

## The Economics of Search Pattern Innovation: A Real-life Case from China's Booming P2P Market

Fei Wang<sup>1\*</sup>, Qin Zhou<sup>1</sup>, Wei Chao<sup>2</sup> and Lei Zhuang<sup>3</sup>

<sup>1</sup>*School of Economics and Management, Southeast University, 211189 Nanjing, P.R. China*

<sup>2</sup>*College of International Studies, Yangzhou University, 225000 Yangzhou, P.R. China*

<sup>3</sup>*School of Economics and Management, Nanjing Tech University,  
211800 Nanjing, P.R. China*

Telephone: <sup>1\*</sup><8618936480692>, <sup>1</sup><8615312086587>, <sup>2</sup><8613348125286>, <sup>3</sup><8615850582460>,

E-mail: <sup>1\*</sup><feiwang07@foxmail.com>, <sup>1</sup><zhouqin631206@163.com>,

<sup>2</sup><chaowei890603@126.com>, <sup>3</sup><zhleiphd@163.com>

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**ABSTRACT** The aim of this paper is to detect booming peer-to-peer (P2P) online-lending growth in China from the perspective of market efficiency, by using monthly platform data from wdj.com and employing a fixed-effect panel data model. It is found that with the increase of technical reserve, the platform's information service capacity has also improved. By sending effective investing message timely and actively, search costs of investors from that platform have been decreasing significantly. As a result, the dispersion of interest rate in China's P2P online-lending market has improved, which may potentially explain such a phenomenal growth from a market-efficiency perspective. It is also found that high-quality platforms are the pioneers of search pattern innovation.

### INTRODUCTION

China is currently the highest peer-to-peer (P2P) lender in the world. Its market size is four and ten times as large as in the US and UK, respectively. Aside from the stimulus obtained by financial restraint, there must be a reason that China's online lending market has experienced such dramatic growth in a single decade. Relevant studies primarily focus on micro- and macro-level dimensions of the issue. Micro studies show that China's P2P online lending has benefited from the unleashing of substantial pent-up individual demand for fundraising and investing (Klafft 2008). In the macro dimension, financial disintermediation has been universally accepted as the driving force (Magee 2011). However, few researchers have tried answering the question from a market perspective.

Information filtering and information recommendation supported by big data technology make customised information supply possible, completely changing search patterns. Buyers or Investors no longer need to spend long periods of time in collecting, processing and analysing

product information; instead, qualified and customised information will be pushed to them precisely when needed, thus promoting search efficiency and decreasing search costs significantly. For example, based on personal information, transaction history and search history, a P2P platform can analyse a person's preferences and habits. By using a mobile client application, a precisely tailored financial product will be recommended.

### Objective

This paper is aimed to explain the economic principle behind information search pattern innovation and then to detect the booming growth of Peer-to-peer online-lending in China. It will use a fixed-effect panel data model to do an empirical study with the monthly platform data from wdj.com.

### Literature Review

One implication of significant price dispersion is incomplete information, which can lead to an inefficient market (Ratchford et al. 1996). In other words, to some extent, price dispersion is a window of market efficiency. Based on search

*\*Address for correspondence*  
E-mail: feiwang07@foxmail.com

theory proposed by Stigler (1961), a substantial number of empirical studies have proved that increasingly fierce competition spurred by decreased search costs leads to more efficient product and financial markets. From Brazil (Nakane and Koyama 2003) to Spain (Martín et al. 2005), it has been proven that search costs can explain interest rate dispersion in banks' loans and deposits. Additionally, Martín et al. (2009) finds that market power co-varies with interest rate dispersion in the same direction, indicating an inverse relationship between market efficiency and interest rate dispersion. With the entry into network age, electronic commerce allows bidders to find and take part in trading regardless of location (Overby and Kannan 2015). Traditional competition evolves into attention rivalry (Evans 2013). With the rise of mobile communication technology, firms invest resources in catching eyes, which totally changes information search pattern (Taylor 2017). Referring to P2P online-lending in China, given the evidence that interest rate is usually pre-tested by platforms, if hard evidence of a relationship between search pattern innovation and interest rate dispersion can be found, we may disclose the economic principles behind that.

The rest parts of this paper is organized as follows. Section II introduces describes the data and specifies our simple model. Section III presents and discusses the empirical results. Section IV concludes the paper and section V supports recommendations.

## METHODOLOGY

In this paper, using monthly sample data from China's P2P platforms, a fixed-effect panel data model is employed. The researchers collected P2P platform data from wdzj.com, founded in October 2011, which has become the largest and most authoritative third-party information platform in China's online lending market. Additionally, a monthly platform development report is published with an evaluation system classified into the categories of technique index, participant index, leverage index, liquidity index, transparency index, reputation index and so on.

### The Data

In May 2015, the technique index was first included in the evaluation system. According to

wdzj.com, the technique index describes a platform's technical reserves and technical competence, with interactive technology such as mobile client application development and information processing technology, which includes filtering and recommendation, at the top of the priority list. Therefore, here the researchers use technique index as an independent variable of innovation degree of search pattern on a given platform. Generally speaking, the larger the technique index, the higher the innovation degree of search pattern. The sample period spans from May 2015 to September 2017 and contains 2,310 pieces of data from 157 platforms.

