



# Analysis of the Impact of Macroeconomic Factors on Non-Performing Loans of Commercial Banks

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**Abstract.** At present, the total balance of non-performing loans of major commercial banks shows a rising trend, which not only seriously weakens the economic support role of commercial banks, but also seriously affects the net profit income and economic asset quality of commercial banks. The national financial system under macroeconomic cognition adheres to the business philosophy of simultaneous development of indirect financing and direct financing, which means that if commercial banks have a credit crisis, it will cause a total collapse of the national financial system. In order to cope with the above problems, this paper conducts a study on the influence of macroeconomic factors on commercial banks' non-performing loans, defines the meaning of non-performing loans by analyzing the concepts related to macroeconomic factors, and then starts from the perspective of classifying commercial banks' non-performing loans and studying their industry distribution characteristics and financial vulnerability. According to the logical framework presentation, the ability of four categories of factors, namely, economic growth, inflation, unemployment, and monetary policy, to influence commercial banks' non-performing loans is determined separately.

**Keywords:** Macroeconomic Factors; Commercial Banks; Non-Performing Loans; Economic Growth

## 1 Introduction

At present, Chinese commercial banks mainly refer to the experience and methods of other developed countries for credit risk assessment, and there is no original quantitative credit risk assessment model that has been formed. However, with the continuous development of the country's financial industry, a variety of new financial products have emerged, which has opened up the path of financial development in China, but has also brought a series of credit asset security problems. [1] The existing research mainly considers two aspects: macro factors and micro factors. Firstly, while exploring the mechanism of micro action of non-performing loan rate of commercial banks, the current development of macroeconomic policy is determined based on the relationship between investment means and non-performing loan balance; then, the changes in the values of GDP growth rate, broad money supply growth rate, consumer price index, unemployment rate and other indicators are analyzed to determine the capital structure

of financial assets of commercial banks; finally, the liquidity and stability capacity of financial assets of commercial banks are judged with the help of theoretical analysis models.

In the course of their academic research, Wang Ching and Bai Xue used the CCA model to assess the level of individual risk of commercial banks, and then calculated the changes in the values of financial default correlation indicators during the crisis period according to the POT-Copula method.[2] This new research idea argues that at the current stage, the individual risk of commercial banks in China shows a rapid increase in development, and in the period of deepening financial reform, this business model is likely to increase the systemic financial risk of commercial banks and make them much less profitable. Compared with other national joint-stock banks, commercial banks have relatively weaker stability capacity, and if they remain in a state of low profitability development for a long period of time, it may affect the rate of return of financial capital, which will have an impact on the economic returns of depositors. In order to cope with the above situation, the ability of macroeconomic factors to influence commercial banks' non-performing loans is studied, and based on this, effective methods to solve the problem of rising non-performing loan balances in commercial banks are explored.

## 2 Concepts Related to Macroeconomic Factors

Macroeconomics involves various factors such as the degree of economic development of a country, the industrial structure of the economy, the composition of the national economy, and the total national economic income and expenditure. For a country, macroeconomics can be approximated as the level of national economic input at the macro level, representing both the position occupied by regional economic income in the larger international economic picture and the ability of the national economy in general to perform in daily economic activities.[3] The relationship between aggregate supply and aggregate demand is an important factor influencing the direction of national economic policy. In the case of a series of developing countries such as China, the total social demand is always greater than the total supply that the country can provide, so when formulating economic policies, we should focus on solving the problem of unbalanced development of regional economies, so that the overall economic income can flow to the market quickly, so that more people can gain from it.

Let  $t$  denote a randomly selected time node,  $i_t$  denote the economic development characteristics of the country at node  $t$ ,  $R_t$  denote the total national economic return at node  $t$ ,  $u$  denote the total economic supply provided by the country, and  $\hat{y}$  denote the total national economic demand. By associating the above physical quantities, the expression of macroeconomic action capability can be defined as

$$P = \frac{\hat{y}^2(R_t)}{u \cdot i_t} \quad (1)$$

With the continuous development and progress of society, macroeconomic factors are also involved in the overall activities of the national economy, such as commercial bank loans.

