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Internet-based Consumer Finance in Developed Countries and in China

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Internet-Based Consumer Finance in Developed Countries and in China

An Interactive Qualifying Project Report submitted to the faculty of
Worcester Polytechnic Institute in partial fulfillment of the requirements for the Degree of
Bachelor of Science in cooperation with Hangzhou Dianzi University

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ABSTRACT

Qiantu Financial Group, based in Hangzhou, China, wants to know how to improve its credit risk management strategies. We identified the credit risk management strategies used by well-established P2P companies around the world to determine common practices and interesting methods for assessing consumer credit risk. Through interviews and a survey of Qiantu's active user base, we provided our sponsor with recommendations that we determined may be relevant and useful to improving Qiantu's current credit risk management system.

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Note:

In much of this Authorship table, the primary author and primary editors are reported as "All." Our team had the goal of creating a final report that would have a cohesive voice and narrative, and therefore, our team worked very closely with each other on writing during our stay

in Hangzhou. Individual writing was often done on a by-sentence or by-paragraph basis, and would often be revised by other members not long after. We made our best effort to identify any sections where one team member contributed most.

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EXECUTIVE SUMMARY

Peer-to-peer (P2P) lending is a prominent alternative lending option that has developed in China due to the growth of Internet-age technology and widespread lack of access to more traditional consumer finance options (Fung Business Intelligence, 2015; Information Technology Newsweekly, 2017; Jing, 2016; Rona-Tas & Guseva, 2014; The Economist, 2017). Managing consumer credit risk and determining the loan approval process are difficult tasks for Chinese P2P lending companies for two reasons. Because the loan application process in a P2P model is often completed online, the company usually never interacts with the borrower in person, so this means that extra emphasis must be placed on identity verification (Trulioo, 2016). Additionally, Chinese citizens have expressed a historic preference for paying in full with cash; this practice has forestalled the development of a structured credit reporting system and has left hundreds of millions of citizens without a credit history for companies to base loan approval on (Information Technology Newsweekly, 2017; Rona-Tas & Guseva, 2014).

The goal of our project was to provide recommendations for how our sponsor, Qiantu Financial Group, could improve the credit risk management system it uses for its main lending platform: Flash Fund. We conducted an interview with the head of Qiantu's Risk Management department and the Administrative Assistant of Funds to identify how Qiantu's loan process works and what strategies the company employs to manage consumer credit risk. We researched twelve P2P lending companies to learn about strategies and features that other such lending enterprises have for their credit risk management, and compared these with the strategies used by Qiantu. We then used the results of this comparison to develop a list of recommendations to help improve Qiantu's loan process and risk management strategies. We finally refined our recommendations

based on our understanding of the current state of P2P lending in China, and from the results of a survey we conducted to gauge Qiantu's users' receptiveness to any changes we might propose.

After consolidating all of our results, we provided Qiantu with a set of recommendations that we believe could strengthen its current credit risk management system. While many companies that we researched employed interesting strategies, the recommendations listed below represent the strategies we believe are of the most relevance and importance to improving the company's current system.

For its application process, we highly recommend that Qiantu consider:

- Asking applicants for their education level as an assessment of creditworthiness and conducting some form of verification.

- Asking applicants to report their number of dependents and marital or relationship status.

- Asking applicants for monthly expenses (e.g., rent or housing maintenance bills).

We also highly recommend that Qiantu consider the following for its approval algorithm:

- Including debt-to-income ratio (DTI) as a measure of creditworthiness.

- Giving reliable repeat customers the option to have two loans or top-up an existing loan.

- Adding a Frequently Asked Questions (FAQs) section to the Flash Fund app and analyzing users' time spent reading the FAQs as a measure of responsibility.

- Determining whether geolocation can be used to predict general creditworthiness based on the socioeconomic factors present in the applicant's location.

- Rejecting applicants who have filed for bankruptcy within a certain timeframe.

For its pricing model, we highly recommend that Qiantu consider:

- Increasing the repayment period of Flash Fund loans to lower the Annual Percentage Rate (APR) and meet new government regulations on the P2P industry.

- Adjusting the origination fee it charges borrowers depending on their creditworthiness.

Finally, regarding the post-loan management stage of the lending process, we highly recommend that Qiantu consider:

- Contacting borrowers via WeChat and QQ instead of through phone calls.

- Charging a late fee to borrowers who submit payments after the due date.

- Not taking the capital loss if borrowers fails to repay their loans.

Overall, based on our research, we believe that Qiantu already implements many of the practices essential to a mature credit risk management system. Qiantu's lending process includes 9 of the 12 strategies relevant to the Flash Fund app that are implemented by at least six other P2P companies. However, our recommendations will provide a stepping stone for Qiantu to re-examine its current system and to explore possible methods for better credit decisioning and stabilizing the company's revenue. By following our recommendations, we believe Qiantu has a high potential for further growth within the P2P industry in China.

1. INTRODUCTION

For a peer-to-peer (P2P) company, just as with almost any other lending institution, it is vital to create a system of consumer credit risk management that mitigates the likelihood of capital loss for its investors as well as the company itself (Crespo, Kumar, Noteboom, & Taymans, 2017). P2P companies constantly need to improve their strategies for estimating which loan applicants will default on their payments, and recovering their losses if they predicted incorrectly. By only approving loan applicants who have a low likelihood of delinquency, not only do P2P companies increase their risk-adjusted returns, but they also provide a comfortable and safer lending environment to investors (Basel Committee, 2000; Guo, Zhou, Luo, Liu, & Xiong, 2016). Without investigating ways to improve its risk management model for the sake of creating a stable business and providing competitive services, a lending enterprise limits its own potential for growth (Crespo et al., 2017).

