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Analysis on the Imitation Effect of Investment Decisions in Internet Lending Market

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Abstract: Nowadays, internet lending has become an important model that cannot be ignored in China financial lending market. Based on the individual transaction data of Chinese Paipaidai website, this paper examines the existence, rationality, decline and heterogeneity of the imitation effect of lenders' investment decisions in China internet lending market. It is found that the potential lenders' investment decisions imitation effect in the internet lending market is influenced by the previous cumulative bid times and the previous cumulative fundraising amount. With the decrease of information transmitted by the characteristics of imitation effect, the follow-up imitation effect of potential lenders will become more and more rational, and the imitative effect will gradually decrease and eventually disappear after reaching a certain peak value, furthermore, the lenders' investment decision imitation effect of loan orders with poor information disclosure is more prominent than that of orders with perfect information disclosure. The research shows that the imitation effect of lenders' investment decisions is mainly related to incomplete information disclosure in the internet loan market, and the paper's outcome is important for us to exhaustively understand the risk accumulation caused by lenders' investment decisions imitation effect and how to solve the information disclosure mechanism problem effectively.

Keywords: Internet Lending, Investment Decisions, Imitation Effect, Loan Order

1. Introduction and Literature Review

Since the establishment of UK Zopa internet lending platform in 2005, internet lending market has been booming for more than ten years, compared with traditional finance, the emerging internet finance shows great superiority and universality, it greatly reduces the impact of traditional financial media. In the past few years, the development trend of internet finance in China is very rapid, as the first largest and most widely used online lending platform in China, the Paipaidai website officially came into operation in 2007, Paipaidai is the earliest established platform, up to now, the number of China's internet loan platforms have reached more than 3,000, with a history total turn volume of 1,631 billion yuan, in 2016 alone, the turn volume was about 970 billion yuan, and the number of people involved in the transaction was more than about 10 million, in terms of quantity and scale, it shows an inflated development, predictably, internet lending has become an important way of China's finance lending market.

But overall, compared with traditional lending, internet lending is still in the initial stage of opening up exploration. In general, Lin et al. believed that internet lending mainly refers to social individuals lending their spare money through online platforms to people who need to raise money [1]. Pi and Zhao pointed out that the interest rate of internet lending is slightly higher than that of traditional finance institutions, which is characterized by small, fast, non-mortgage and unsecured loan [2], however, as an information intermediary, the internet lending platform needs to do a good job in the application, examination, information authentication and repayment management of borrowers' loan information.

With the continuous development of the internet lending market, economists are gradually deepening the research in the field of online lending, fortunately, the large amount of individual transaction data on the internet lending platform provides a very good experimental basis for us to study the investment decision-making behavior of internet lending.

Investment decision-making behavior has always been the main research content of behavioral finance, there has been a lot of literature studies in this field, however, more and more analysis of investment decision-making behavior is mainly focused on stock, fund, institutional financing and corporate mergers and acquisitions, there are not much study on the new internet finance, therefore, based on the individual transaction data on the internet lending platform, this paper attempts to make an in-depth analysis from the perspective of the imitation effect of lenders' investment decisions, thus the readers can understand exactly the behavior paradigm of investors in the internet lending market, and excavate some new characteristics of the imitation effect of lenders' investment decisions in the internet lending model.

A large number of literature studies show that when the information disclosure is incomplete or the information environment is uncertain, some investors will find or grasp information that other investors do not have, then it may cause potential investors to speculate on the information transmission contained in other people's investment decisions and adopt investment decisions that imitate other people's behavior while ignoring their own information behavior, that is to say, the imitation effect of lenders' investment decisions in internet lending market has been formed. At present, the research on the imitation effect of this investment decisions is mainly reflected in the stock market, for example, Kumar and Lee analyzed the data of individual transactions in the stock market, he deemed the lenders' investment decisions have imitation effect, but the imitation effect may also be distorted [3], for example, subsequent lenders and previous lenders may get the same information disclosure or be disturbed by the same information, therefore, the investment decisions' imitation effect test must be able to directly identify the driving mechanism behind it.

