Value Evaluation on Data Assets of P2P Net Loan Platform

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Abstract. P2P net loan platform is the emerging force of economic development. The value evaluation on data assets of P2P net loan platform plays an important role in distinguishing the value of the data assets, providing a reference to improve the value of the data assets, and promoting the future development of the P2P platform. By analyzing the characteristics of the data assets of the P2P net loan platform, this paper proposes to evaluate the value of the data assets by using the B-S model. In the process of evaluation, the analytic hierarchy process is used to confirm the value of the underlying data assets and improve the B-S model. Finally, we conduct an empirical study on five P2P net loan platforms by using the improved model, and make suggestions on how to improve the value of data assets of P2P net loan platform.

1. Introduction

With the further popularization of the Internet and the continuous development of the financial industry, the Internet financial enterprises emerge as the times require [1]. The P2P net loan platform is the backbone of the Internet financial enterprises [2]. During the gradual expansion of the user groups of P2P net loan platforms, a large amount of raw data will be generated [3]. The raw data becomes a kind of asset of the platform after continuous accumulation. At the same time, based on modern technology such as data mining, the platform can also extract the raw data accumulated on the platform to a greater extent and improve the value of the information [4, 5]. Therefore, it becomes a core issue to evaluate the value of the data assets of P2P net loan platform.

Similar to intangible assets, the data assets of P2P net loan platform can be measured and confirmed in the way of analogous intangible assets [6]. The traditional evaluation methods of intangible assets include cost method, equity method and market method, all of which turn into real option method, analytic hierarchy process and expert evaluation method after further evolution [7-9]. The real option method is mainly used to assess the value of assets with greater uncertainty under the dynamic environment, and the data assets of P2P net loan platform conform to this assessment environment [10]. The real option method mainly includes B-S model, binomial model and Roll-Geske-Whaley model [11-13]. By analyzing the characteristics of the P2P net loan platform as well as the characteristics of its data assets, this paper obtains the necessity of the data asset evaluation and the influencing factors of the evaluation. The analytic hierarchy process is used to confirm the value of the underlying data assets of the platform, and the B-S model method is used to evaluate the value of the data assets of the P2P net loan platform.

2. Characteristics of data assets of P2P net loan platform

The P2P net loan platform is characterized by its low cost, high efficiency and high risk. In the process of analyzing the value of the data assets, we have found the following issues: On one hand, when the
P2P net loan platform is in operation, it gathers raw data about the large demand of enterprise users and consumer information. The accumulated raw data becomes considerable data assets, but this kind of data assets is relatively intuitive and of low value. On the other hand, the valuable information can be extracted from the raw data. The data assets with better quality can be obtained after integration and summarization, so as to bring more benefits to the P2P net loan platform. The data assets of P2P net loan platform have the following main characteristics:

1. Dynamics. The P2P net loan platform has frequent moving users and uncertain number of users. The amount of data assets is constantly changing and dynamic.

2. Mining. The data assets of P2P net loan platform mainly come from the user's consumption process. In this process, a lot of raw data is accumulated and the quality of data is improved by taking modern technical means such as data mining. The data assets with higher quality are extracted, integrated and processed, thus creating greater profit margin for the enterprise.

3. Risky. There has always been the problem of network information security, especially for the P2P net loan platform, of which the problem is more prominent.

3. Data asset evaluation model of P2P net loan platform

The data asset evaluation of P2P net loan platform refers to the effective evaluation on the real value of the data assets of the P2P net loan platform itself through a suitable model framework. In this paper, the B-S model is used to evaluate the value of data assets of the P2P net loan platform. In the B-S model, the underlying data assets of the platform should be considered. By analyzing the components of the underlying data assets of the platform and evaluating the weight of the component factors of each part through the analytic hierarchy process, we have determined the underlying value of data assets of each P2P net loan platform. Based on the parameters of the underlying data assets and other parameter data, we finally evaluate the value of the data assets of the platform through the B-S model.

3.1 The calculation of the value of the data assets of the P2P net loan platform

The underlying assets in financial derivatives refer to the assets agreed in the Derivatives Contract, namely the financial instrument or commodity that can be bought or sold by the option holder. If this concept is extended to the P2P net loan platform, the underlying data assets of the platform are more similar to the intangible assets and are in the main form of data.

