Analysis of Credit Score in China's E-commerce Market

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Abstract—Ecommerce has become the mainstream all around the world. In China, multiple platforms occupy the market of ecommerce. These platforms have different strategies and focus on unalike customers. Most of them use personal credit score as a measurement to reduce the risk of fraud transactions, especially in some second-hand goods platforms. In this paper, the author uses survey to analyze the potential relationship between credit score and frauds, from both the consumer and seller's sides. Then the author discusses some possible improvements which could be made to adjust the current using credit system used in the online platforms.

1 INTRODUCTION

In China, online shopping has been booming for the decade. The total amount of online transactions has increased from two hundred billion to more than six thousand billion CNY. Meanwhile, the concept of sharing economy is developing fast than ever before. As the situation that people have things they no longer need or find other substitutes they prefer more happens frequently. What is more, some of these objects are still usable or even brand new, people may want to sell or exchange these things with others to get part of their money back. At this time points, platforms represented by Xianyu and Zhuanzhuan come out to provide a free trading platform for people who wants to sell their unused items and people who are looking for an opportunity to get fancy merchandises at a lower price. In 2020, one of the biggest platforms Xianyu, reached a total transaction value of two hundred billion. As the business scale becomes bigger, several problems stand out. The critical point is that almost everyone can register the seller at these platforms, and the investigated system is not working. This means the sellers and buyers need to judge the credibility, which is almost impossible. To deal with this problem, platforms bring in the system of credit score as a supervision and a consult for the consumers to judge the reliability on their own. Among all of these, Xianyu is the one who performed best. Xianyu is the platform operated by Alibaba and used the Zhima credit score, which is computed based on its system. Since almost everyone in China uses AliPay, the Zhima credit score collects much more data than others and provides a powerful model to compute each person's scores. Although the platforms introduce multiple methods to measure the credit, the transaction result depends on the sellers and buyers themselves. As the platforms develop, the problem seems to be more serious. The fault and cheating behaviors

happen when people use second-hand platforms both as sellers and buyers because of information asymmetry and adverse selection. Finding the factors that lead to bad behavior and creating an efficient method to reduce the rate is essential for benign operation.

2 LITERATURE REVIEW

In Yuqing Liu's article "Research on China's internet personal credit information system construction" [1] and Lingfeng Xu's work "Discussion on China's internet credit system", they both use the Zhima credit score as an example to represent the score that is currently used in personal commerce [2]. They point out that the data resource of Zhima basically comes from ecommerce, internet business and cloud computing. In addition, they also argue that this score has multiple drawbacks such as dependence and injustice. Lack of data sharing between companies wastes lots of resources and time to deal with the same data repeatedly. The government and finance institutions restrict internet companies from getting the complete data which makes the accuracy even lower. In another paper written by Hanzi Xun [3], she figures some methods to improve the current system like creating basic database for all companies to share and construct official credit score system with standardized indexes. Yanyu Zhang's paper "Hidden danger in internet second-hand market" discusses the potential risk of these platforms which includes the abuse of credit score [4]. Further research by Yuxiao Lei builds the model to analyze the indexes which influence the initial trust between sellers and buyer in C2C markets. In their paper, they discover the personal trust trend and their belief of the platforms are the main factors which influence the initial trust [5]. And some researches point out the reason why the bad transactions are information asymmetry and "Lemon problem". In paper "Research of 'lemon problem' in second-hand market" by Susu Ge [6], she analyzes ten

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problems of online shopping platforms and argues the information asymmetry and adverse selection will leads to the Lemon problem, which makes the sellers tend to provide lower quality goods and buyers are willing to pay less for the same products. In another paper "A Study of the Social Credit Score System and the Implications it may have in Chinese Society" written by McWilliams [7], the author discusses the current credit system in China from a different point of view. These previous papers discuss the risks of online platforms and the possible reasons. Some of them also indicate the credit score as an important index. Since they suggested credit score as a potential problem, they do not analyze the relationship between the personal credit score and the fault rate. This relationship can be measured from both the sellers and buyers' point. This is an important relationship since it can provide the direction to further improve the system if it is true.

3 PROPOSED METHOD

As discussed previously, information asymmetry and adverse selection have a significant impact on the second-hand market. Information asymmetry, also known as information failure, happens when the two economic activity participants have unequal amount of information. In the second-hand market, this phenomenon occurs on both sides of the participants. The buyers can only get information from the pictures provides by the seller. And the sellers can make their judgment about the buyer solely depends on the credit score and the previously shopping history. So, in this case, the credit score plays a vital role in making the decision. Adverse selection is another reason that leads to the Lemon problem. Adverse selection is based on the information asymmetry. If one participant holds more information than the other, they could make the better choice to reduce their risk at a lower price.