The strategies that help constitute a strong system of credit risk management are even less standardized and harder to gauge in China. The development of Chinese financial technology (FinTech) has been rapid and unstable, with P2P emerging as a popular model for alternative lending (Grassland, 2014; The Economist, 2017). In China, due to unstructured credit reporting and the lack of a standardized credit scoring model, many citizens do not have a credit history (Information Technology Newsweekly, 2017; Nguyen, 2016; Rona-Tas & Guseva, 2014). Combined with China's lax data privacy laws, it is up to Chinese P2P companies to decide what applicant information is worth collecting and examining, how to use this information to determine creditworthiness, and how much a customer's creditworthiness should affect his or her

use of the company's services (Dong, 2016). Qiantu Financial Group, a Hangzhou-based lending service, wants to know how to improve its strategies for managing credit risk based on an analysis of the credit risk management systems of notable and/or well-established P2P companies. Without this knowledge, Qiantu will struggle to stabilize its growth and gain a competitive edge in the Chinese Internet finance industry.

Plenty of literature exists online explaining the necessity of a strong system of consumer credit risk management within any lending institution, especially a P2P company (Basel Committee, 2000; Burns & Stanley, 2001; Morrison & Foerster, 2015). Additionally, information on the general process of borrowing and lending through P2P and how credit risk management manifests itself at each stage are readily available, both from research reports and the P2P companies themselves (Lending Club, 2017h; Lending Club, 2017l; Wang, Chen, Zhu, & Song, 2015). Finally, many articles online corroborate the notion that FinTech has taken off in China rapidly and P2P has emerged as a popular solution to the lack of traditional credit options in the country (Aldama, 2017; Grassland, 2014; Kuhn, 2017; Minter, 2017; Xu & Liu, 2006).

While research has been done to compare well-established P2P enterprises from both a borrower's and lender's perspective, little has been done to compare the overall credit risk management systems of each company. Additionally, minimal research has been done into how well the strategies employed by non-Chinese P2P companies would translate into the unique consumer finance setting in China.

Our project goal was to provide Qiantu with a list of recommendations for improving its consumer credit risk management strategies based on an analysis of such strategies in developed enterprises. To achieve our goal, we completed the following four objectives.

1. Identify Qiantu's current lending process and credit risk management strategies.

2. Identify the credit risk management strategies of notable and/or well-established P2P lending companies.

3. Identify potential suggestions for improving Qiantu's current credit risk management based on the strategies of the P2P companies researched.

4. Revise the list of potential suggestions through an understanding of the current state of P2P lending in China and Qiantu customer receptiveness.

To accomplish our objectives, we conducted interviews with P2P industry professionals and performed online research on the credit risk management strategies of P2P companies. We created a list of categorized information for each area of credit risk management based on our research. Using these lists, our team synthesized a set of recommendations which we believed would be relevant to Qiantu. We framed our suggestions to be suitable given the state of P2P and consumer finance in China, as well as the purpose of Qiantu's loan products and preferences of its user base. With our recommendations on how to improve its credit risk management, we believe Qiantu will be able to lower its loan delinquency rate and strengthen its position in China's P2P lending market.

2.   BACKGROUND

The evolution of technology and the Internet has enabled the development of an Internet-based finance sector in China (Fung Business Intelligence, 2015; Grassland, 2014). Riding the digital trend, many consumer finance enterprises have brought their services into the online world in order to reach a wider market and make the loan application process more efficient. In this chapter, we begin by defining peer-to-peer (P2P) lending and how it differs from the traditional consumer lending model. We go on to define consumer credit risk and the four main stages of a lending process where credit risk management strategies are employed: application process, approval algorithm, pricing model, and post-loan management. Finally, we provide an overview of the state of Chinese Internet-based consumer finance, and explain why China has the potential to push the boundaries of today's global P2P lending industry.

2.1   Internet Consumer Finance

Internet finance is an umbrella term for all methods of funding that utilize technology and the Internet to enable the transfer of money (Fung Business Intelligence, 2015; see Interview with Professor Sweeney in Appendix B). Internet finance is a very broad domain, with many subsections that have different functions and meet different needs. Figure 1 shows the diagram outlining the major constituent parts of Internet finance, as released by the People's Bank of China (PBOC) in its *2014 Financial Stability Report*.
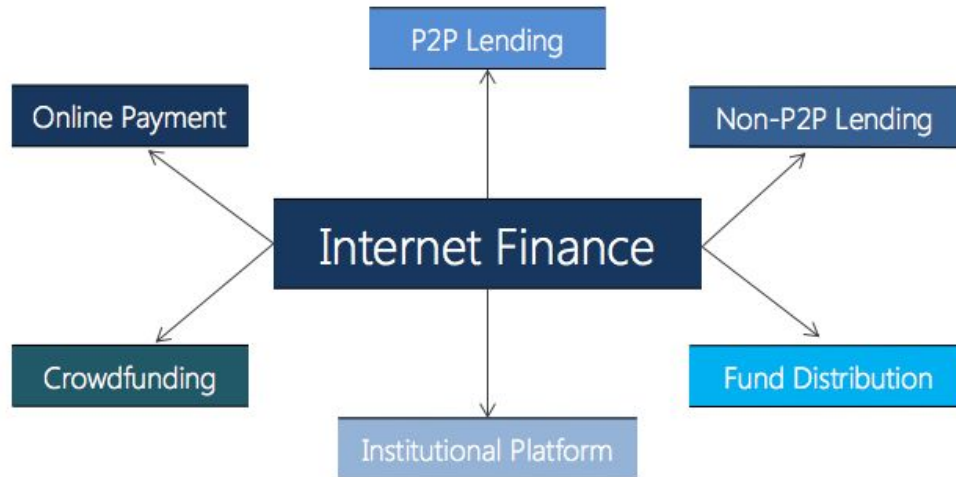
Figure 1. Internet Finance Outlined by the PBOC (Fung Business Intelligence, 2015, p.2).

