

Research on risk assessment of P2P online lending industry

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Abstract: As the advance of P2P online lending, it fully reflects the advantages different from traditional financial institutions. It provides a way for self-employed individuals and small, medium and micro-sized enterprises to find it difficult to borrow money, and also gathers investors' idle funds to help investors obtain higher returns. However, many risks of P2P lending are exposed due to problems such as platform running and capital chain breaking. Nowadays, the development of P2P online lending is facing a bottleneck. It is of practical significance to study the evaluation system of P2P online lending and how to better prevent and control platform risks. This paper studies the risks of P2P online lending industry under the mode of Internet finance. Firstly, it expounds the relevant theories of Internet finance, and then explains the general situation of the whole P2P industry, and analyzes five major financial risks. Then the analytic hierarchy process is used to establish the risk assessment system of P2P network lending industry. Finally, according to the results of risk assessment system, the paper puts forward corresponding Suggestions for P2P online lending industry. This study provides ideas for P2P platforms to evaluate their own risks and puts forward measures to prevent risks, so as to help P2P platforms break through the development bottleneck and move towards the long-term development road.

1. Introduction

1.1 Research background and significance

1.1.1 Research background

Relying on online platforms and using Internet finance as the medium, online lending can help small enterprises to ease their financing difficulties and provide effective ways for individual funds to realize diversified investment. However, with the rapid development of P2P lending, the risks brought by the whole industry cannot be ignored. In the past two years, the occurrence of P2P thunderstorms fully exposed the huge risks behind the network lending. The instability of the

platform makes investors lose confidence and makes the whole industry shake. In the context of the downward development of industrial economy, studying the risk factors and preventive measures of P2P network lending can effectively play the role of risk prevention and control^[1].

1.1.2 Research significance

The research significance of this paper: first, in the risk analysis of P2P industry, we can learn which aspects are important regulatory indicators, so that platforms can be more aware of their own problems and improve their awareness of risk prevention. Second, in the process of Internet financial development, P2P thunderstorms quickly exposed the Internet financial industry hidden huge risks and hit the key. By evaluating the risk indicators of P2P industry, studying the risk factors and preventive measures of P2P lending, it is of reference significance for the risk control and supervision of Internet finance industry.

1.2 Research methods

(1) Literature research method: this paper takes "Internet finance", "P2P lending", "risk control" and other keywords to search relevant literature, and summarize, sort out and analyze the literature. Learn the relevant theoretical research and results of Internet finance, and learn the research methods of risk assessment.

(2) Analytic hierarchy process (AHP) : this paper establishes the assessment index of financial risk of P2P industry, calculates the weight of the index with AHP, and finally analyzes the risk factors of P2P network lending.

(3) Quantitative research method: through the analysis of literature and the understanding of relevant scholars' Suggestions, this paper establishes a matrix to directly reflect the impact of different risk indicators on the P2P industry numerically.

1.3 Innovation points of the paper

This paper studies the risk assessment and preventive measures of P2P online lending industry under the background of Internet finance. Adopted the analytic hierarchy process (AHP) could be divided into two levels, the risk index and combining quantitative and qualitative analysis method, through relevant scholars to evaluate each index respectively, to determine the index weight, finally from the data on more intuitive and accurate reflection of the influence of different indexes of P2P industry degree, help for now net lending industry put forward reasonable Suggestions on the risk prevention and control.

2. Development status and risks of P2P industry

2.1 Analysis of the current situation of P2P network lending

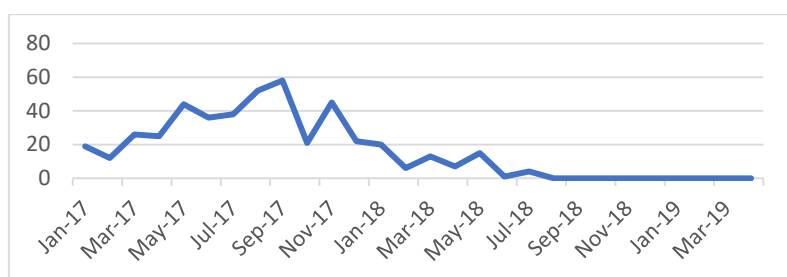


Figure 1 changes in the number of P2P online lending platforms from 2017 to April 2019

From the perspective of the number of platforms: figure 1 shows that from 2017 to April 2019, the increment of P2P network platforms was relatively stable in the middle of 2017, with an average increment of 30 platforms per month. It reached the peak in early 2018 and then plummeted until the increment reached 0 in recent months.