In the internet lending market, the lender lacks sufficient professional knowledge and resources when judging the borrower's personal information and order information, especially the borrower's credit rating and default risk, therefore, the previous lender's investment decision-making will become an important reference for the subsequent lender's investment decision-making. Herzenstein et al. found that potential lenders in the internet lending market were more likely to bid for orders that had been tendered many times in the previous period, and this bidding strategy also directly affected the operating performance of the loan order in the later period [4]. Shen et al. clearly pointed out that the lender in the internet lending market does not rationally evaluate the risk and benefit of the loan order when making investment decisions, but simply browse the relevant personal information of the borrower and follow the bidding according to other people's investment decisions [5]. Lee and Lee used data from the largest internet lending platform in South Korea to test that the imitation effect of lenders' investment decisions decreases with the bid time evolving [6]. Zhang and Liu used Prosper data to study the imitation effect of investment decision-making of lenders in internet lending, the results showed that the imitation effect of

investment decision-making in internet lending market is a rational behavior based on information transmission [7], although the research is only a preliminary attempt, the research significance is very significant, however, Chen and Han believed that the US Prosper internet loan platform is quite different from the Chinese internet loan platform, for example, Prosper platform adopts interest rate bidding system, while China's internet lending platform is fixed interest rate system, the floating interest rate of the United States transmits little information value in China, therefore, it remains to be discussed whether the conclusion is established in China [8]. Puro et al. pointed out that the lender's investment decisions in internet lending will change with the learning experience, compared with the bidder's irrational behavior in the auction market, the lender in the internet lending market will filter the soft information of the borrower, which will help them to obtain better investment opportunities [9]. Zhang and Liu further pointed out that potential lenders' investment decisions in the internet lending market are more than pure imitation of the previous lenders' investment decisions, they will actively observe during the imitation process, in order to infer the reputation of the borrower from the previous lender's investment decisions, and adjust their judgment expectations through the release of public information [7].

Based on predecessors' research results, this paper studies the existence, rationality, decline and heterogeneity of the imitation effect of investment decision-making in China's internet lending market with the help of Paipaidai website trading platform, through in-depth analysis, this paper finds that the lender's investment decision-making in the internet lending market has an imitation effect, and the imitation effect is a rational behavior, with the reduction of the amount of information transmitted by the imitation effect, this imitation effect shows a certain decreasing nature, in addition, the imitation effect of investment decision-making is different in intensity and duration for orders with different degree of information disclosure. In short, this paper makes a deep analysis of the imitation effect of investment decisions in China's internet loan market, it tried to clarify the intrinsic characteristics and correlative effect of the imitation effect, so as to provide the exact theoretical basis for the participants and regulators in the internet lending market to formulate relevant policy recommendations.

2. Theoretical Discussion

In internet lending market, borrowers and lenders have different information, the most important problem between them is information asymmetry, although the internet is conducive to information matching between borrowers and lenders, Chen [10], Akerlof [11] believed that with the expansion of transaction scope and transaction object, the problem of information asymmetry may be magnified more obviously, Stiglitz and Weiss pointed out that information asymmetry is highlighted by the fact that borrowers are more aware of their repayment ability and willingness than lenders,

which is the root cause of the difference in credit ration [12], this paper uses Akerlof model for reference to explore the role of information disclosure in internet lending in the successful matching between borrowers and lenders of different quality.

Suppose that there are a group of lenders in the market, and the utility function of each lender is:

$$G_1(C_1, L | H, S) = C_1 + HSL \qquad (1)$$

among them, G is the utility function, C_1 is the online loan investment of lenders,

L = 1 is the choice investment, L = 0 is the choice not to invest, H is a function used by the lender to evaluate the reliability of the lending platform and the quality of the borrower. S is the description of the borrower's personal information and order information, set the budgetary constraint of the lender as the following formula:

$$I_1 = C_1 + RL \qquad (2)$$

here, I_1 is the lenders' income, R is the interest rate that the lender is willing to accept, although the lender is not familiar with the borrower's quality and ability, it can make a general judgment by the borrower's marked interest rate and the information disclosure evaluation given by the platform. It is assumed that the average quality of all borrowers is expected to be: $E(S) = Q$, the expected utility of a lender to invest in an order is:

$$E(G_1) = I_1 + (HQ - R)L \qquad (3)$$

among them, if the lender's credit utility is to be improved, the following conditions must be satisfied: $HQ > R$.

similarly, suppose that there are a group of borrowers in the market, and the utility function of each borrower is:

$$G_2(C_2, r | T, S) = C_2 + TSr \qquad (4)$$

here, C2 is the borrower's internet loan, r=1 means that the loan fails, and r=0 means the loan is successful, T is the borrower's evaluation parameter of the internet lending platform and the feeling of getting utility from the loan, R is the interest rate that the borrower is willing to give, the borrower's loan constraint is set as follow:

$$I_2 = C_2 + Rr \qquad (5)$$

in the above formula, I_2 is the borrower's income, if the personal information and order information S is open and effective, then the lender and the borrower match successfully, both realize their respective utility, if personal information and order information S is not open or concealed for errors, then both borrowers and lenders will not be able to achieve a win-win situation. Substituting the borrower's loan constraint into his utility function, the expected utility of the borrower successful order fundraising is the following:

$$E(G_2) = I_2 + (TS - R)r \qquad (6)$$

here, if the borrower wants to borrow successfully, he must meet the following circumstance: $TS < R$.