In this section, we will examine two of the categories that pertain specifically to consumer finance: institutional lending and P2P lending. In an institutional lending model, the actual loan exists between a traditional institution, such as a bank, and the borrower. This is, as opposed to P2P lending, where companies connect individual borrowers with lenders (see Interview with Professor Sweeney in Appendix B).

2.1.1 Institutional Lending

Traditionally, consumers apply for and receive loans through banks and other large institutions (Grassland, 2014). In the Internet-based consumer finance landscape, the concept is relatively unchanged by enterprises that offer institutional lending services (PayPal, 2014); a large entity advances consumers capital so that they can pay for a product or service, and the consumers makes payments to the institution over time in order to pay off the debt that they owe to it.

A prime example of how institutional lending services can combine traditional lending models with Internet-level speed is PayPal Credit (2014). With PayPal Credit, consumers who have an existing PayPal account can apply for a line of credit in order to make purchases and pay for them in monthly installments. The funds are still advanced from a large institution, in this case Comenity Capital Bank, but the approval process is very rapid. In traditional loan applications, banks conduct customer screenings that involve binding contracts that require the consumer to provide financial statements, income projections, a business plan, and many other documents (Belniak, 2016; Hecht, 2017; see Interview with Luke Deer in Appendix F). PayPal advertises that its credit approval process is conducted at the time of purchase; consumers select the PayPal Credit option, answer two questions, and get an approval decision within a few seconds.

2.1.2   P2P Lending

Lending that is considered "peer-to-peer" is labelled as such because it occurs directly between two individuals without the involvement of traditional institutions (Hayes, 2015; Hecht, 2017; Lee & Lee, 2001). The role of enterprises that provide P2P lending services is often to match investors who have capital to spare with consumers who are looking to borrow that capital. In the P2P system, the enterprise typically acts solely as an intermediary; investors choose among borrowers based on the amount of risk they want to take. Many P2P lending services have their own model for scoring borrower trustworthiness to assist investors, as well as methods for compensating those who choose to make riskier investments (Lending Club, 2017c; Prosper, 2017b; Torney, 2016; Zopa 2017a). However, because banks are not facilitating

transactions, there may be a greater risk that the borrower will fail to pay back the loans, due to a less intensive application process (Belniak, 2016). Thus, many Internet-based P2P companies will step in for the investors to handle debt collection in the case that the borrower defaults on the loan (Galland, 2017; Renton, 2012).

2.2   Consumer Credit Risk Management

Although consumer credit risk is just one of the many types of risk a business must manage, how a business operates its credit risk management model is vital to its stability and success (Crespo, Kumar, Noteboom, & Taymans, 2017). Consumer credit risk can be defined as the risk to a lender that an individual borrower will fail to repay the loan he or she has taken out with that lender (Basel Committee, 2000; Investopedia, 2017). If a borrower fails to repay, not only does the lender lose the initial capital he or she invested, but the interest that the lender needs to make a return on investment. Thus, a lending institution must constantly attempt to "[identify] and [capitalize] upon appropriate opportunities while avoiding inappropriate exposure in such a way as to maximize the value of [the] enterprise" (Burns & Stanley, 2001, p.2).

Since P2P companies often function only as a platform to connect borrowers and investors, if a borrower fails to repay his or her loan, it most directly affects the outside lender and not the P2P company itself (Morrison & Foerster, 2015). However, having willing lenders is an essential piece of the P2P formula; companies must ensure that the marketplace they provide is lucrative to investors, and that the consumers they approve are relatively safe investments. Thus, P2P companies still must have strong consumer credit risk management models in order to properly filter out risks that are too high for investors to take. The different elements of

consumer credit risk management we will explain are the application process, approval algorithm, pricing model, and post-loan management.

2.2.1 Application Process

Consumer credit risk management in the P2P lending application process involves what information the P2P company requires from the potential borrower, what third-party sources the company uses to get additional information, and what information is gathered from those sources (Wang, Chen, Zhu, & Song, 2015). It also encompasses any checks done by the P2P company itself to verify the borrower's identity and that the information he or she provided is accurate.

Many companies have chosen to elect one of two different approaches in their application process, each of which serves a specific niche in the P2P lending market. The most common approach involves trying to process the application very quickly so the borrower can receive a loan within days of his or her initial request (Lending Club, 2017i; Prosper, 2017a). In contrast, other enterprises try to create the least amount of risk possible for investors by introducing multiple screening steps in their application process and asking for additional information from the borrower at each step (Auxmoney, 2017e; Behrens, 2011). In addition to the basic identification provided, further information will be asked from the borrower, such as family and household income to make sure the individual is able to pay back the loan in full. Companies may also request data from other public or private enterprises and databases to answer any additional questions about the borrower (Phillips, 2009). This method takes longer but allows the lender to be very confident in his or her investment.