### The Model

To verify the relationship between search pattern innovation and interest rate dispersion in the P2P online lending market, the researchers constructed a fixed-effect panel data model in which the dependent variable is Coefficient of Variation (CV), which measures the degree to which the interest rate is dispersed (Atkinson 1970). As mentioned above, technique index is the key explanatory variable. Lending period and platform information variables including the indexes of participant, leverage, diversification, transparency, liquidity and reputation are putted as control variables. Table 1 shows detail explanation of each variable, while descriptive statistic of each variable can be seen from Table 2. The researchers hypothesise that a larger technique index tends to decrease the interest rate's degree of dispersion, which will intensify competition among platforms and create a more efficient online lending market. According to the basic principle of fixed-effect panel model and referring to relevant researches (Martín et al. 2009; Wang et al. 2016), the model is given as follows:

$$cv_{it} = \alpha_i + \beta_1 tech + \beta_2 period + \beta_3 parti + \beta_4 leve + \beta_5 diver + \beta_6 trans + \beta_7 liqui + \beta_8 repu + \varepsilon_{it}$$

## RESULTS AND DISCUSSION

Table 4 provides the results of the fixed-effect panel data model. From Model (1) to Model (3), the coefficients are -4.3e-04, -4.5e-04 and -3.9e-04 respectively, which means with one-unit technique index increase the Coefficient of Variation (CV) decrease by 4.3e-04, 4.5e-04 and 3.9e-04 accordingly. More importantly, with more con-

**Table 1: Explanation of variables**

<i>Variable</i>	<i>Explanation</i>
CV	Coefficient of Variation describes the dispersion of interest rate distribution.(CV=Standard deviation / Interest rate in the P2P industry)
Technique	An indicator of platform's technical reserves and competence in information processing, the larger the technique index, the higher the innovation degree of search pattern.
Period	Lending period (month).
Participant	The higher the score, the more investors and borrowers on the platform.
Leverage	An indicator of risk tolerance. The higher the platform's score, the lower its leverage, indicating greater risk tolerance.
Diversification	A high level of decentralisation among lenders and borrowers results in a high diversification score, which is good for platform operation.
Transparency	Information disclosure. The more platform information and operation released, the higher the score.
Liquidity	The degree of development of the platform's secondary market. An indicator of how rapidly lenders can recover capital and interest.
Reputation	An indicator of a platform's reputation, which will affect its acceptance among lenders and borrowers.

trol variables added in, the negative relationship between technique index and Coefficient of Variation is still able to pass the significant test at 0.1 level. What behind the significant negative relation above is that investors' search costs have been decreased with the help of platform through search pattern innovation. Platforms with stronger technical force perform better in search pattern innovation, which will lower the search cost further. It is the decreasing search cost that smooth interest rate dispersion in China's P2P market.

To gain further insight, the researchers further segment the sample data. In most recent study of P2P online lending (Wang et al. 2016), the reputation index has been proven to be an

effective signal of platform quality, where the sub-samples are high-quality, medium-quality and low-quality in descending order of reputation index. It can be seen clearly from Table 3 that high-quality platforms have highest mean value of technique index while medium and low-quality platforms are almost the same. They are sub-sample of high-quality, medium- and low-quality platform in Table 4 from Model (4) to Model (6). As can be seen clearly from Model (4) to Model (6) that technique index has both the heaviest (-0.0026) and the most significant ( $p < 0.01$ ) influence on Coefficient of Variation in Model (4), whereas the estimated coefficients are both insignificant in Models (5) and (6). In other words, compared with medium- and low-

**Table 2: Descriptive statistics**

<i>Variable</i>	<i>Number</i>	<i>Mean</i>	<i>Median</i>	<i>Max</i>	<i>Min</i>	<i>S.d.</i>
CV	2310	0.1922	0.168	1.0362	0	0.1428
Technique	2310	63.5297	63.72	91.09	24.59	10.984
Period	2310	8.0174	5.195	38.14	0.29	7.8919
Participant	2310	49.0884	46.075	100	4.37	17.82
Leverage	2310	36.8298	34.83	99	1	23.4769
Diversification	2310	60.6046	61.385	99.93	5	21.0828
Transparency	2310	42.1476	41.43	80.75	11.02	11.1024
Liquidity	2310	70.3872	70.515	100	15.62	15.7156
Reputation	2310	42.5876	40.97	92.26	10.79	13.6119

**Table 3: Descriptive statistics of sub-samples**

<i>Sub-sample</i>	<i>Number</i>	<i>Mean</i>	<i>Median</i>	<i>Max</i>	<i>Min</i>	<i>S.d.</i>
High-quality	770	70.6088	71.59	91.02	38.5	10.2296
Medium-quality	770	60.6868	60.805	91.09	24.54	9.838
Low-quality	770	59.2936	61.11	80.61	24.59	9.1973