In the process of internet loan transaction, there is a problem that the two parties can not conclude the transaction, mainly due to $HQ \neq TS$, actually, the lender will decide whether to invest in the order according to the formula $HQ > R$, however, the average quality Q of borrower's personal information and order information S is determined by the borrower's interest rate R according to the borrower's willingness to pay, therefore, the equilibrium interest rate is actually involved in the decision process of Q, assumes that S is a homogeneous distribution, that is, creditworthy borrowers and credit inferior borrowers account for half of them, so when the formula $R > TS$ satisfies, it will lead to creditworthy borrowers gradually withdraw from the internet loan platform. But because of the high repayment rate of creditworthy borrowers, the reality is that creditworthy borrowers also have other ways of presenting their credit information so that they can borrow at lower interest-rate financing costs. Bester believed that creditworthy borrowers usually use mortgage and credit information records to transmit their credit signals in the credit market, while credit inferior borrowers choose to pay high interest rate to compensate for their less credit risk in order to gain lenders' favor [13]. As a result, the impact of different information disclosure descriptions (including personal information and order information) on the success of borrowing by creditworthy and credit inferior borrowers varies greatly. Barasinska and Schafer [14], Li et al. [15] pointed out in the internet lending behavior, the lender cannot get the information quality disclosed by the borrower at the beginning, they usually judge whether they should invest in a borrower's order based on common sense and perception, such as the previous cumulative bid times and the previous cumulative fundraising amount of the order, thus producing the imitation effect of investment decisions among lenders. Of course, the imitation effect of lenders in making investment decisions is based on the imperfect information disclosure mechanism in the market, that is to say, in the long period of internet lending development, because the internet loan platform has different caliber for user evaluation and information disclosure, as well as Zhuang and Zhou [16] believed that lenders lack confidence in the key information audit and certification of lending platforms, it results in the process of internet lending, the lender's investment decision-making behavior has imitative effect.

3. Variables Definition and Description

This paper selects data from Paipaidai lending website from January 1st, 2016 to July 1st, 2017, through the analysis of samples, the author found that most of the loan amount is about several thousand yuan, and the order will be completed in a few minutes to raise fund, the short bidding time is not conducive for us to dealing with the cumulative bid times and the cumulative fundraising amount variables, therefore, this article chooses the order with loan amount of more than 30 thousand yuan, through screening, there are about more than 9,400 valid orders, by means of computer programming, the

author counted the bidding interval records according to the order of bidding time for each loan order.

When a borrower applies for a loan, the internet lending platform asks the user to provide some personal information, including the purpose of the loan, gender, age, marital status, educational level, city of life, real estate, car property, and a detailed description of the loan, and so on. It also needs to provide some authentication information, including mobile phone number, ID card number, household registration and residence certificate, credit report certificate, copy of work card, income certificate, bank passbook, driver's license, etc. After the borrower publishes the information, the lender may participate in the investment bidding, but the investment amount of each lender should be less than the total order loan amount, and must be greater than 50 yuan. Within the specified bidding time (up to 7 days), the total amount of tender reached the order fundraising amount, the order was successfully raised and entered the borrowing stage, once a successful order is approved by the internet lending platform, borrowers and

lenders are not allowed to change the loan order plan at will.

In order to observe in more detail the imitation effect of lenders' investment decisions, this paper considered all orders on the Paipaidai lending platform as a market, with hourly t as the observation unit, define the amount of the order K being bid at t time as the dependent variable, expressed in $Y_{k,t}^M$, here, t=1, 2,... T (T is the deadline for loan order), the main explanatory variables include the previous cumulative bid times $B_{k,t-1}$ and the previous cumulative fundraising amount $M_{k,t-1}$, these two variables are also the results of collective evaluation of the order by the previous lenders, it can be used as a measurement indicator of the imitation effect of subsequent potential lenders' investment decisions. Other explanatory variables includes order characteristics (time interval, borrowing interest rate, borrowing term), borrower characteristics (credit, gender, marriage, age, education, income). The explanation of specific variables is shown in table 1.