### 3 Overview of Non-Performing Loans of Commercial Banks

#### 3.1 Definition of The Concept of Non-Performing Loans

Non-performing bank loans is an important concept in the field of economics, in the context of commercial banking, specifically refers to economic assets that cannot be repaid on time to the bank that issued the loan, in macroeconomic cognition, if the value of non-performing loans is large and delayed for too long, it may lead to the risk of bankruptcy of commercial banks due to the inability to recover the principal, the specific solution expression is:

$$\chi = P \frac{E_1}{E} \times 100\% \quad (2)$$

Where  $E_1$  denotes the non-performing loan balance and  $\tilde{E}$  denotes the total loan balance of commercial banks. Under the role of macroeconomic factors, the higher the level of the NPL ratio  $\chi$  takes, the greater the share of non-performing loan balances, and in this case, the relatively higher economic vulnerability of commercial banks. Suppose a commercial bank has a large number of non-performing loans, and the amount of non-performing loan balance will increase with the extension of operation time, which will affect the bank's economic system, in this case, if other units or organizations continue to lend to the bank, the bank will fall into economic crisis due to excessive total loans, which will also pose a threat to the country's macroeconomic stability. In order to maintain the economic stability of banks, when the non-performing loans approach a critical value, the relevant banking institutions will recover the loans by various means, which is an effective way to ensure that the commercial bank operating system can remain stable.

#### 3.2 Non-Performing Loan Classification of Commercial Banks

In order to facilitate management, the classification of non-performing loans by commercial banks follows the two methods of "overdue and bad loans" and "five levels of classification", and the specific classification criteria are shown in Table 1.

**Table 1.** Classification methods of non-performing loans of commercial banks

Project	Overdue And Bad Loans	Five Level Classification Method
Attribution	The People's Bank of	People's Bank of China
Unit	China	

Content	Commercial bank loans are classified into four basic types: normal, overdue, stagnant and doubtful, of which overdue, stagnant and doubtful loans belong to the category of non-performing loans	Classifies commercial bank loans into five basic types: normal, concern, subordinate, doubtful and loss, among which subordinate, doubtful and loss belong to the category of non-performing loans.
Scope of application	Applicable to commercial banks with small scale and single business model	The classification standard is more complete and applicable to all kinds of large, medium and small commercial banks, and is also commonly adopted by the World Bank, the International Monetary Fund and the Organization for Economic Cooperation and Development

Because of the diversity of domestic commercial banks' business model and economic scale, one over two dull criteria and five levels of classification criteria exist simultaneously when classifying non-performing loans.

### 3.3 Industry Distribution

In terms of available data, the distribution of non-performing loans of domestic commercial banks has obvious industry-specific characteristics. In recent years, several major industries such as wholesale and retail, industrial manufacturing, excavation and mining, and building and construction have relatively high levels of non-performing loans. The following table shows the industry ranking of the average NPL ratio of two types of commercial banks, namely Pudong Development Bank and Ping An Bank, in the past five years.

**Table 2.** Non-performing loan rate statistics of commercial banks [8]

	Industry	Average Non-Performing Loan Ratio/ (%)		Industry	Average Non-Performing Loan Ratio/ (%)
Pudong Development Bank	Wholesale and retail	12.35	Ping An Bank	Wholesale and retail	6.70
	Real Estate	5.27		Real Estate	3.62
	Manufacturing			Manufacturing	
	Excavation and Mining	3.28		Hotel & Restaurant Accommodation	2.35
	Building Construction	2.71		Excavation and Mining	1.53
	Real Estate	1.54		Real Estate	1.64

In terms of the values in Table 2, domestic commercial banks' non-performing loans mainly originate from the wholesale and retail industry and the industrial manufacturing industry, which are relatively less affected by time compared to the phased development industries such as real estate, but due to the size of the market and the large number of participating enterprises, the ensuing non-performing loan balances also have a serious impact on the economic development of commercial banks.

### 3.4 Non-Performing Loans Financial Vulnerability

Under the influence of macroeconomic factors, once an enterprise encounters financial difficulties, it will not be able to pay off the principal and interest of the bank, and for commercial banks, they will not be able to recover economic costs and profits in time, and they will be forced to fall into the crisis of market exclusion and face bankruptcy. If the country's financial market is sick, it will lead to commercial banks can not play the function of gathering wealth and regulating the macroeconomic model, which will not only make the country's overall economic level decline rapidly, but also make the major enterprises face the triple pressure of not being able to collect back the money, not being able to sell goods and not getting loans, especially in the period of rapid economic development, if it can not maintain the economic stability of commercial banks while effectively control the balance of non-performing loans, it will highlight the vulnerability of the country's finances, thus contributing to the continued low level of national economic income.[4] The following figure reflects the ability of macroeconomic factors to influence the non-performing loan balances of commercial banks.