**Table 4: Search pattern innovation and interest rate dispersion**

	<i>Model (1)</i>	<i>Model (2)</i>	<i>Model (3)</i>	<i>Model (4)</i>	<i>Model (5)</i>	<i>Model (6)</i>
Tech	-4.3e-04* (-1.87)	-4.5e-04* (-1.81)	-3.9e-04* (-1.71)	-2.6e-03*** (-2.66)	1.20E-03 -1.55	-8.80E-04 (-1.3)
Period		-7.60E-04 (-1.28)	-3.70E-04 (-1.08)	2.96E-04 -0.2	-e-03 (-0.85)	-6.70E-05 (-0.05)
Parti			-3.50E-04 (-0.9)	-1.1e-03* (-1.67)	5.40E-04 -0.76	-2.10E-04 (-0.28)
Leve			-8.4e-04*** (-3.33)	-e-03*** (-2.75)	-e-03** (-2.1)	-3.50E-04 (-0.68)
Diver			-9.5e-04*** (-4.23)	-2.50E-04 (-0.79)	-e-03** (-2.36)	-2.6e-03*** (-5.08)
Trans			-2.70E-05 (-0.08)	-2.6e-03*** (-4.03)	2.1e-03*** -3.29	2.00E-04 -0.33
Liqui			e-04 -0.35	-1.3e-03** (-2.52)	-8.00E-04 (-1.56)	3.10E-04 -0.54
Repu			2.90E-04 -0.63			
Cons	0.2199*** -7.85	0.227*** -8.9	0.307** -6.23	0.649*** -7.73	0.1626* -1.83	0.4255*** -3.96
Obs.	2310	2310	2310	770	770	770

Note: (t value); \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

quality platforms, high-quality platforms are not only more technique intensive, but are also better at using interactive technology and information processing technology to improve investors' search cost and the interest rate dispersion.

### CONCLUSION

This paper is based on search cost theory. In it, the researchers used monthly platform data from wdzj.com and employed a fixed-effect panel data model to detect booming P2P growth in China. They found that decreasing investors' search costs by using search pattern innovation significantly improves the dispersion of interest rates. Consequently, the market is becoming increasingly efficient, which could not only tell the economics behind information search pattern innovation but also explain the boom in P2P online-lending in China. More importantly, the research result is more significant and remarkable in the sub-sample of high-quality platforms, probably because high-quality platforms are more inclined to adopt both interactive technology and information-processing technology to instantly send registered investors customised investment information. Therefore, in addition to providing an explanation for booming P2P growth, the researchers' findings have important implications for improving P2P platforms.

### RECOMMENDATIONS

To make it simple, the logic of P2P economic potential unleashing is that search pattern innovation improves market efficiency through decreasing customer's search cost. And this is definitely repeatable not only in the fields of internet economy, but also in some traditional industries. Therefore, this paper is not just an extension research of search cost theory in internet economy, but with valuable practical significance in reviving national economy for government.

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### REFERENCES

- Atkinson AB 1970. On the measurement of inequality. *Journal of Economic Theory*, 2: 277-283.
- Evans DS 2013. Attention rivalry among online platforms. *Journal of Competition Law and Economics*, 9(2): 313-357.
- Klafft M 2008. Online Peer-to-Peer Lending: A Lenders' Perspective. *Paper Presented in International Conference on E-Learning, E-Business, Enterprise Information Systems, and E-Government (DBLP)*, 14-17 July, Las Vegas, Nevada, USA.
- Magee JR 2011. Peer-to-peer lending in the United States: Surviving after Dodd-frank. *North Carolina Banking Institute Journal*, 15: 139-174.

- Martín OA, Saurina J, Salas FV 2005. Interest rate dispersion in deposit and loan markets. *Documentos de Trabajo No. 0506*, Madrid: Banco de España.
- Martín OA, Salas FV, Saurina J 2009. Informational differentiation, interest rate dispersion and market power. *Applied Economics Letters*, 16: 1645-1649.
- Nakane MI, Koyama SM 2003. Search Costs and the Dispersion of Loan Interest Rates in Brazil. *Paper Presented in Proceedings of the 31<sup>st</sup> Brazilian Economics Meeting in ANPEC*, 9-12 December, Sao Paulo.
- Overby EM, Kannan KN 2015. How reduced search costs and the distribution of bidder participation affect auction prices. *Management Science*, 61(6): 1398-1420.
- Ratchford BT, Agrawal J, Grimm PE, Srinivasan N 1996. Toward understanding the measurement of market efficiency. *Journal of Public Policy and Marketing*, 15: 167-184.
- Stigler GJ 1961. The economics of information. *Journal of Political Economy*, 69: 213-225.
- Taylor G 2017. Raising search costs to deter window shopping can increase profits and welfare. *Rand Journal of Economics*, 48(2): 387-408.
- Wang F, Wang YJ, Zhuang L 2016. Trust crisis, adverse selection and brand reconstruction: An empirical study on wdzj.com. *Statistics and Information Forum*, 31: 95-99.
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