In the second-hand market, the buyers got less information about the product. So, right buyers may not want to pay a high cost for that. And bad buyers who have a higher possibility to cheat in the transaction are more willing to pay for that cost. On the contrary, sellers do not know about the buyer's behavior, so good sellers will set a higher price while bad sellers are going to stay at a lower price level to attract potential buyers. These will lead to the Lemon Problem, which means the good buyers and sellers cannot get paid back during the time. And they will quit the market, which makes the bad sellers and buyers take the central part of it. The market will be full

of fake products and bad behaviors and finally, come to an end. Based on these theories, the initial hypothesis is that the credit score of buyers or sellers will make the bad transaction rate decrease, which means they are negatively correlated. The hypothesis is made because if additional information like a credit score is provided, it will give both sellers and buyers another aspect to judge the credibility. This paper chooses to survey to collect the data from both sellers and buyers to test the hypothesis.

The survey is designed in three parts. The first part will get primary data, including age and gender identity and credit scores. This part will filter the user of second-hand platforms and give them a segmentation based on whether they are buyers or sellers. The second part is faced by buyers. This part will collect the data about their credit score, the products they bought, the frequency they use, and the credit score of the sellers they bought from. And the bad transactions they have met. The third part is faced with the sellers. This part will collect the data about their credit score, the products they sold, the number of transactions they made, the credit score of the buyers they sold to. And the bad transactions they have met. The second and third parts will be provided separately and collect from a different group of users. The analysis will be given to test the hypothesis.

4 EMPIRICAL STUDY AND RESULT

Since the author did not get enough data as expected, the empirical study and result part have not been finished yet. The analysis will be made up of five main parts.

4.1 The filter of data

This part will clean the data and make user segmentation based on the basic data collected from the first part of survey. This survey collected valid data from 402 people. 294 of them have the experience of using online second-hand platforms, approximately 75 percent. This proportion shows the huge market of online second-hand goods. For data cleaning and filtering, these people who do not have the experience are removed from the result. Among these data, 188 of them have the experience as a buyer and 122 of them as seller. The user segmentation was made based on the age, gender, credit score and their identity as seller or buyer. User are divided into four clusters and the most efficient factor is the credit score. Result are shown in figure 1 and 2.
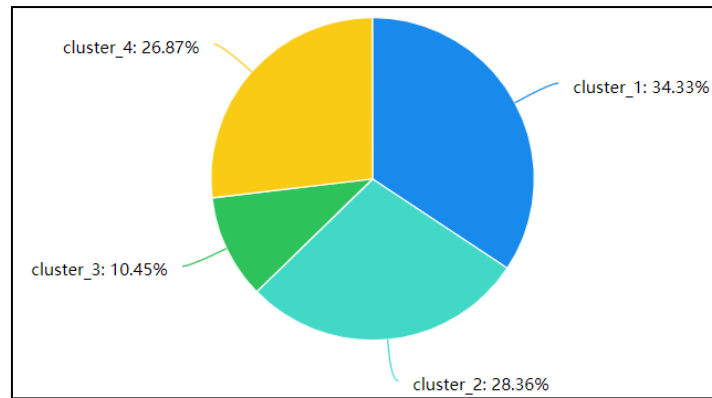
Figure 1. The cluster of users

Users with the credit score between 550-650 make up the biggest part of data, and present a relationship with the cluster. And the final cluster are made up of the users who do not have a personal credit score.
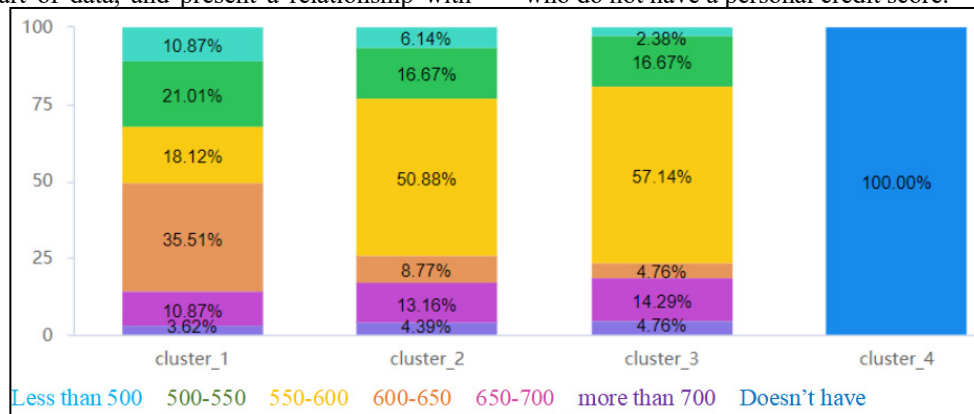