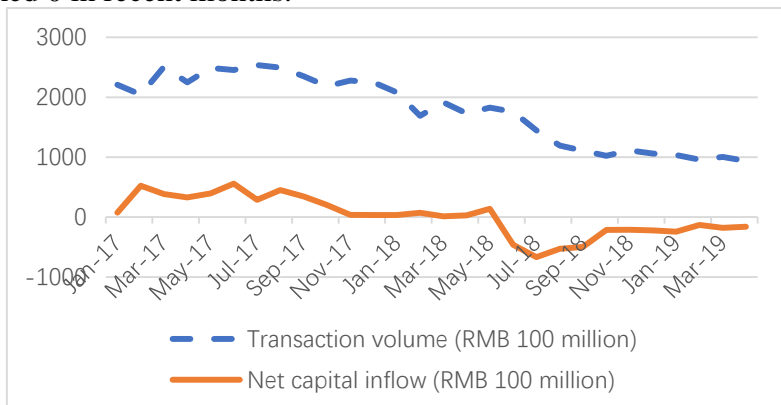


Figure 2 fund operation of P2P online lending platforms from 2017 to April 2019

From the perspective of platform funds, FIG. 2 shows that from 2017 to April 2019, the turnover of P2P network platforms declined significantly, from 233.7 billion yuan in 2017 to 149.5 billion yuan in 2018 to 93.774 billion yuan in April 2019, with an average annual decline of 37%. The net capital inflow of the platform achieved zero return at the beginning of 2018, and it has even been negative growth since June 2018.

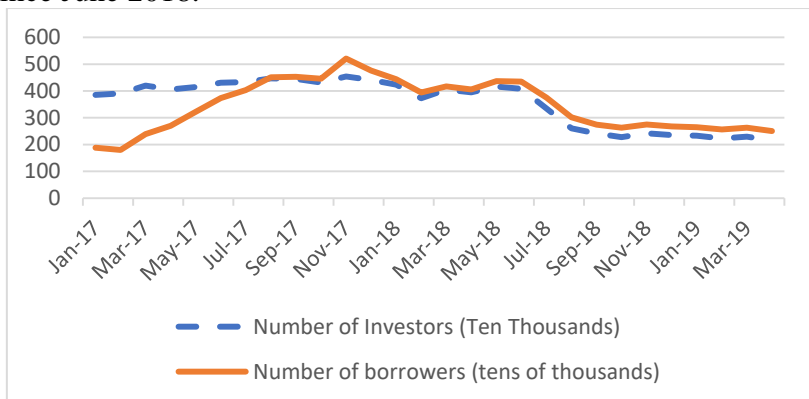


Figure 3 changes in the number of borrowers of P2P online lending platforms from 2017 to April 2019

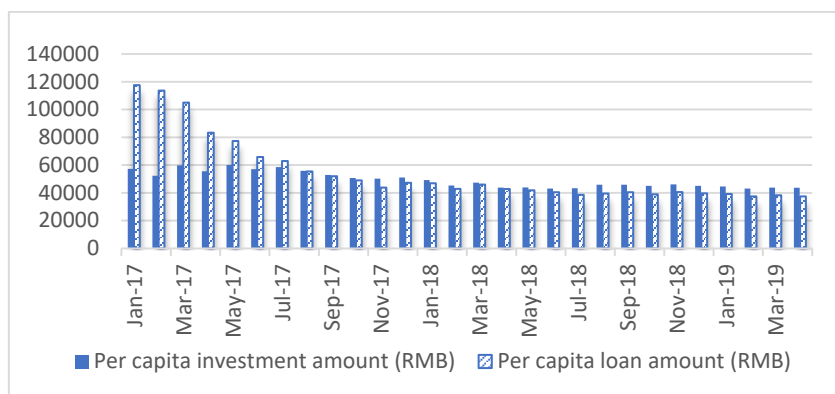


Figure 4 changes in lending amount of P2P online lending platforms from 2017 to April 2019