***Table 1.** Variables and implication.*

Variables	Variable name	Implication
$Y_{k,t}^M$	the amount share of the loan order being tendered	the bid amount of the order k at the time of t
$B_{k,t-1}$	the previous cumulative bid times	the proportion of the total cumulative number of order K bidders at the end of t-1 time
$M_{k,t-1}$	the previous cumulative fundraising amount	the proportion of the total cumulative fundraising amount of order K bidders at the end of t-1 time
$V_{k,t}$	time interval	the time interval for order k being invested between at t time and t-1 time. For example, if someone invests in it at t-1 time, it is recorded as 1, if no one invests in it at t time, but someone invests at t-2 time, it is recorded as 2, and so on
R_k	interest rate of loan order	interest rate for loan order K, Paipaidai platform stipulates that loan interest rate should not exceed 24%
D_k	loan deadline	loan deadline of loan order K, the shortest time for Paipaidai lending platform is 1 month, usually 3, 6, 9, 12, 18, 24 months, etc.
C_k	credit	credit rating for borrowers, the internet lending platform has seven credit ratings for each borrower, we mark HR, E, D, C, B, A and AA as 1, 2, 3, 4, 5, 6 and 7, respectively, the lowest level is HR grade. In the heterogeneity test, we divide the loan orders into HR group and non-HR group according to the credit level of the borrower.
S_k	gender	gender of borrower, when the borrower is male, it is 1, and the female is 0
W_k	marriage	marriage status of borrower, we record the married status as 1, while the unmarried, divorced and widowed status is recorded as 0
A_k	age	age of borrower, statistical analysis revealed that most borrowers were between 22-45 years old
E_k	education	education background of borrower, according to the educational level of the users provided by the website, the borrowers' academic qualifications are classified as: senior high school and below, junior college, bachelor's degree, master's degree and above, and are recorded as 1, 2, 3 and 4 respectively
P_k	income	monthly income of borrower, when the borrower's monthly income is below 1thousand yuan, 1thousand-2thousand yuan, 2thousand-5thousand yuan, 5thousand-10thousand yuan, 10thousand-20thousand yuan, 20thousand-50thousand yuan, 50thousand yuan or more, we take the variable as 1, 2, 3, 4, 5, 6, 7 in turn

In the required loan orders, table 2 is descriptive statistics of the variables concerned, since the amount share of the loan order being tender, the previous cumulative bid times and the previous cumulative fundraising amount are all proportional value, it can be seen that the minimum and maximum value of them are both 0 and 1, the average time interval is 5 hours, and the longest interval is 122 hours, the loan interest rate is basically between 5% and 24%, with an average interest rate of 17.3%, the term of the loan is about 8 months, and the

longest period lasts 36 months, borrowers' credit scores are at E and D levels, and borrowers' credit ratings are generally low, most of the borrowers were male and married, with an average age of 27 years, borrowers with junior college degree or above and monthly income of 5thousand-10thousand yuan were more common. These are simple descriptive statistics, and in order to obtain more rigorous evidence, more detailed empirical research design based on relevant econometric models is needed.

Table 2. *Variables description statistics.*

Variables	Average value	Minimum value	Maximum value	Standard deviation	Median
$Y_{k,t}^M$	0.236	0	1	0.142	0.418
$B_{k,t-1}$	0.472	0	1	0.113	0.556
$M_{k,t-1}$	0.539	0	1	0.415	0.409
$V_{k,t}$	4.960	0	122	11.675	51.892
R_k	0.173	0.051	0.242	0.694	0.185
D_k	8.312	1	36	0.267	10.622
C_k	2.899	1	7	0.315	3.420
S_k	0.723	0	1	0.671	0.463
W_k	0.694	0	1	0.435	0.521
A_k	27.162	20	66	0.785	1.942
E_k	2.563	1	4	0.707	2.230
P_k	4.502	1	7	1.318	3.956

4. Model Selection and Empirical Analysis

4.1. The Existence Test for Imitation Effect of Investment Decision in Internet Lending Market

In order to test whether the imitation effect of investment decision exists in the network loan market, this paper takes the amount share of the loan order being tendered as the dependent variable, the explanatory variables are the previous cumulative bid times, the previous cumulative fundraising amount and time interval, loan interest rate, loan term, credit, gender, marriage, age, educational background and income, set the following model:

$$Y_{k,t}^M = \alpha + \beta_1 B_{k,t-1} + \beta_2 M_{k,t-1} + \beta_3 V_{k,t} + \beta_4 R_k + \beta_5 D_k + \beta_6 C_k \\ + \beta_7 S_k + \beta_8 W_k + \beta_9 A_k + \beta_{10} E_k + \beta_{11} P_k + \varepsilon_{k,t} \quad (7)$$

In the regression (Ⅰ) of table 3, the estimation coefficient of the previous cumulative bid times is 4.273, significantly at 1% level, this indicates that the more the previous cumulative bid times of the borrowing order, the more potential lenders will be attracted, resulting in a faster increase in the amount share of the borrowing order being tendered, the estimation coefficient of the previous cumulative fundraising amount is