Figure 2. The age distribution of clustering

4.2 Reliability and validity of survey

In this part, the author will examine the reliability and validity of the data by analyzing distribution of data. For the reliability, the author uses Cronbach to analyze and the result is shown below.

TABLE 1. RESULT OF RELIABILITY ANALYSIS

Title	CITC	Cronbach's Alpha if item deleted
Gender	0.047	0.734
Age	0.033	0.754
Do you use Second-hand platforms?	-0.945	0.774
Credit Score	0.850	0.552
Are you a seller on these platforms?	0.816	0.593
Have you ever meet buyers with fraud behavior?	0.326	0.711
Are you a buyer on these platforms?	0.817	0.598
Have you ever meet sellers with fraud behavior?	0.487	0.674

The Cronbach's Alpha index of the data is 0.719. The value is between 0.7 and 0.8, which means the data is reliable. Besides, the data is collected from 22 provinces, improving the reliability more. For the validity examination, this paper use KMO value to test.

TABLE 2. RESULT OF VALIDITY ANALYSIS

Title	index1	index2	index3
Gender	0.092	0.102	0.900
Age	-0.058	0.918	0.119
Do you use Second-hand platforms?	-0.987	-0.075	0.074
Credit Score	0.953	0.084	-0.052
Are you a seller on these platforms?	0.972	-0.015	0.010
Have you ever meet buyers with fraud behavior?	0.368	0.439	-0.415
Are you a buyer on these platforms?	0.945	0.090	-0.129
Have you ever meet sellers with fraud behavior?	0.643	-0.028	0.193

The KMO value based on these indexes is 0.637 which lies between 0.6 and 0.7. So the validity of the data is acceptable but not very high.

4.3 Analysis of buyer

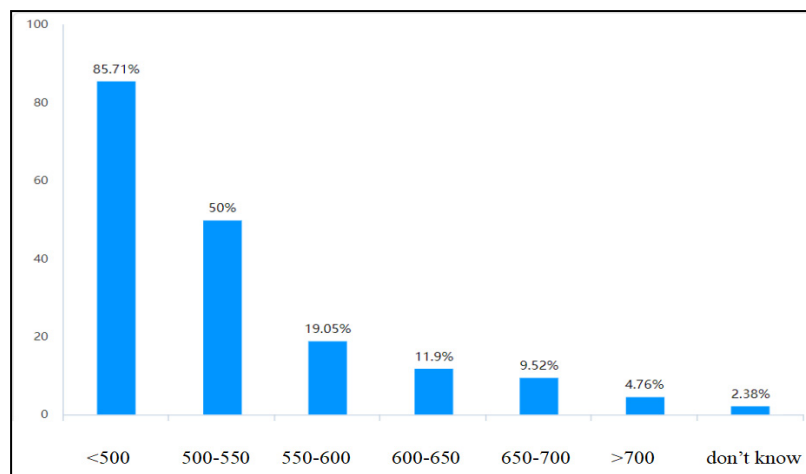This part will use the data of buyers to analyze the relationship between the credit score and bad rate. Other indexes, including frequency and amount, will also be considered. The total amount of buyer is 188, and 42 of them have met fraud transaction during their shopping experience. The credit score, previous transaction record and transaction amount of the sellers are shown below.
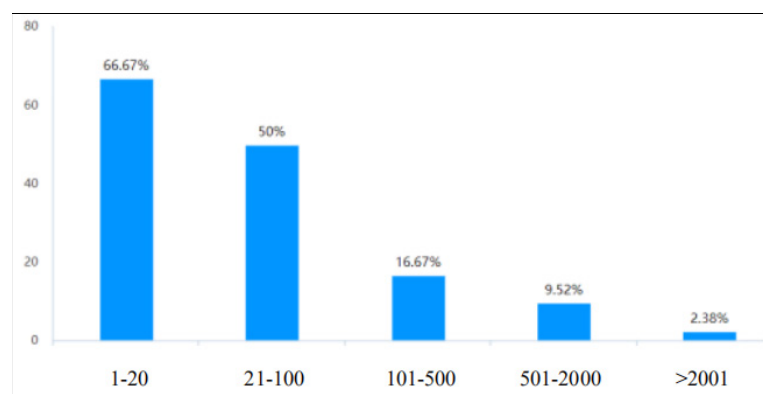

