors with competitive advantages, they can identify new drivers of economic growth and inject strong momentum into regional economic development.

On the other hand, banks should treat regional industrial restructuring as an opportunity for their own operational transformation. In line with policy trends and the inherent logic of industrial upgrading, they ought to proactively adjust their business focus, including the positioning of and service models for key industries. By

concentrating on local strategic sectors with competitive advantages and closely aligning product design and resource allocation with customer characteristics and needs, banks can enhance operational efficiency and reduce their non-performing loan ratios.

5.2.2 Strengthening Effective Government Governance and Addressing Regulatory Gaps

Local governments should proactively establish scientific and rational mechanisms for official performance evaluation and supervision, aiming to fundamentally mitigate the two primary motives for government intervention—fiscal deficit pressures and career advancement incentives. By adopting a reformed governance assessment framework, they can transform governmental functions and adjust intervention approaches accordingly. This entails reinforcing market-driven resource allocation principles, empowering banks to conduct lending activities in accordance with market mechanisms, thereby enhancing both resource allocation efficiency and credit quality.

In operational development, regional banks should continuously enhance their ability to forecast economic conditions and market changes, increase their sensitivity to shifts in economic policies, cultivate talent in financial trend prediction, and establish robust early-warning mechanisms. By adopting more forward-looking credit strategies, they can better mitigate regional financial risks arising from economic fluctuations.

Given the typical pro-cyclical nature of the banking industry, relevant government departments should formulate appropriate policies and strengthen counter-cyclical adjustments to prevent and control credit risks. During periods of rapid economic growth, raising the benchmark lending rate can help curb excessive credit expansion. Conversely, during economic downturns, lowering the benchmark lending rate can reduce financing costs for businesses and individuals, thereby curbing the growth of non-performing loans and maintaining a stable and progressive economic environment, which supports sustainable and high-quality regional development.

Furthermore, government authorities should continue to deepen supply-side structural reforms in the financial sector. By promoting effective investment and consumption, they can support the healthy development of the real economy, reduce financing costs and debt burdens, and stimulate its vitality and competitiveness.

Through continuously optimizing the regional economic development environment and improving the operational conditions of the real economy, potential risks of non-performing loans in regional banks can be mitigated at the source.

5.2.3 Adapting to Financial Technology Innovations to Accelerate Financial Deepening

Technological innovation is an inevitable direction for financial development. The deep integration of technology and finance has caused rural commercial banks to face both traditional financial risks and technology-related risks. Therefore, while leveraging the advantages of fintech and big-data thinking to build smart financial infrastructure and intelligent risk prevention systems, banks must also remain vigilant against the compound risks arising from the combination of technology and finance. They need to skillfully harness technological capabilities and strengthen their proactive risk prevention awareness and risk resilience.

Furthermore, banks can enhance their databases and risk control models by strengthening communication and cooperation with technology companies. By utilizing tech firms' strong R&D capabilities and extensive risk management experience, banks can improve the sensitivity and accuracy of their risk monitoring systems. This enables timely identification of abnormal transactions among related entities and effective oversight of the allocation and usage of loan clients' credit funds, thereby further preventing the formation of non-performing loans during the fund circulation process.

5.3 Limitations and Future Research

This study analyzed the influencing factors of non-performing loans in regional banks, using Dongying Bank as a case study, and proposed countermeasures for risk prevention. However, certain limitations remain, which point to potential avenues for future research：

(1) This study primarily examined the impact of industrial structure upgrading, government intervention, and financial technology on non-performing loans in regional banks. However, it is possible that other significant influencing factors were not included in the model, which may have affected the results to some extent. Therefore, future research should explore this topic further by incorporating a more comprehensive set of influencing variables to derive more explanatory conclusions.

(2) This study provides recommendations for the prevention and management of non-performing loans (NPLs) in regional commercial banks. Given the significant differences in the factors influencing NPL ratios across various types of regional banks, their NPL issues cannot be addressed with a one-size-fits-all approach. It is essential to implement prevention and management strategies tailored to their specific characteristics and individual circumstances. Similarly, when formulating policies, government and regulatory authorities should also take these differences into account to achieve more refined and precise supervision.

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Appendix

Dear Participant,

This research investigates the influencing factors of non-performing assets in regional banks. We sincerely thank you for taking part in this survey, which will require approximately 5-10 minutes of your time. The questionnaire is anonymous in nature and will be used solely for academic purposes. There are no right or wrong answers; we simply ask that you respond based on your actual experience and genuine perceptions.

Your contribution is of great significance to this study and will greatly assist our bank in improving its practices.

Section One: Basic Information

1. Your gender:
   A. Male B. Female
2. Your age:
   A. Below 25 and 25 B. 26-35 C. 36-45 D. 46 and above 46
3. Your marital status:
   A. Married B. Single
4. Your education level:
   A. Below bachelor's degree B. Bachelor's degree
   C. Master's degree D. Doctoral degree
5. Your tenure at the bank:
   A. Below 1 year B. 2-5 years
   C. 5-10 years D. Above 10 years

Section Two

1. The rapid development of high-tech industries and modern services in our region has reduced our bank's credit reliance on traditional high-energy-consumption sectors.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

2. The effective exit of "zombie enterprises" in the region has diminished the sources of potential non-performing assets for our bank.

A. Strongly Disagree B. Disagree C. Not Sure

D. Agree E. Strongly Agree

3. The widespread improvement in corporate profitability driven by industrial upgrading has strengthened the overall debt repayment capacity of our corporate clients.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

4. The refinement and clustering of local industrial chains have lowered the operational volatility of enterprises that have received credit from our bank.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

5. Some of our bank's credit decisions are influenced by local government industrial policies or administrative guidance.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

6. The bank-enterprise matching events organized by local government have sometimes led our bank to extend loans to enterprises that do not meet our internal risk control standards.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

7. To align with local development plans, our bank's loan portfolio has become highly concentrated, thereby increasing the potential risk of our asset portfolio.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

8. In order to maintain local employment or social stability, our bank is sometimes required to continue providing credit support to certain financially distressed local enterprises.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

9. The automated post-loan management system has enhanced our bank's efficiency in monitoring the use of loan funds, thereby preventing fund diversion.

A. Strongly Disagree B. Disagree C. Not Sure

D. Agree E. Strongly Agree

10. The big data-based enterprise profiling and rating system has made our credit decisions more objective and reduced human judgment errors.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

11. The digitized loan process has mitigated moral hazard by preventing individual relationship managers from relaxing risk control standards to meet performance targets.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

12. The precision marketing enabled by financial technology has lowered our customer acquisition costs, allowing us to focus more on loan quality rather than quantity.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

13. Our bank implements strict and consistent standards for the recognition of non-performing assets.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

14. The current level of non-performing asset exposure is generally aligned with our previous risk predictions.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

15. Our bank has implemented effective controls over asset risks that may arise from related-party transactions.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree

16. The accuracy of our bank's credit asset classification results is reliable.

A. Strongly Disagree B. Disagree C. Not Sure
D. Agree E. Strongly Agree