From the perspective of platform activity: figure 3 and 4 show that from 2017 to April 2019, the number of borrowers on the platform increased significantly in the middle of 2017, and remained stable in the first half of 2018, with the average amount of borrowing around 65,000 yuan. It can be seen that users on the platform have high stickiness and active transactions. And since July 2018, lending both sides appear in significant decline, borrowing amount is only about 39100 per capita, compared with before, drop about 40%, reflected people's confidence in the platform is abate, reluctant to put money into the platform to obtain profits, resulting in lower platform activity.

The results of the analysis from the above three perspectives show that the P2P industry developed rapidly in 2017, fell back in 2018, and weakened. By 2019, the overall development of P2P online loan industry appeared fatigue and faced a bottleneck. It can be seen that since 2018, the outbreak of online credit risk has exerted a huge impact on the development of the whole industry. Internet financial risk prevention is urgent^[2].

2.2 Risk types of P2P online lending

2.2.1 Information security risks

On P2P lending platforms, lenders and borrowers need to keep detailed records of personal information, such as income, ability, assets, and family status. In the era of Internet and big data, and due to the numerous P2P platforms, short development time, imperfect management mechanism, lax legal supervision, and other reasons, the information of both lenders and lenders is more likely to be leaked, putting personal information security at risk.

2.2.2 Credit risk

Credit risk refers to the possibility that the borrower's failure to perform in accordance with the contract will bring losses to investors and platforms in the process of financial transactions linked by credit relationship. The improper performance of the borrower not only reduces the borrower's own credit and makes it difficult to obtain more funds, but also increases the default rate of the platform and makes investors lose confidence in the platform. Investors will not choose the platform for capital investment, thus bringing losses to enterprises^[3].

2.2.3 Market risk

In the past two years, numerous P2P platforms have run away in an endless stream, seriously damaging the reputation of platforms and causing investors to lose confidence in the market. The occurrence of P2P thunderstorms fully exposed the drawbacks of Internet finance, and the national law began to strictly examine the platform, making the market environment more severe. The number of credit companies fell by half in 2018 compared with 2017, and annual transactions also fell sharply, according to the data. Tougher market conditions have created new challenges for borrowers raising capital.

2.2.4 Business risks

Although the P2P network lending process is simple and the capital operation is fast, the requirements on the platform related technology and management are improved. There are mainly two aspects of platform operation risk. First, as the platform itself, it lacks professional credit risk management personnel in its organizational structure and does not have the knowledge and qualification of loan risk management, so it is difficult to grasp and deal with the problems in the operation process. Second, the platform has improper operating strategies, blindly pursuing high

profits and lax audit of borrowers, resulting in a large number of bad debts and facing the risk of bankruptcy^[3].

2.2.5 Financial risk

Many platforms, as intermediaries between lenders and borrowers, not only fail to adopt third-party fund management platforms to properly manage investors' funds but also use investors' funds for business operations. This phenomenon of self-borrowing results in no one controlling and taking risks. When problems occur in the fund operation of the platform, the platform will run away due to overload, and investors will bear huge financial risks and losses.

3. Risk assessment of P2P lending industry

3.1 Overview of AHP

Analytic hierarchy process (AHP) is a hierarchical weight decision analysis method. Analytic hierarchy process (AHP) according to the nature of the problem and to achieve the overall goal of, the problem is decomposed into different form factors, and according to the correlation between influence factors and subordinate relations will be according to the different hierarchical aggregation combination, formed a multi-level analysis structure model, and eventually make the question comes down to the lowest layer relative to the top of the determination of the relative weight or relative pros scheduled^[4].