Figure 3. Credit score
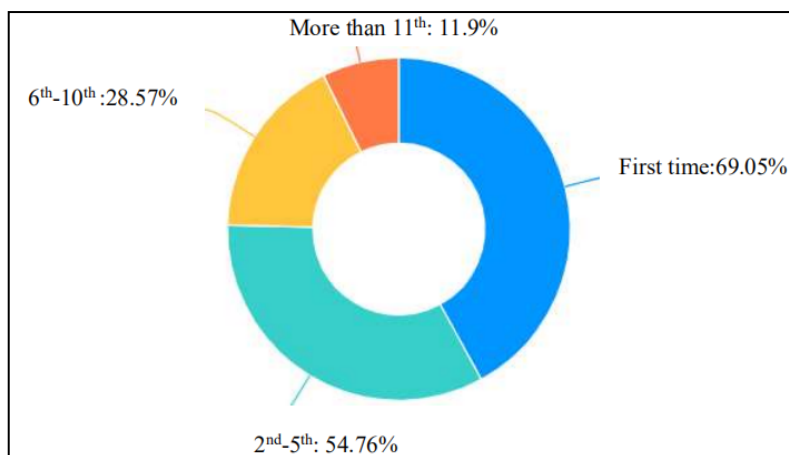

Figure 4. Transaction amount

Figure 5. Transaction time

From the three figures above, it can be found that the fraud rate is to some extent related to these factors. It shows a negative correlation between credit score, transaction amount and transaction times of the sellers.

4.4 Analysis of seller

In this part, the author will use the data of sellers to analyze the relationship between the credit score and bad rate. Other indexes, including frequency and amount, will
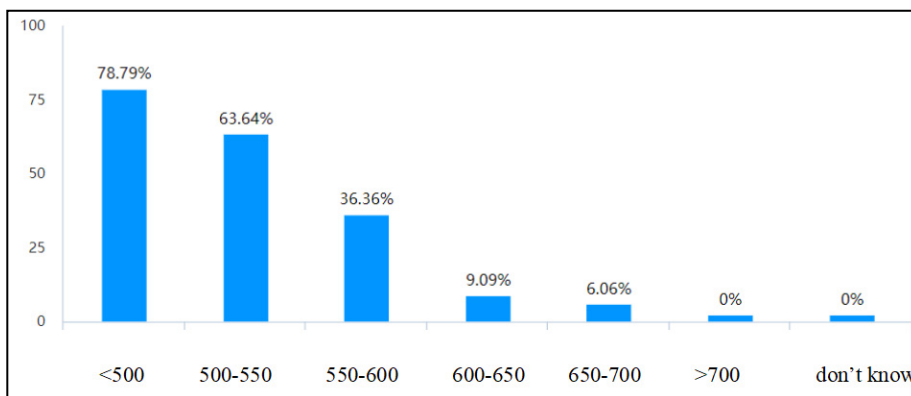
also be considered. The total amount of sellers is 122, and 33 of them have met fraud transactions in their experience. The factors are shown below.
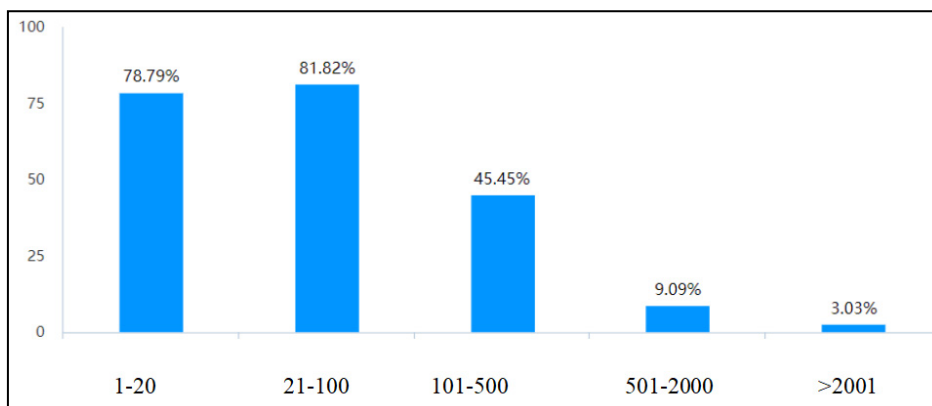