3.215, significantly at the 1% level, it can be seen that the previous cumulative fundraising amount will have a positive impact on the investment decisions of potential lenders, that is to say, when considering the tender, the lender will value the cumulative amount of the previous investment, these two indicators reflect that the investment decisions of potential lenders will be influenced by the investment decisions of previous lenders, that means, there is an imitation effect of investment decisions in the internet lending market. The coefficient of time interval is -0.015, which is significant at the 5% level, it shows that in the short time interval stage, a lot of potential lenders will be attracted to invest, and the share of the tendered amount of the order will continue to expand, while the lender's investment enthusiasm decreases and the order's share of the tendered amount decreases, the investment interval is also extended, which reflects that the imitation effect of the lender's investment decisions is different at different stages.

From the coefficients of other explanatory variables in the regression (I), the higher the borrowing rate and the borrower's credit score, the more tender amount will be attracted, in addition, borrowers with married, older, highly educated and high-income characteristics are conducive for their order to obtain lender investment favor, lenders also prefer orders with shorter borrowing periods.

Table 3. *Existence and rationality test.*

	Regression (I) existence			Regression (II) rationality	
	coefficient	t value		coefficient	t value
constant	-2.784***	-5.810	constant	-3.275***	-6.388
$B_{k,t-1}$	4.273***	1.992	$B_{k,t-1}$	2.166***	4.310
$M_{k,t-1}$	3.215***	0.784	$B_{k,t-1} \times M_{k,t-1}$	1.036***	0.021
$V_{k,t}$	-0.015**	-2.412	$B_{k,t-1} \times V_{k,t}$	-5.109E-022**	-9.375
R_k	0.146**	-0.775	$B_{k,t-1} \times R_k$	3.213***	1.364
D_k	-4.268***	-1.134	$B_{k,t-1} \times D_k$	-0.039***	-2.578
C_k	5.322***	2.480	$B_{k,t-1} \times C_k$	0.017***	2.192
S_k	2.310	1.661	$B_{k,t-1} \times S_k$	-0.002	-6.380

	Regression (I) existence			Regression (II) rationality	
	coefficient	t value		coefficient	t value
W_k	1.577***	1.083	$B_{k,t-1} \times W_k$	0.060***	5.218
A_k	2.856**	0.644	$B_{k,t-1} \times A_k$	0.038**	3.284
E_k	3.115***	1.849	$B_{k,t-1} \times E_k$	0.004*	1.219
P_k	0.529**	0.024	$B_{k,t-1} \times P_k$	0.019**	2.102
R^2	0.334		Adjusted R^2	0.267	
F	216.463		F	289.755	
Observations	9 428		Observations	9 302	

note: * * *, * *, * are respectively significant at 1%, 5% and 10% levels.

4.2. The Rationality Test for Imitation Effect of Investment Decision in Internet Lending Market

the regression (I) estimation result of table 3 verifies the existence on imitation effect of investment decisions in internet lending market, further this paper wants to understand whether the imitation effect is rational, so comprehensively analysis the influence effect on the interaction term variable between imitation effect features (here adopted the previous accumulative bidding times) and loan order features to the subsequent bidden amount share of loan order, the regression model (II) is as follow:

$$Y_{k,t}^M = \alpha + \beta_1 B_{k,t-1} + \beta_2 B_{k,t-1} \times M_{k,t-1} + \beta_3 B_{k,t-1} \times V_{k,t} + \beta_4 B_{k,t-1} \times R_k + \beta_5 B_{k,t-1} \times D_k + \beta_6 B_{k,t-1} \times C_k$$
$$+ \beta_7 B_{k,t-1} \times S_k + \beta_8 B_{k,t-1} \times W_k + \beta_9 B_{k,t-1} \times A_k + \beta_{10} B_{k,t-1} \times E_k + \beta_{11} B_{k,t-1} \times P_k + \varepsilon_{k,t}$$

(8)