3.2 Selection of risk indicators

The selection of risk assessment indicators in this paper will follow the principles of relevance, testability, typicality, and dynamics. After analysis, the risk assessment indicators are determined as follows:

Target layer: risks of P2P network lending industry.

Table 1 risk assessment index setting of P2P lending industry

Primary risk index	Secondary risk index
Information security risk A	System safety certification a
	The default rate on b1
Credit risk B	Loan amount b2
	Number of borrowers b3
	Platform operating time c1
Market risk C	Number of platforms c2
	Platform type c3
	D1 registered capital
Business risk D	Transaction cost d2
	Current asset turnover rate d3
	Volume d4
Financial risk E	Rate of return on assets e1
	Asset-liability ratio e2

3.3 Determination of risk index weight

3.3.1 Construction of judgment matrix

The scale and meaning of the judgment matrix are shown in table 2:

Table 2 scale and meaning of judgment matrix

scale	meaning
1	The two factors are equally important
3	One factor is slightly more important than the other
5	Compared with the two factors, one factor is obviously more important than the other
7	One factor is more important than the other
9	One factor is more important than the other
Two, four, six, eight	The median value of the two adjacent judgments above,
The bottom	The judgment of the comparison between factor I and j a_{ij} , then the judgment of the comparison between factor j and I $1/a_{ij}$.

In order to make the constructed judgment matrix more reasonable and the results more convincing, the importance of different indicators was finally assessed by looking for teachers from relevant research groups in schools and reading relevant books. That's how you set up the judgment matrix. The results are as follows:

$$\text{First-level index judgment matrix: } P = \begin{bmatrix} 1 & 1/3 & 3 & 1/5 & 1/5 \\ 3 & 1 & 5 & 1/3 & 1/3 \\ 1/3 & 1/5 & 1 & 1/6 & 1/6 \\ 5 & 1/3 & 6 & 1 & 3/2 \\ 5 & 1/3 & 6 & 2/3 & 1 \end{bmatrix}$$

Second-level index judgment matrix: $A = A = 0.0841$

$$B = \begin{bmatrix} 1 & 4 & 6 \\ 1/4 & 1 & 3 \\ 1/6 & 1/3 & 1 \end{bmatrix}$$

$$C = \begin{bmatrix} 1 & 3/2 & 1/2 \\ 2/3 & 1 & 1/3 \\ 2 & 3 & 1 \end{bmatrix}$$

$$D = \begin{bmatrix} 1 & 1/2 & 1/5 & 1/3 \\ 2 & 1 & 1/4 & 1/3 \\ 5 & 4 & 1 & 2 \\ 3 & 3 & 1/2 & 1 \end{bmatrix}$$

$$E = \begin{bmatrix} 1 & 2/3 \\ 3/2 & 1 \end{bmatrix}$$

3.3.2 Single-level sorting

Hierarchical single ranking is the ranking of the importance of each factor in the hierarchy for a certain factor at the previous level.

1) Normalize the matrix: $w'_{ij} = \frac{w_{ij}}{\sum_{i=1}^n w_{ij}}$

2) Calculate the maximum feature root: $\lambda_A = \frac{1}{n} \sum_{i=1}^n \frac{(Aw)_i}{w_i}$

3.3.3 Matrix consistency test

Consistency test of matrix is to test the logicity of the importance of each factor to prevent the contradiction of evaluation.

1) Consistency index: $CI = \frac{\lambda - n}{n - 1}$

2) Random consistency index RI

3) Consistency ratio: $CR = \frac{CI}{RI}$ When $CR < 0.1$, it is considered that the weight of each factor calculated by the judgment matrix is reliable through consistency test.