3.1.1 The composition of the underlying data assets of the platform

Through the analysis of the assets composition of the P2P net loan platform and the related data, the P2P net loan platforms mainly include the comprehensive interest rate, the number of investors, the number of borrowers, and the accumulated sum to be returned. According to the four types above, the data assets of the P2P net loan platform is composed of the loan income of the platform, the investor's data assets and the borrower's data assets.

The loan income of the platform mainly refers to the interest income of the platform by lending the corresponding money to the borrower in operation, which is obtained in accordance with the comprehensive interest rate in the loan cycle. The investor's data assets refer to the average income that may be brought by each investor, which is calculated in accordance with the number of the investors of the platform and based on the data of platform in the past years. The borrower's data assets refer to the average income that may be brought by each borrower, which is calculated in accordance with the number of the borrowers of the platform and based on the data of platform in the past years. Finally, combined with the three aspects, the value of the underlying data asset of P2P net loan platform is calculated.

3.1.2 Analytic hierarchy process to calculate the weight of components

Analytic hierarchy process (AHP) refers to a qualitative and quantitative, systematized and hierarchical decision analysis method of hierarchical weight. This paper uses the analytic hierarchy process (AHP) to confirm the three components of the underlying data assets of the platform, namely
the loan income of the platform, the investor's data assets and the borrower's data assets. The basic ideas are as follows:

According to the factors that affect the data assets of enterprises, three indexes are determined and a hierarchical structure model is established. According to the loan income of the platform, the investor's data assets and the borrower's data assets, we find that there is a difference in determining the final value of the platform's data assets, and the difference can be quantified by constructing a judgement matrix. When comparing the importance of two factors, we mark the importance as follows: A is equally important; B is slightly important; C is relatively important; D is very important; E is absolutely important. By using relevant scoring method, we invite relevant industry experts to score and construct the following judgment matrix:

\[
\begin{pmatrix}
1 & 1/2 & 1/3 \\
2 & 1 & 2/3 \\
3 & 3/2 & 1
\end{pmatrix}
\]

(1)

After obtaining the judgment matrix, we calculate the weight vector \( \omega = (\omega_1, \omega_2, \omega_3) \) through the yaahp software. Among them, \( \omega_1 \) is the weight coefficient of the loan income of the platform; \( \omega_2 \) is the weight coefficient of the investor's data assets; \( \omega_3 \) is the weight coefficient of the borrower's data assets. Finally, after consistency test, we obtain the weight coefficients of the three factors.

3.1.3 The calculation of the value of the underlying data assets of the platform

Through the analytic hierarchy process, we confirm the weight of the components of the underlying data assets, get the proportion of each component in the total value of the underlying data assets, and finally confirm the value of the underlying data asset of the P2P net loan platform. Through the analysis of the underlying data of each platform, this paper puts forward four calculation formula in terms of the loan income of the platform, the investor’s data assets, the borrower’s data assets and the underlying data assets of the platform. Let \( L_w, I_{de}, \) and \( B_{de} \) denote the loan income of enterprise, the investor’s data assets, and the borrower’s data assets, respectively. Let \( A_d \) and \( C_{ir} \) be the amount to be returned on the day and the comprehensive interest rate, respectively. Let \( N_i, T_j, \) and \( N_d \) be the number of investors, the turnover on the day, and the number of investors on the day, respectively. Let \( N_b \) and \( N_{bd} \) be the number of borrowers and the number of borrowers on the day, respectively. Suppose \( U_a \) is the underlying assets of Internet financial enterprises. The concrete calculation formula is as follows:

\[
L_w = \frac{\sum A_d - A_d \cdot (1 + C_{ir})}{N_d}
\]

(2)

\[
I_{de} = N_i \times \frac{\sum T_j - A_d / (1 + C_{ir})}{N_d}
\]

(3)

\[
B_{de} = N_b \times \frac{\sum A_d / (1 + C_{ir})}{N_d}
\]

(4)

\[
U_a = \omega_1 \cdot L_w + \omega_2 \cdot I_{de} + \omega_3 \cdot B_{de}
\]

(5)

Among them, \( N_d \) is the total number of days when the transaction takes place.

3.2 Evaluation on the data assets of P2P net loan platform based on B-S model
It is most important to evaluate the option value when taking the real option method. The B-S option pricing model and the binomial option pricing model are the most common models in the value evaluation of real option.

There are many factors that affect the value evaluation of the data assets of the P2P net loan platform. The dynamic, mining and risky features of the data assets of the platform lead to the uncertainty of the assets value of the P2P net loan platform and the assets value of the execution data. Therefore, it can be seen that the real option method is more suitable for the evaluation of the data assets of the P2P net loan platform.