The results from the regression (II) can be found that the estimation coefficient of the previous accumulative bidding times is 2.166, and it is significant at the 1% level, this indicates the imitation effect is still existence, the coefficient of interactive term between the previous accumulative bidding times and the previous accumulative fundraising amount is 1.036, significantly at the 1% level, but with smaller coefficient compared with separate previous accumulative fundraising amount in regression (I), that means information transmission from the previous accumulative bidding times is declining, the investment decisions of potential lenders are affected by previous lenders, results in the subsequent share of the bid in orders is significantly less, it also reflects that the imitative effect of potential lenders' investment decisions will become more rational. The coefficient of interaction between the previous cumulative bid times and the time interval is -5.109E-022, though statistically significant at the 5% level, it is much less than that the coefficient of individual time interval in regression (I), it means that the amount of information conveyed by the imitation effect shortens the duration of the time interval to the lender's investment enthusiasm. The coefficient of interaction between the previous cumulative bid times and interest rates is 3.213, which is significant at 1% level. It has greatly increased compared with the coefficient of the separate interest rate in regression (I). It shows that the amount of information contained in the imitation effect can easily affect the attraction of higher interest rate to more bid amounts. That is to say, the potential lenders' imitation of the previous lenders increased the interest rate effect. The coefficient of interaction between the previous cumulative bid times and credit is 0.017, significantly at the 1% level. It has been greatly reduced compared with the coefficient of separate credit in regression (I). This is a special phenomenon, perhaps the reason is that credit score is mainly based on various applications from borrowers and past loan repayment records, this is good for borrowers who are successful in borrowing and timely repayment, the probability of lenders investing in such borrowers is very high, there is a problem that such lenders may tend to make repeated, unequal investments in areas they are familiar with, in this way, lenders' mutual imitation will not pay special attention to the borrowers' credit, this is somewhat similar to Wu and Chen's analysis of investor loyalty dependence in the stock market [17].

Besides, the interactive variable coefficients of the previous cumulative bid times and loan term, sex, marriage, age, educational background and income, which are generally reduced compared with separate coefficient of the regression (I). Taken together, it can be concluded, the influence of interactive variables of the previous cumulative bid times and loan characteristics on the order subsequent bidden amount share is in line with rational imitation effect characteristics, that is to say, the imitation effect of lenders' investment decisions in internet loan market will be more and more rational.

4.3. The Decline Test of Imitation Effect of Investment Decision in Internet Loan Market

In order to investigate the diminishing character of imitative effect of investment decision in internet loan market, this paper predicts that there is a cumulative information transmission mechanism behind the imitation effect, moreover, the amount of information obtained by potential lenders from previous lenders is decreasing gradually. Table 4 is a summary of the progress of the order being invested, the readers can see that with the increase of the order raising amount, except for the 21% to 30% interval of the order raising amount, lenders anticipate that the probability of order raised successfully is marginal decreasing at other stages, this also indirectly confirms that the imitation effect of decision-making behavior made by potential lenders according to the progress of investment in the early stage of the order is decreasing.

Table 4. *Progress of order being invested.*

Order raising amount (%)	Times of orders being tendered	Expected probability of order raise success (%)	Order raising amount (%)	Times of orders being tendered	Expected probability of order raise success (%)
0-10	1 830	67.810	51-60	217	96.561
11-20	1 205	76.142	61-70	106	98.304
21-30	946	80.103	71-80	61	99.226
31-40	683	90.200	81-90	29	99.803
41-50	402	94.316	91-100	11 573	100

About the verification of the imitation effect diminishing model of investment decision in internet loan market, the dependent variable still takes the amount share of the loan order being tendered, in the explanatory variables, the square item of the previous accumulative bid times and the square item of the previous accumulative fund raising amount are introduced, the following two models are used for testing:

$$Y_{k,t}^{M} = \alpha + \beta_1 B_{k,t-1} + \beta_2 (B_{k,t-1})^2 + \beta_3 M_{k,t-1} + \beta_4 (M_{k,t-1})^2 + \varepsilon_{k,t} \tag{9}$$

$$Y_{k,t}^{M} = \alpha + \beta_1 B_{k,t-1} + \beta_2 (B_{k,t-1})^2 + \beta_3 M_{k,t-1} + \beta_4 (M_{k,t-1})^2 + \beta_5 V_{k,t} + \beta_6 R_k + \beta_7 D_k + \beta_8 S_k + \beta_9 W_k + \beta_{10} A_k + \beta_{11} E_k + \beta_{12} P_k + \beta_{13} C_k + \varepsilon_{k,t} \tag{10}$$

The regression (III) in table 5 is based on the results of model (9), the coefficients of the previous cumulative bid times and the previous cumulative fundraising amount are 3.865 and 2.577 respectively, both are significant at the 1% level, the coefficients of the square item of the previous accumulative bid times and the square item of the previous accumulative fund raising amount are -2.113 and -1.784 respectively, both are significant at the 1% level, it can be seen that the imitation effect of potential lenders' investment decisions will decrease gradually after reaching a certain peak value, it also reflects that the information read by potential lenders from the previous investment status of orders is marginal diminishing.