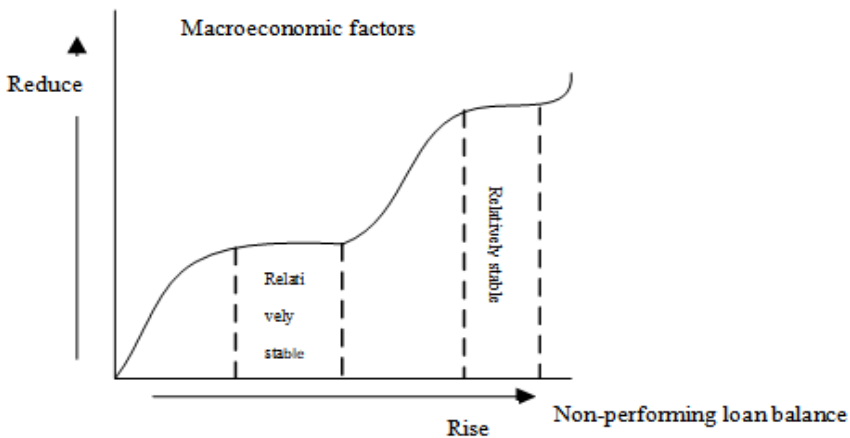


Fig. 1. Impact of macroeconomic factors on non-performing loan balances of commercial banks

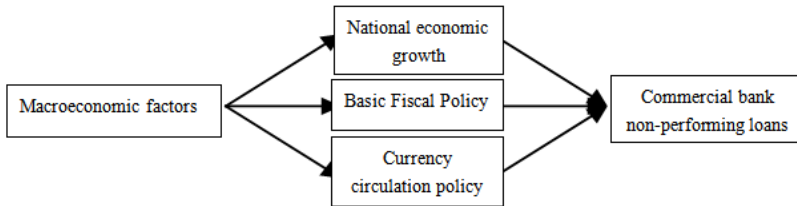
Analysis of Figure 1 shows that with the reduction of macroeconomic factors' influence ability, the balance of non-performing loans of commercial banks shows a rising change state, which means that the influence of macroeconomic factors on non-performing loans of commercial banks is the reverse promotion effect, but in the whole

process, the balance of non-performing loans will appear several times in a relatively stable development stage, within this stable value stage, the vulnerability level of the national financial system is relatively low, which is also the best time for the state to intervene in non-performing loans of commercial banks.

## 4 Theoretical Analysis

### 4.1 Logical Framework

Combined with the development characteristics of the national economy, macroeconomic development is an objective factor that leads to commercial banks' non-performing loans, and the growth or decline of non-performing loan balances is always directly influenced by the variability of macroeconomic development. To some extent, the influence of the macroeconomic environment on the financial model of commercial banks is a double-edged sword, i.e., it provides broad external conditions for survival and also provides an economic supporting role for the formation of non-performing loans.[5] The basic economic guidelines for commercial banks stipulate that macroeconomic factors are directly influenced by the country's economic growth, basic fiscal policy and monetary circulation policy, which, under certain circumstances, may lead to the creation of non-performing loans. The following figure reflects the path framework of macroeconomic factors affecting commercial banks' non-performing loans.



**Fig. 2.** Framework of the impact path of macroeconomic factors on commercial banks' non-performing loans

In terms of the path framework shown in Figure 2, macroeconomic factors are mainly manifested in three aspects: national economic growth, basic fiscal policy, and monetary circulation policy, and changes in these three external economic environment conditions will have an impact on commercial banks' non-performing loans, so it can also be considered that macroeconomic factors play an indirect role in influencing commercial banks' non-performing loans.

### 4.2 Economic Growth and Non-Performing Loans

Since social development is characterized by significant stages, the economic effects that may be triggered by economic growth in different periods of development can also be significantly different. For commercial banking units, the level of economic risks

they bear at different stages under the influence of macroeconomic factors is also different [6]. Combined with the characteristics of economic development, the situation of non-performing loan balance can be summarized into four stages: initial - growth rate shift - maturity - decline. In the initial stage, the country's overall economic development is slow, commercial banks do not have the ability to issue a large number of loans, so the overall level of non-performing loan balance is relatively low; speed shift stage, the country's economy has entered a period of rapid development, the basic fiscal policy, monetary circulation policy have significantly changed, more and more individuals and units began to apply for loans from commercial banks, so the level of non-performing loan balance is also In the mature stage, the country's economy enters a period of stable development, and the individuals and units that have applied for loans need to repay regularly, and the individuals and units that have applied for loans do not need to issue loan applications urgently; in the recession stage, the country's overall economy is in a state of regression, and the individuals and units that have applied for loans do not have the ability to repay steadily, so the level of non-performing loan balances will show an urgent increase in development.