In this paper, we calculate the data assets of the P2P net loan platform through the analytic hierarchy process, improve the B-S model, and apply it to the evaluation of the data assets of the P2P net loan platform. According to the hypothesis of the model and the mathematical deduction, the calculation formula of the value of the data assets of the P2P net loan platform is as follows:

\[ C = SN(d_1) - Ke^{-rT}N(d_2) \]  \hspace{1cm} (6)

\[ d_1 = \frac{\ln\left(\frac{S}{K}\right) + (r + \frac{\sigma^2}{2})T}{\sigma\sqrt{T}} \]  \hspace{1cm} (7)

\[ d_2 = d_1 - \sigma\sqrt{T} \]  \hspace{1cm} (8)

Among them, C represents the value of data assets of P2P net loan platform; S represents the value of underlying data assets of P2P net loan platform; K represents the value of execution data assets of P2P net loan platform; \( r \) is the fixed interest rate of data assets of P2P net loan platform; \( \sigma \) is the volatility of the data assets of the P2P net loan platform; T is the life cycle of the data assets of the P2P net loan platform. \( d_1, d_2 \) is the coefficient of the value of data assets varying with the underlying assets value of the P2P net loan platform; \( N(\cdot) \) is the cumulative probability distribution function of normal distribution variables.

4. Empirical researches
In August 2016, Interim Measures for the Management of Business Activities of Internet Loan Information Intermediaries (hereinafter referred to as "Interim Measures") was officially issued, thus announcing the end of the interest rate battle among the net loan platforms. For investors, the net loan platforms that remain are worth paying attention to. Therefore, this paper selects five P2P net loan platforms to evaluate their value of data assets, including Hongling Venture Capital, Iqianjin, Yooli, Yangqianguan, and Weidai.com.

4.1 The calculation on the value of data assets of P2P net loan platform
By calculating the underlying data assets of the P2P net loan platform, the assets of the execution data, the volatility of data assets, the life cycle of the data assets and the fixed interest rate of the data assets, we eventually determine the value of the data assets of the five P2P net loan platforms.

4.1.1 The weight calculation of components of P2P network loan platform’s data assets
The weight of the underlying data assets of the platform mainly includes three elements, namely the loan income of the platform, investor’s data assets and borrower’s data assets. In view of the importance of the three elements, this paper designs the corresponding questionnaire and takes the method of expert scoring, so as to fully reflect the difference of the important degree of the elements. Finally, based on the analytic hierarchy process (AHP), the weight of each component is calculated by using Yaahp software. According to the result of expert scoring, the judgment matrix of the three elements is obtained as follows:

\[ A = \begin{pmatrix}
1 & 3 & 5 \\
1/3 & 1 & 3 \\
1/5 & 1/3 & 1
\end{pmatrix} \]  \hspace{1cm} (9)

The weight of each factor is calculated: the weight coefficient of the loan income of the platform is
\( \omega_1 = 0.6370 \); the weight coefficient of the investor's data assets is \( \omega_2 = 0.2583 \); the weight coefficient of the borrower's data assets is \( \omega_3 = 0.1047 \).

4.1.2 The value calculation of the data assets of the P2P net loan platform

Through the relevant data of the five P2P net loan platforms from October 2016 to October 2017, we calculate the loan income of each platform, the investor’s data assets and the borrower’s data assets, and finally calculate the underlying data assets of the platform. According to formula (2) (3) (4), the calculation results of the assets components of five P2P net loan platforms are shown in Table 1.

| Platforms | Loan income of platforms (10,000 yuan) | Investor's data assets (10,000 yuan) | Borrower's data assets (10,000 yuan) |
|-----------|----------------------------------------|--------------------------------------|--------------------------------------|
| Hongling Venture Capital | 1162.59 | 50465.07 | 2519.28 |
| Iqianjin | 1487.12 | 293838.43 | 22863.31 |
| Yooli | 209.71 | 2126.75 | 339.61 |
| Yangqianguan | 469.92 | 184846.41 | 21434.52 |
| Weidai.com | 1207.16 | 86100.41 | 5717.41 |

According to Table 1, the specific values of the assets components of five P2P net loan platforms are obtained. According to the formula (5), the value of the underlying data assets of each platform is calculated, as shown in Table 2.

| Platforms | Underlying data assets of platform (10,000 yuan) |
|-----------|-----------------------------------------------|
| Hongling Venture Capital | 14039.47 |
| Iqianjin | 79239.55 |
| Yooli | 718.48 |
| Yangqianguan | 50289.36 |
| Weidai.com | 23607.31 |