Table 5. *Decline test and heterogeneity test.*

	decline		heterogeneity	
	regression (III)	regression (IV)	regression (V) non-HR group	regression (VI) HR group
constant	-4.327*** (-5.314)	-4.805*** (-5.993)	-3.211*** (-3.526)	-3.029*** (-4.021)
$B_{k,t-1}$	3.865*** (5.327)	3.024*** (5.071)	2.217*** (4.203)	3.726*** (5.704)
$(B_{k,t-1})^2$	-2.113*** (-4.896)	-1.936*** (-2.690)	-1.840*** (-3.669)	-2.653*** (-4.684)
$M_{k,t-1}$	2.577*** (6.318)	2.383*** (6.020)	1.169*** (4.218)	1.950*** (5.173)
$(M_{k,t-1})^2$	-1.784*** (-4.216)	-1.865*** (-5.035)	-0.907*** (-5.311)	-1.326*** (-5.865)
$V_{k,t}$		-0.003*** (-0.638)	-0.014 (-0.749)	-0.025 (-0.833)
R_k		1.120*** (3.703)	1.136*** (3.995)	0.784*** (3.112)
D_k		-0.364* (-1.775)	-1.237** (-3.655)	-1.464** (-3.952)
S_k		1.007 (0.052)	2.180 (0.063)	2.941 (0.130)
W_k		0.011* (3.315)	1.215** (4.340)	1.326** (4.681)
A_k		0.733* (0.004)	0.352* (0.016)	0.428* (0.011)
E_k		1.239** (3.528)	1.746** (4.210)	2.051** (4.638)
P_k		2.208** (2.114)	1.933*** (1.102)	2.335*** (1.626)
C_k		4.462*** (1.069)	NA	NA
R^2	0.177	0.168	0.182	0.213
F	367.904	310.052	436.869	489.115
observation value	9 118	9 062	3 107	5 955

Note: * * *, * *, * are respectively significant at 1%, 5% and 10% levels, the t value of coefficients are in brackets.

In order to have a more comprehensive study of the diminishing characteristics of imitation effect of investment decisions in the internet loan market, in the model (9), other control variables are introduced, regression (IV) in table 5 is the result of adopting model (10), as can be seen, the first term coefficient of the previous cumulative bidding times is 3.024, and it's square term coefficient is -1.936, the first term coefficient of the previous cumulative fundraising amount is 2.383, and it's square term coefficient is -1.865, in other words, When the cumulative bidding times of the order is completed to 64%, the cumulative fundraising amount is completed to 78%, the imitation effect of potential lenders' investment

decisions will show the process of marginal decline and eventual disappearance, in fact, in the China internet lending market with imperfect information disclosure, lenders speculate information and make decisions mainly by observing and learning the investment behavior of previous lenders, however, the effective information that can be inferred is gradually decreasing, The imitation effect that can be made is also descending.

4.4. The Heterogeneity Test of Investment Decisions' Imitation Effect in Internet Lending Market

The main reason for the imitation effect of investment decisions in the internet lending market is the existence of incomplete information disclosure and transmission, does the imitation effect of lenders' investment decisions have a difference for orders with different extent of information disclosure? this paper grouped according to the borrower's credit score of loan orders, this is because credit score reflects the level of information disclosure of borrowers to some extent, the lower the credit score, the worse the borrower's information disclosure, the higher the credit score, the more information disclosure the borrower has, the sample is divided into HR group and non HR group according to the credit level of the borrower, in table 5, regression (V) and regression (VI) are based on the model (11) as follow:

$$
\begin{aligned}
Y_{k,t}^{M} = &\alpha + \beta_1 B_{k,t-1} + \beta_2 (B_{k,t-1})^2 + \beta_3 M_{k,t-1} + \beta_4 (M_{k,t-1})^2 + \beta_5 V_{k,t} \\
&+ \beta_6 R_k + \beta_7 D_k + \beta_8 S_k + \beta_9 W_k + \beta_{10} A_k + \beta_{11} E_k + \beta_{12} P_k + \varepsilon_{k,t}
\end{aligned}
\tag{11}
$$

Here, the dependent variable is still the amount share of the loan order being tendered, among them, regression (V) and regression (VI) are the corresponding results of non HR group and HR group, it can be seen from regression (V) and regression (VI), the coefficient of the previous cumulative bid times is 3.726 and the coefficient of the previous cumulative fundraising amount is 1.950 in HR group, which are higher than those in non-HR group, 2.217 and 1.169 respectively, this indicates that the imitation effect displayed by the poor information disclosure order group is more prominent, this is because the information that lenders can get from these order characteristics is very limited, therefore, it is necessary to make decisions based on the investment behavior of the previous lenders, whether they should imitate and follow up or not? For the order group with perfect information disclosure, the lender himself can commendably judge whether the order is worth investing, therefore, the imitation effect of lenders' investment decisions on non HR group orders is weaker.