2.2.2 Approval Algorithm

Before the borrower can receive a loan, the P2P company must determine that his or her likelihood of repayment is at a level that is acceptable for the company, based on the personal information, credit history, and loan request details collected in the application process (Renton, 2017; Vasileiou, 2016). Whether or not the borrower is approved for a loan is a simple yes or no question, but the process of arriving at the decision is very complex (Upstart, 2017a; Wang et al., 2015). An example of an approval algorithm can be found in Appendix I. Because of today's advancements in big data and machine learning technology, companies such as Upstart can implement computer systems that process enormous amounts of information about loan repayment and delinquency, and constantly optimize themselves to make better statistical judgments about a potential borrower.

The accuracy of the approval algorithm's estimation is crucial to the success of a P2P lending company (see Interview with Xu Shasha and Dr. Zhu in Appendix C). The algorithm's purpose is to allow the greatest number of people with the highest chance of fully paying back their loans to get approved for a loan. However, if the algorithm is not monitored closely and adjusted, the company may start to approve too many bad-risk loans or too few safe-risk loans. Over time, this could seriously damage the company's profits.

2.2.3 Pricing Model

Even after a consumer who has been approved for a loan moves forward in the process, his or her level of creditworthiness lies somewhere on a continuum above the approval threshold (Lending Club, 2017h). If there were no difference in the interest rates charged to consumers with higher and lower credit risks, investors would receive the same returns regardless of a

borrower's creditworthiness and would always prioritize the safer risks. Thus, many P2P companies have developed models for adjusting the loan interest rates and fees in order to compensate the lenders and incentivize greater risk-taking with greater returns. Therefore, for the purposes of this report, we define a pricing model as the way that a consumer's creditworthiness, as perceived by the company, influences his or her loan fees and rates.

2.2.4   Post-loan Management

After a loan is approved and disbursed, the P2P company still has to manage the loan repayment (Gordon, 2017; Lending Club, 2017l; Zopa, 2017c). Up until the loan has been disbursed, the process is dependent on a consumer's credit history and resulting "perceived" creditworthiness; while past behavior is a good indication of future behavior, no borrower is ever guaranteed to repay the loan properly (Brandl, 2017). Companies need to make sure that borrowers are repaying their loans in a timely manner, as their reputation and success rely on lenders receiving returns on their investments. The larger and steadier the returns-on-investment are, the more lenders will be willing to invest, but the inverse is also true.

To make sure that loan payments are made on time, effective P2P companies have defined systems for how they work with their consumers after a loan is approved. Some companies may reward punctual repayment, but often times companies simply penalize late payment with late fees or increased rates (Lending Club, 2017l). These fees are useful for incentivizing proper repayment; however, if the P2P company cannot get in contact with the borrower once he or she misses a payment due date, then penalties may become useless measures. Thus, a large part of a company's post-loan management system is also its debt collection procedures (Morrison & Foerster, 2015). This includes a procedure for reminding

borrowers of impending due dates, the company's definition of default, how the company handles contacting delinquent borrowers, what outside parties the company involves and at what point, and when the company declares the loan to be non-performing, indicating that the company will no longer pursue the borrower to repay the loan.

2.3 Chinese Internet Finance

The development of China's financial system has been very different from that of Western countries, which are considered to have a mature "traditional" system of consumer finance (Rona-Tas & Guseva, 2014; Xu & Liu, 2006; Zhang, Xiong, Ni, & Li, 2015). Products, such as credit cards and consumer bank loans, have never fully taken root, and as a result, the traditional Western model does not apply well in China. However, the conditions are just right for China's Internet finance market, specifically P2P lending, to take off in a very big way.

2.3.1 Why Internet Finance

Internet finance, specifically P2P lending, presents a convenient route for obtaining loans that does not involve traditional banking institutions (Schneider, 2008). Consumers in China have struggled to obtain traditional bank loans for a long time (Xu & Liu, 2006). Chinese banks have always been preferential towards lending to businesses, and with the amount of bad debt in state-owned banks having surpassed $500 billion USD, they are only becoming more wary of lending to consumers. This presents a problem for the new Chinese middle class who have shed traditional values of frugality and opened themselves to the possibilities of consumer finance (Information Technology Newsweekly, 2017; Jing, 2016). The hundreds of millions of young, tech-savvy, college graduates in China are both the consumers most open to receiving loans and

the ones whose demand has been least serviced by financial institutions thus far. This group is considered by Chinese analysts to be a potentially mammoth market and will likely cause Chinese Internet finance to swell enormously as digital lending services are made more available to them.

Traditional consumer finance has not been well supported in China due to the lack of structured credit reporting and widespread access to information about consumers (Rona-Tas & Guseva, 2014). These are vital elements in healthy, established consumer finance systems; however, in China, traditional aversion to borrowing money forestalled comprehensive collection and storage of credit information. Eventually, the state-owned PBOC created the Credit Reference Center (CRC), currently one of the largest databases of its kind in the world. The CRC "collects information on all loans irrespective of their size" (p. 227), with entries on 800 million Chinese citizens and credit information on 280 million as of 2012. The government has decided not to share this information with private companies and multinationals, leaving it up to them to determine how to assess consumer credit risk. Chinese corporate giants, such as the Hangzhou-based Alibaba, are large and popular enough to collect their own consumer information. They can then share this data with smaller private organizations such as our sponsor, Qiantu Financial Group, that can use this to create their own credit scoring models (Grassland, 2014; Shu, 2015). This essentially cuts traditional financial institutions and bureaus out of the equation, allowing the companies that pioneer the Internet finance industry to define their own rules for how to service consumers.