4.1.3 The value calculation of the execution data assets of P2P net loan platform

According to the Guidance on the Layout of the Data Centers issued in 2013, the data centers are classified into four levels, namely micro enterprises, small and medium enterprises, large enterprises and operators. Among them, the number of servers is required to be less than 50 for micro enterprises, from 50 to 1500 for small and medium enterprises, from 1500 to 4000 for large enterprises, and from 4000 to 10000 for operators. The number of network interface is required to be from 192 to 384 for micro enterprises, from 192 to 3000 for small and medium enterprises, from 3000 to 16000 for large enterprises, and from 16000 to 40000 for operators. In general, the typical computing configuration for small and medium enterprises is 2G main frequency server +1T hard disk +1Mbps. If taking the hosting service model of cloud computing, the cost for three years will be 37000 yuan. The storage data equipment of enterprises and the human resources cost can basically constitute the execution data assets of enterprises. In this paper, we consider the P2P net loan platform as small and medium enterprises, which are similar to the maintenance costs of data center. The data assets of the execution data on each platform (maintenance costs for three years) is about 37000 yuan.
4.1.4 The volatility calculation of the data assets of P2P net loan platform

There are generally two methods to calculate volatility, namely by referring to historical data and referring to similar asset volatility. In the first method, we usually calculate by using the formula. In the second method, we need to calculate by referring to a similar asset volatility. The second method is adopted in this paper. The data assets of P2P net loan platform are similar to the volatility of intangible assets. Dixit and Pindyck believe that the volatility of 15%~25% in real options is more accurate. The data assets of P2P net loan platform have greater risk than intangible assets, so we take the upper limit of volatility (25%) as the parameters to do the research in this paper.

4.1.5 The life cycle calculation of the data assets of P2P net loan platform

The P2P net loan platform starts very late in China and the relative policies are imperfect, so its development is unstable at current stage. In this paper, we consider the life cycle of data assets is 3 years.

4.1.6 The fixed interest rate calculation of the data assets of P2P net loan platform

For the fixed interest rate of data assets of P2P net loan platform, we refers to the annual interest rate of banks in this year. In this paper, we take the annual interest rate of the bank (2.75%) as the fixed interest rate of the data assets of P2P net loan platform.

According to the formula (7) (8), the D1 and D2 of each platform are obtained by using MATLAB. According to the formula (6), the values of data assets of the five P2P net loan platforms, namely (C), are obtained respectively by using MATLAB, as shown in Table 3.

Table 3. Data assets value of five P2P net loan platforms

| Platforms             | d1   | d2   | C (10,000 yuan) |
|-----------------------|------|------|----------------|
| Hongling Venture Capital | 21.98| 21.54| 42115.01       |
| Iqianjin              | 25.97| 25.54| 237715.24      |
| Yooli                 | 15.11| 14.68| 2152.03        |
| Yangqianguan          | 24.92| 24.49| 150864.67      |
| Weidai.com            | 23.18| 22.74| 70818.52       |

4.2 Countermeasures and suggestions

Through the empirical analysis above, in this paper, we put forward countermeasures and suggestions for the added value of the data assets of P2P net loan platform:

Firstly, we should make full use of the mining feature of the data assets of the P2P net loan platform. The P2P net loan platform has a great advantage. It has a very large information database in which many information resources can be used. We should make best use of this advantage, and mine more valuable information through scientific and technological means, so as to increase the value of the data assets of P2P net loan platform.

Secondly, through the empirical research above, we find that the data assets of the five platforms are still of very high value. It is a recessive asset of the platform. The platform should make use of the data assets to improve its revenue and promote its better development.

5. Conclusions

In this paper, by analyzing the characteristics of P2P net loan platform and its data assets, we find that the data assets are similar to intangible assets and their value can be evaluated by using the B-S model in the real options. We analyze the influencing factors of the B-S model, and use the weight method to calculate the underlying data assets of the P2P net loan platform. Then we calculate the remaining
influencing factors. In the process of identifying the underlying data assets, we improve the traditional B-S model to make it more suitable for the P2P net loan platform. Additionally, we conduct an empirical study on the five P2P net loan platforms. In the empirical process, we use the improved B-S model to evaluate the data assets value of the five P2P net loan platforms. Finally, we put forward countermeasures and suggestions to improve the data assets value of P2P net loan platform.

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