### 4.3 Inflation and Non-Performing Loans

If the state requests financing from the central bank, the relevant commercial banking organizations will provide financing for the state by issuing more money. Although this practice can temporarily alleviate the problem of low money circulation in the market, it will lead to a rapid increase in prices, and if the residents continue to shop in the same way, the quantity level of goods purchased will decrease, and the missing part will become additional economic benefits for the state due to inflation compared to the original purchase level, and this behavior will also increase the non-performing loan balance of commercial banks. Let  $\sigma$  denote the inflation rate,  $C_0$  denote the original purchase of goods, and  $C_1$  denote the post-inflation purchase of goods, and by associating equation (2), the expression for the effect of inflation on the non-performing loan balances of commercial banks can be defined as

$$B = \frac{\sqrt{\sigma(C_1 - C_0)}}{\chi \cdot |\Delta T|} \quad (3)$$

Where  $\Delta T$  denotes the duration of the inflationary effect.

### 4.4 Unemployment And Non-Performing Loans

Enterprises and residents are the main objects of commercial bank loans. From the perspective of enterprises, if the company layoffs in large quantities, it means that the overall national macro-economy is in a weak state at the current stage. In order to reduce operating costs, enterprises have to lay off staff to ensure the stable operation of the company's internal economic assets. At this time, if layoffs still cannot improve the economic income of the enterprise, it will lead to the continuous rise of the total non-

performing loan balance of commercial banks [7]; From the residents' point of view, unemployment means that they lose their stable income in the future, and it is difficult for them to continue to repay their loans on time. In third and fourth tier cities with low consumption and low income levels, small non-performing loans do not have a serious impact on the economic system of commercial banks, while in first tier cities, residents' loans become the core component of commercial banks' loans, and if they cannot repay their loans within a specified period of time, the economic system of commercial banks will receive heavy damage.

#### **4.5 Monetary Policy and and Non-Performing Loans**

In order to meet the expansion needs of the national monetary policy, the central bank will inject a large amount of currency in circulation into the market, which will cause the total amount of loanable funds of commercial banks to increase and the average loan interest rate to remain low, thus stimulating people's desire to borrow. In special development situations, the state may also implement tight monetary control policies, the total amount of money in circulation in the market is greatly reduced, commercial bank loan interest rates are forced to rise, at this time, enterprises and individuals will face the problem of increased loan costs, part of the individuals and units may directly abandon the loan, which has a negative impact on economic profitability, has occurred loans can not be returned on time to banks, resulting in the increase of non-performing loan balances of commercial banks.

## **5 Conclusion**

Combining the above-mentioned research, it can be seen that the solutions to the problem of rising non-performing loan balances in commercial banks are as follows:

(1) While adapting to macroeconomic factors, try to avoid frequent changes in economic policies, on the one hand, to guarantee the stability of economic income of enterprises and individual borrowers, so that they have the ability to repay their loans on time, on the other hand, to control the level of unemployment rate of the population within a certain range standard, so that individual borrowers will not make their ability to repay their loans in a period of time, while for enterprise loan recipients For enterprises, the state can take certain economic management measures so that their revenues do not decline too significantly over a period of time.

(2) The economic development model of commercial banks is appropriately revised and the qualification of lenders is strengthened. For the less qualified borrowers should take the measure of not lending, one can effectively avoid the emergence of non-performing loans, and the other can maintain the stability of the bank's daily income and expenditure; for the more general qualified borrowers to take the measure of less lending, and should strictly require the repayment time; for the more qualified borrowers to take the lending measures of multiple reviews, should accurately grasp the personal credit situation of the borrower before releasing the loan, and strictly verify their economic inflow and outflow in recent years.



(3) In the context of the new economy, macroeconomic factors can be understood as the total development system of the national economy, including the state of economic activities and operations, and the state has always encouraged the development of this type of economic factors, which is the main reason for the expansion of economic and financial trade of commercial banks.

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