What is likely the most influential reason for the continual development of China's Internet finance industry is that the popularity of mobile payment has laid a perfect foundation

for the transition to digital lending (The Economist, 2017). China is, without a doubt, at the forefront of today's financial technology trend (Aldama, 2017; Kuhn, 2017; Minter, 2017). In a country with a population of about 1.3 billion, roughly 665 million people access the Internet with mobile phones, and for about 65% of those users, their phones operate as mobile wallets, which is the highest ratio in the world. Some Chinese Internet-based consumer finance companies are already building their lending services on top of the mobile pay framework provided by the likes of Alibaba and Tencent. Qufenqi (2017) is a Chinese lending firm founded in 2014 that disburses loans directly to the borrower's AliPay account. Whereas in the United States P2P lending is far from an integral part of consumer finance, the combination of high demand, historic aversion to credit cards, and a strong FinTech framework means that soon China could boast P2P penetration rates higher than ever seen anywhere else in the world (Information Technology Newsweekly, 2017; Jing, 2016; Rona-Tas & Guseva, 2014; see Interview with Professor Sweeney in Appendix B). In the not-too-distant future, it may be just as common for Chinese citizens to pay for an expensive dinner using fast-approval microcredit loans as it is to pay with funds in their AliPay and TenPay accounts today.

2.4   Summary

Online P2P lending has taken root as a way for consumers to borrow while avoiding institutional channels, and as a way for investors to make higher returns in an era of low interest rates (Galland, 2017; Schneider, 2008). Developing a strong system for managing consumer credit risk is crucial if a P2P company wants to have staying power in the industry. Managing

consumer credit risk exists in four areas of the lending process: application process, approval algorithm, pricing model, and post-loan management.

The unique development of FinTech and consumer finance in China over the past few decades indicates that while China is poised for a huge swell in the online P2P lending market, creating a successful credit risk management system may depend on more than simply what system have been proven favorable elsewhere in the world. In order to provide useful recommendations for improving Qiantu Financial Group's credit risk management strategies, research needed to be conducted on the risk management systems of well-established P2P companies. We also needed to qualify our recommendations to Qiantu by understanding how P2P services fit into the wider consumer culture of China and the preferences of Qiantu's user base. In the next chapter, we detail the methods we used to answer these questions.

3.   METHODOLOGY

The goal of this project was to provide suggestions to Qiantu Financial Group for how to improve its system of credit risk management, based on an analysis of credit risk management strategies of notable and/or well-established peer-to-peer (P2P) lending companies. In this chapter, we explain what research methods we employed to achieve each of our measurable objectives, and how we executed them. Our measurable objectives were to:

1. Identify Qiantu's current lending process and credit risk management strategies.

2. Identify the credit risk management strategies of notable and/or well-established P2P lending companies.

3. Identify potential suggestions for improving Qiantu's current credit risk management based on the strategies of the P2P companies researched.

4. Revise the list of potential suggestions through an understanding of the current state of P2P lending in China and Qiantu customer receptiveness.

3.1   Identifying Qiantu's Current Lending Process

Qiantu currently has two lending products: Flash Fund, which was the focus of our project; and Easy Money. Our first objective was to identify Qiantu's current lending process for Flash Fund and what credit risk management strategies it implements at each stage. To accomplish this objective, we conducted an interview with two employees from Qiantu - the head of the Risk Management Department and the Administrative Assistant of Funds. The protocol and transcript for this interview can be found in Appendix C. During this interview, we discussed how Qiantu implements the four basic stages of credit risk management we had

defined to guide our research: application process, approval algorithm, pricing model, and post-loan management.

From this interview, as well as further correspondence between our team, the Administrative Assistant of Funds, and Qiantu's CEO, we created a diagram of Qiantu's Flash Fund lending process, detailing the credit risk management strategies at each stage. The diagram can be found in Appendix G of this report. The creation of this document would later help us compare Qiantu's strategies to those of notable and/or well-established P2P enterprises.

3.2   Risk Management Strategies of Other P2P Companies

The second objective for our project was to identify the credit risk management strategies of notable and/or well-established P2P lending companies. We defined a well-established P2P lending company as an enterprise that has been operational for at least five years and has originated at least $500 million USD in personal loans. We considered a notable company to be one that did not meet our definition for a well-established company, but we found to be an industry leader in its geographic region and worthy of research. We identified ten well-established P2P enterprises: Auxmoney (Germany), China Rapid Finance (CRF) (China), Lending Club (USA), PPDai (China), Prosper (USA), RateSetter (UK), Upstart (USA), Yirendai (China), Younited Credit (France), and Zopa (UK). Additionally, we researched two P2P companies that we defined as notable: Afluenta (Latin America) and WeLend (Hong Kong). For every company that we identified for research, we gathered information online. We focused our research on gathering as much information as possible about each company's loan application process, approval algorithm, pricing model, and post-loan management. We organized the data we collected during our online research into tables, which can be found in Appendix J of this

report. Each company's table is further subdivided into the four stages of credit risk management that we identified. The information in each subgroup was standardized to facilitate further comparisons of these companies, which we will explain in the next section.

3.3 Identifying Credit Risk Management Suggestions

In order to complete our third objective, identifying potential suggestions for improving Qiantu's current credit risk management strategies, we identified strategies for managing consumer credit risk that were interesting or common between the P2P lending companies we identified in Section 3.2. To identify such strategies, we created a list of categorized information, one for each stage of credit risk management that we had defined earlier: application process, approval algorithm, pricing model, and post-loan management. We pooled various pieces of information from all the companies we researched and subsequently subdivided them into related groups, allowing us to find patterns and similarities in the qualitative data.