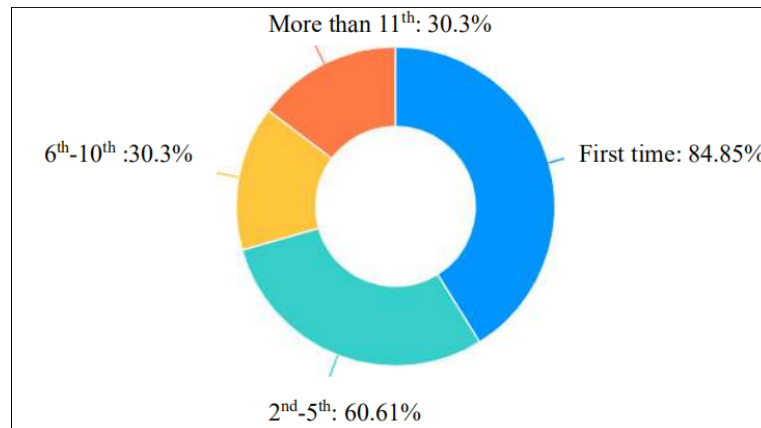**Figure 6.** Credit score

Figure 7. Transaction amount

Figure 8. Transaction time

From the three figures above, it can be found that the fraud rate is to some extent related to these factors. It shows a negative correlation between credit score, transaction amount and transaction times of the buyers.

4.5 Brief Summary

From the further part of the analysis, we certificated the reliability and validity of the data and made further grouping and analysis based on the data. It can be concluded that there is a negative correlation between the fraud transactions and the credit score, transaction amount and transaction times both on the buyers and seller's sides. The credit score is to some extent related to the transaction times of the user. If they never use these platforms before, they will have no credit score and which means they have a higher possibility to make fraud transactions. Among the data, about 90% of fraud transaction happened when the amount is lower than 500 and they are likely to have less than 5 shopping experience with their credit scores mostly less than 600. These people have less motivation to keep their scores, so their cost is less than usual users. Another reason might be that if the amount is not too large, the opposite may do not want to use legal means against them. An interesting point is that people with no credit scores are less likely to make fraud transactions. The reason might be the adverse selection. Buyers and sellers do not want to choose people with lower credit so a chance is given to people who do not have yet.

5 CONCLUSION

This paper tries to analyze the relationship between credit score and lousy transaction rates in second-hand platforms. The hypothesis has been partly proved by the analysis result of the data. The analysis can be used to help in establishing the current platform systems. Some drawbacks might be that the data is collected from a survey, and the data capacity is limited. Further research can be done by the company using the data from its database, which can simply provide many accurate and adequate data to give a more meticulous analysis. In addition, further work can be focused on how a complete credit system, beyond just the credit score, could be built in China's e-commerce.

REFERENCES

1. Y. Q. Liu, Research on China's internet personal credit information system construction, E-Business Journal, DOI:10.14011/j.cnki.dzsw.2019.06.030.(In Chinese).

2. L. F. Xu, Discussion on China's internet credit system, Marketing Management Review, 2020.03, 50-51, ISSN:1009-2994. (In Chinese).

3. H. Z. Xun, Research on the Optimization of China's Personal Credit Evaluation System, Northern Economy and Trade, 2019.08, 90-91, ISSN:1005-913X. (In Chinese).

4. Y. Y. Zhang, Hidden danger in internet second-hand market, Legal System and Society, DOI:10.19387/j.cnki.1009-0592.2017.05.372. (In Chinese).

5. Y. X. Lei, J. Ai, S. Wang, Research on Influencing Factors of Buyers' Initial Trust of Sellers in C2C Second-hand Market, Journal of Xinyang Agriculture and Forestry University, DOI:10.16593/j.cnki.41-1433/s.2019.03.012. (In Chinese).

6. S. S. Ge, Y. Y. Lu, Research on the "Lemon" Problem in the Online Second-hand Market, Northern Economy and Trade, 2015.12, 36-39. (In Chinese).

7. McWilliams, Glennis, "A Study of the Social Credit Score System and the Implications it may have in Chinese Society", Honors Theses, 1397, 2020.