In addition, from the square term coefficients of regression (V) and regression (VI) in table 5, when the previous cumulative bid times is completed at 83%and the previous cumulative fundraising amount is completed at 77% all in non-HR group, the imitative effect of the group will continue to decrease and until it vanishes, when the previous cumulative bid times is completed at 71%and the previous cumulative fundraising amount is completed at 68% all in HR group, the imitative effect of this group will continue to decrease and disappear gradually, by contrast, it can be found that the inflection points of the previous cumulative bid times and the previous cumulative fundraising amount in HR group are lower than those in non HR group, that is to say, the duration of the imitation effect of investment decision-making caused by information transmission in order group with poor information disclosure is shorter than that in order group with perfect information disclosure.

5. Conclusion

The imitation effect of investment decisions is very common in the lending and financing market, the previous studies mainly focused on the traditional finance field, internet lending as a new financial model in recent years in China, it will be an important topic to discuss the imitative effect of investment decisions in the internet lending market, according to the personal transaction data of Paipaidai internet lending platform, this paper examines the existence, rationality, decline and heterogeneity of the imitative effect of investment decisions in the online lending market, this paper attempts to give a comprehensive scientific and rational analysis of the imitative effect of investment decisions in the internet loan market.

The research has the following conclusions: (1) overall, the imitative effect of investment decisions exists in China's internet loan market, because of the quality problem of information disclosure in internet lending market, as a result, the more the previous cumulative bid times and the higher the previous cumulative fundraising amount, the easier likely it is to have a positive impact on the investment decisions of subsequent potential lenders, that is forming the imitation effect of potential lenders' investment decisions, however, the imitative effect produces different investment enthusiasm in each bidding stage; (2) by analyzing the influence of interaction variables between imitation effect features (refers to the previous cumulative bid times) and loan order characteristics on the subsequent bid amount share of orders, this paper finds that because the investment decision of subsequent potential lenders are influenced by the previous lenders investment decision, the amount of information transmitted by the previous cumulative bid times is decreasing, causes to the subsequent bid amount share of orders is significantly reduced, it means that the imitation effect of potential lenders' investment decisions in China's internet loan market will be more and more rational; (3) further research is concluded that because of the amount of information transferred and contained by the previous cumulative lender's investment decision-making behavior is decreasing continuously, therefore, the imitation effect of potential lenders' investment decisions will decrease gradually after

reaching a certain peak value, and according to the completion of the order being invested (refers to the ratio of completion of the cumulative bid times and the cumulative fundraising amount), it can also be inferred that the imitation effect of the potential lender's investment decisions will gradually decrease and disappear after reaching a certain degree; (4) based on credit scoring grade, this paper investigates the heterogeneity of investment decisions' imitation effect in HR group and non HR group in lending market, the analysis result shows that the worse the degree of information disclosure, the more obvious the imitation effect of investment decisions of potential lenders, but the imitative effect sustains for a short time.

Over the past few years, the development of internet lending in China has attracted much attention, some researchers believed that compared with traditional finance market, the internet loan market is small, however, the response of the internet lending market to market-oriented lending is more sensitive, and it can reflect the risk level of the finance market in a timely manner. This study not only has an important guiding role for the healthy and orderly development of China's online lending market, but also has a certain reference value for the finance regulatory authorities and market participants to formulate relevant policy recommendations. Compared with other ways of investment and financing, internet lending has huge advantage, but also faces a greater quality problem of loan information disclosure. At present, the disclosure and audit of soft and hard information provided by various domestic internet lending platforms cannot meet the need of the lender in investment decision-making, which leads to more lenders must be cautious in imitation of other lenders' investment behavior, in essence, the transmission of information contained in this imitative effect is also diminishing and transient, and eventually there will be some risk accumulation. Based on this, this paper puts forward some suggestions which are worthy of consideration: Firstly, focus on building a scientific and perfect information disclosure mechanism (especially for information disclosure of borrowers), it should be noted that over time, information disclosure mechanism should be dynamic and adjustable. Secondly, strengthen government's effective supervision over information disclosure mechanism, in order to maintain the smooth implementation of information disclosure mechanism, the authorities should clearly guide and supervise the main body, integrate and coordinate laws and regulations concerning the mechanism of personal information disclosure. Thirdly, efforts should be made to create conditions for sharing the key information disclosure resources of the major internet lending platforms and to do a good job of linking up with the credit certification system.

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