3.3.1 Categorized Information on Researched P2P Companies

To synthesize a list of categorized information, we first moved all the information about the given credit risk management stage for each company from the research table (see Appendix J) into a shared spreadsheet document (see Figure 2). The figure shows that for each credit risk management stage, all of the information was initially grouped and color-coded by which company it had come from so that once we sorted the data, we could still determine which company each datapoint had come from. Next, we looked for datapoints across the companies that had common themes, strategies, and policies, and grouped them accordingly. Once all

datapoints were grouped, we gave each group a label, and transferred the diagram to a shared text file. We completed this process four times, once for each credit risk management stage.
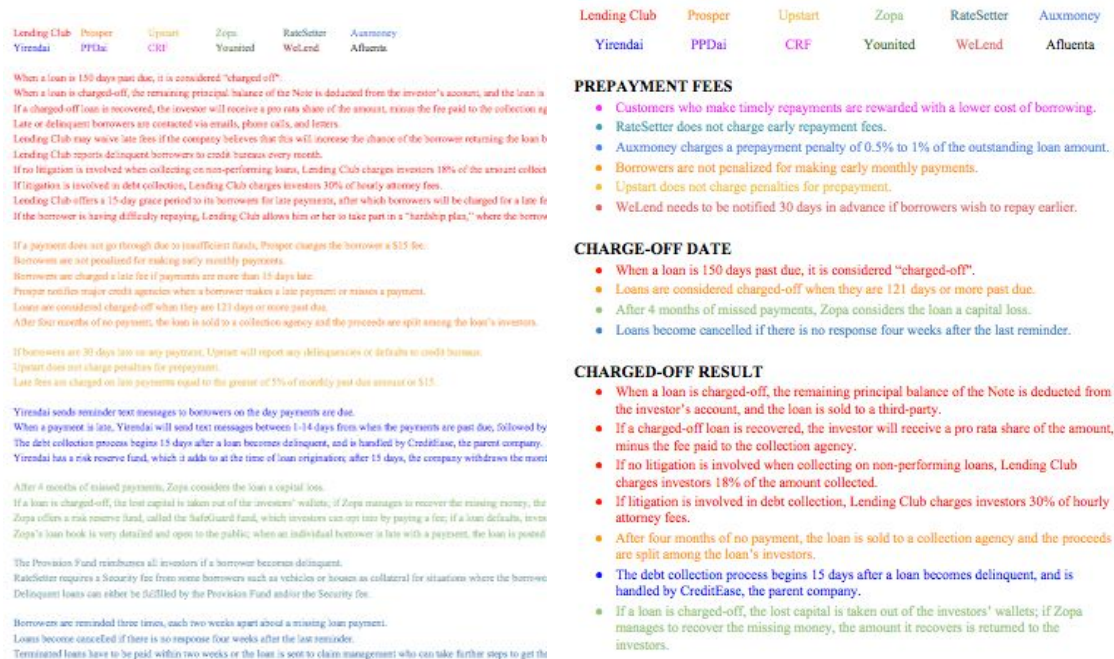
Figure 2. Start (left) and End (right) Comparison of Research on P2P Companies

3.3.2   Preliminary Suggestions

Once all of the information for each stage of credit risk management were categorized into lists of related groups, our team began creating a set of preliminary recommendations. To create the set, we went through the categorized list for each stage by labeled group to look for credit risk management strategies that could be added to Qiantu's existing system. We used the diagram of Qiantu's lending process found in Appendix G, the information collected in the interview found in Appendix C, and personal communication with our liaisons to identify strategies that Qiantu likely does not currently implement. Given the language barrier and the fact that Qiantu's approval algorithm was proprietary and kept secret, we could not verify whether some of the suggestions were already implemented by Qiantu.

3.4   Creating a Finalized List of Suggestions

Our fourth objective was to revise the list of potential suggestions we created in Section 3.3.2. To do so, we had to gain a strong understanding of the current state of P2P lending and consumer finance in China, which we accomplished by interviewing industry professionals. Because of these interviews, we were able to eliminate suggestions from our list that would not be applicable or relevant. Additionally, we had to gauge Qiantu customer receptiveness to the relevant suggestions by surveying members of the Flash Fund user base. As a result of accomplishing this, we were able to then remove certain suggestions from our list that would not be well-received and may have damaged the size of Qiantu's user base.

3.4.1   Interviews with Industry Professionals

In order to fully understand the current state of P2P lending in China, we conducted multiple interviews throughout our stay in Hangzhou. Each of these interviews were aimed at understanding how Chinese P2P companies handle consumer credit risk in general, as well as understanding the growth trends and legal regulations of P2P lending in China.

With the assistance of our Hangzhou Dianzi University (HDU) student partners, we were able to schedule an interview with employees at a P2P company based in Hangzhou, called Weidai. Weidai partners with our sponsor, Qiantu Financial Group, and specializes in creating a platform for people to invest towards car loans. The protocol and summary for this interview can be found in Appendix D. Also with the help of our HDU student partners, we were able to contact and interview a professor at HDU, Professor Xiu Fengli, who specializes in the P2P lending industry in China. The protocol and transcript of this interview can be found in Appendix E. Lastly, we were able to interview Luke Deer, who is a researcher from Sydney, Australia and

focuses his studies in East Asian alternative lending. During our online research of P2P companies, we discovered a research paper that he contributed toward and contacted him. The protocol and transcript of our interview with Mr. Deer can be found in Appendix F.