3.3.4 Establishment of risk assessment system

Input the value of the judgment matrix into MATLAB, run the program, calculate and get CI and CR, and the results show that the consistency test of the judgment matrix is acceptable. On the premise that the consistency of matrix is acceptable, the weights of various risk indicators are finally obtained, and the results are shown in table 3:

Table 3 risk assessment system of P2P lending industry

Primary risk index	First-level index weight	Secondary risk index	The relative weight of secondary indicators	Absolute weight of secondary indicators
Information security risk A	0.0841	System safety certification a	0.0841	0.0841
Credit risk B	0.1787	The default rate on b1	0.6910	0.1235
		Loan amount b2	0.2176	0.0389
		Number of borrowers b3	0.0914	0.0163
Market risk C	0.0452	Platform operating time c1	0.2727	0.0123
		Number of platforms c2	0.1818	0.0082
		Platform type c3	0.5455	0.0247
Business risk D	0.3273	D1 registered capital	0.0835	0.0273
		Transaction cost d2	0.1248	0.0408
		Current asset turnover rate d3	0.4875	0.1596
		Volume d4	0.3043	0.0996
Financial risk E	0.3646	Investment yield e1	0.4000	0.1458
		Asset-liability ratio e2	0.6000	0.2188

According to the results in table 3, financial and operational risks have the greatest impact on P2P lending industry, accounting for 36.46% and 32.73% respectively. Among these two risks, the asset-liability ratio, current asset turnover rate and investment return rate are the key indicators to be evaluated, and their impact on P2P lending industry reaches 21.88%, 15.96% and 14.58%. The second is credit risk, which accounts for 17.87 percent, with default rates accounting for nearly 70 percent. Followed by 8.41% information security risk and 4.52% market risk. Platforms should pay more attention to these risks, especially the assessment indicators that have a great impact on risks need to be monitored.

4. P2P network loan industry risk prevention countermeasures

4.1 Reasonably arrange the capital structure and establish a comprehensive budget system

Up to now, P2P lending industry has gone through a process from "hot" to "cool". Now, there are bottlenecks in the development of the industry, with a sharp decrease in profits, and it is difficult for enterprises to achieve the promised return on investment to creditors, resulting in increased debt burden and financial risks. Therefore, first, P2P platforms should be moderately indebted and use financial leverage. At the same time, they should also control the negative effects brought by financial leverage, so as to reduce the operating costs of the platforms. Secondly, a comprehensive budget system should be established to timely understand the cash flow of enterprises, strengthen

financial management and effectively prevent financial risks of P2P platforms^[5].

4.2 Optimize organizational structure and achieve compliance operation

Due to the short development time and immature market operation, the organization structure of P2P online loan industry lacks professional risk management personnel, and the platform require high requirements of financial and Internet-related knowledge, so it is difficult for industry personnel to deal with problems in the operation process. The platform needs to continuously improve the quality of risk management of company personnel, regulate the rights and obligations of platform stakeholders, and optimize the organizational structure.

Many P2P platforms are not operated properly. The top management of enterprises blindly pursue high profits while ignoring the control of risks, and the audit of borrowers is not strict, resulting in a large number of bad debts. In order to continue to operate, platforms even use investors' funds. In this regard, the platform needs to operate in compliance, set up separate accounts for investors' funds and platform funds, and formulate strict internal control system, so as to reduce business risks^[6].

4.3 Establish credit evaluation system and strengthen customer management

In the past two years, a large number of P2P platform runaway incidents and the rise of borrower default rate have caused huge property losses to investors, and they are lack of confidence in the online loan industry. Platform users are not only contributors to profits, but also a big source of risks.

The platform needs to establish a credit evaluation system, and the network examination of borrowers should be more strict, so as to understand the borrower's solvency in real time, provide different risk services for customers with different risk ratings, and standardize the payment collection channels. In addition, a unified user credit evaluation system should be established among various platforms. The whole industry should mark borrowers with poor credit to prevent borrowers from submitting loan applications on different platforms and making transactions^[7].

4.4 Strengthen the construction of risk management system

The risk prevention of P2P platform is closely related to the monitoring of relevant indicators. Through the real-time monitoring of risk assessment indicators, data processing, risk measurement, and other methods, the risk prevention can be better carried out. In this regard, the platform should strengthen the construction of risk management system, give play to the advantages of Internet finance, which are different from traditional financial institutions, integrate the Internet technology and the process of big data and risk index monitoring, improve the data analysis ability, enhance the risk prevention ability of the whole P2P industry, and promote the healthy development of P2P platforms.

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