3.4.2   Surveying Members of the Flash Fund User Base

In order to revise our suggestions, we surveyed members of Qiantu's Flash Fund user base to gauge their opinions on potential changes that would be relevant to them and to mitigate the possibility that our recommendations might detrimentally impact Qiantu's customer satisfaction. The questions in the survey were focused on basic demographic information about the respondent and his or her opinion on potential changes to Qiantu's lending process that were based on the preliminary set of recommendations we had created in our third objective. The survey questionnaire and a further description of the protocol we followed for distributing the survey can be found in Appendix O. Once we had written the survey, we translated it into Chinese and set it up using QQ Surveys, an online service for creating surveys and compiling the results. We then worked with Qiantu and its Product Manager to finalize and distribute a link to the online survey to Flash Fund users. The survey was distributed over the course of three days through Flash Fund's official account in WeChat.

In order to generate an increased survey response rate, we added a ¥300 RMB incentive that would be given to a randomly chosen person that opted-in by supplying his or her WeChat ID. Through discussion with our sponsor and HDU partnering students, we determined that providing an incentive would be culturally appropriate. The incentive was designed not to be coercive since all respondents who chose to participate in the survey had the potential to receive the prize, but only one respondent was randomly selected to win. For the sake of confidentiality,

only the winner knew the result of the raffle; we contacted the winner using the WeChat ID that he or she provided.

3.5 Summary

To accomplish our project goal, providing suggestions to Qiantu on how to improve its credit risk management system, we completed the following steps. We began by interviewing an employee from Qiantu's Risk Management Department to obtain a deep understanding of its lending process and strategies for managing consumer credit risk. We then conducted research on the risk management systems of various notable and/or well-established P2P lending companies, focusing on how each company implements the loan application process, approval algorithm, pricing model, and post-loan management. Then, we created a list of categorized information for each stage of credit risk management using the research we gathered on P2P companies to develop a preliminary list of suggested strategies for Qiantu to implement. Next, we interviewed industry professionals to understand the current state of P2P lending and consumer finance in China, and we distributed a survey to members of Qiantu's Flash Fund user base to gauge their opinions on any suggested changes. Finally, we narrowed the set of recommendations to contain only those that would be most appropriate. In the next chapter, we will discuss the results of our research.

4.   RESULTS AND ANALYSIS

The goal of this project was to identify strategies to improve the consumer credit risk management of Qiantu Financial Group, a P2P lending company located in Hangzhou, China. In this chapter, we first describe in depth how Qiantu currently manages consumer credit risk in its lending process. We then analyze the results of creating our categorized lists of strategies used by other P2P companies we researched, noting which strategies Qiantu may or may not want to consider and why. Finally, based on the results of our interviews, we examine the impetus for the creation of the Chinese P2P industry, opportunities and pressures presented to Chinese lending companies, and the social implications of some of the credit risk management strategies they employ.

4.1   Qiantu's Current Risk Management

In order to develop a set of useful recommendations, we first identified Qiantu's current credit risk management strategies and determined how the company accomplishes each of the four stages that we mentioned in previous chapters: application process, approval algorithm, pricing model, and post-loan management. Based on interviews and cross-checking with relevant Qiantu staff, we created a diagram of Qiantu's lending process for its Flash Fund app (see Appendix G), on which we elaborate further in the following sections. Overall, based on what we know, we believe that Qiantu has a credit risk management system that includes many of the best practices we identified in our research of other P2P companies. However, because many of the strategies and models used by Qiantu are proprietary, we were not able to gather very in-depth information on the inner workings of its lending process. Therefore, our recommendations will

be based on strategies that we believe, but cannot confirm, that Qiantu does not currently implement.

Qiantu's main product is the Flash Fund loan, which consists of a payday loan, usually either ¥500 or ¥1,000 RMB in size with a repayment period of 7 or 14 days. As the name suggests, the Flash Fund app is designed to be a source of quick credit, where applicants can get an approval decision in several minutes, and borrowers can receive funds in several hours. As a result, to create our final recommendations, we mainly considered strategies that would aid Qiantu without constituting a large increase in time spent verifying the applicants' information and approving or rejecting them. Additionally, compared to the loan sizes offered by the P2P companies we researched, the size and repayment period of a Flash Fund loan is very small; potential suggestions that we felt would not be appropriate or necessary because of this fact were not considered in the final recommendations.

4.1.1 Application Process

As part of its loan application process, Qiantu collects personal and financial information on its applicants, including name, contact information, monthly income, mobile telephone provider, government-issued ID number, and employment information. Qiantu uses the personal information provided by the applicant to access more information about him or her from outside databases. The company retrieves information about the applicant's e-commerce activity from AliPay, his or her credit history from Sesame Credit, and personal cell phone activity from the applicant's mobile provider, to name a few criteria. After these data have been amassed, Qiantu endeavours to verify the applicant's physical identity and financial status as shown in Figure 3. For Flash Fund, Qiantu's verification process is completely automated. After all the required

information has been collected and processed, the application is moved to the approval algorithm.
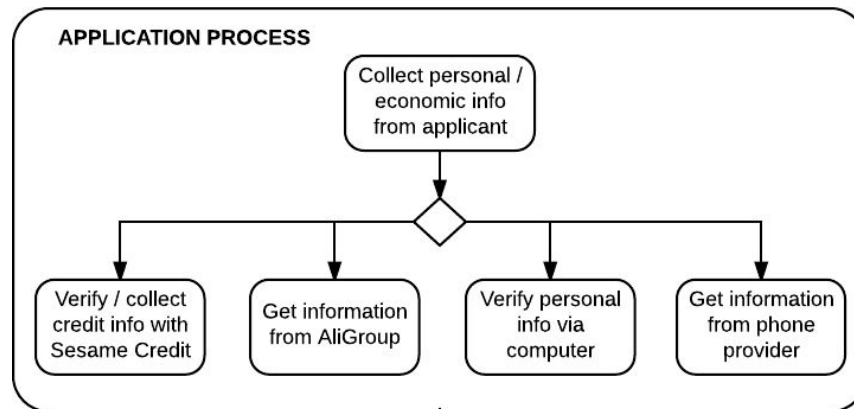
Figure 3. Flash Fund Application Process

4.1.2 Approval Algorithm

The first step in Qiantu's approval algorithm (see Figure 4) is determining whether the applicant is a new or returning customer, which will dictate how the approval decision is made throughout the rest of the algorithm.

New customers first must pass a list of minimum requirements (see Appendix H), which includes criteria such as being at least 18 years old and having had a usage plan with a mobile carrier for at least four months. If the applicant passes all of the static minimum requirements, he or she moves on to the dynamic section of the process, the approval model. Even if an applicant was rejected based on the minimum requirements, his or her application will still go through the approval model for the purpose of data collection and analysis. This is because Qiantu works to update the models the company uses in its overall approval algorithm regularly to better predict which applicants will make reliable borrowers. Examining how rejected customers' data are processed by the model is valuable feedback for the company.

Qiantu has different approval models that consist of different sets of rules. The model that is used to approve or reject the applicant is determined depending on the origin of the application. Applications directly from the Flash Fund app, for instance, will be reviewed by a different model than applications from third-party sources. Each model consists of a set of rules that assign points based on the applicant's information. The points the applicant receives from each rule are added together to form the final score. If the applicant's final score is above a certain threshold, and he or she met the initial minimum requirements, the applicant will then be approved for the loan.
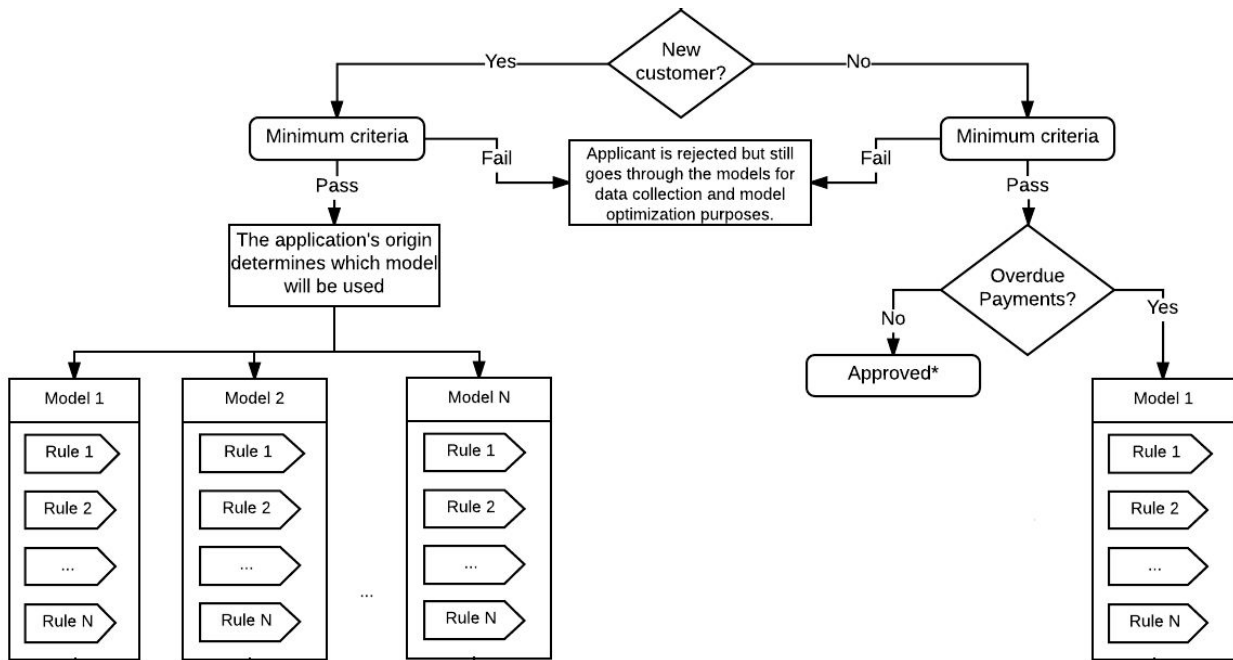
Figure 4. Flash Fund Approval Algorithm

For returning customers, the approval process differs slightly. Since returning customers have passed the new customer approval algorithm once before, the approval process is slightly more relaxed. Similar to the process for new customers, Qiantu first checks if the applicant passes a set of minimum requirements (see Appendix H). If the application passes, Qiantu

investigates the applicant's past payment history. If the applicant has no record of overdue payments, the application will automatically be approved. Otherwise, there is a single model for returning applicants that functions in the same way as the models described for new customers.

In both cases, if the applicant passes both the minimum criteria and the model, he or she has been approved. However, the applicant is required to undergo and pass a final facial recognition process to receive the loan. Applicants must use Flash Fund's camera feature to send up to three pictures of themselves moving their head in different ways and making multiple expressions. The results of this process are then compared to the photo connected to the national ID number provided by the applicant during the application process. As an additional anti-fraud measure, Qiantu asks applicants to submit photos of themselves of their daily lives.

On the other hand, failing either the minimum requirements or the approval model renders the applicant ineligible to borrow money through Qiantu. However, if a new applicant is rejected, he or she is able to apply again after 15 days, and returning users may reapply after five days. Additionally, Qiantu will refer rejected applicants to other P2P lending companies; if a rejected applicant who is recommended to another company is approved for a loan, Qiantu will receive a fee from the other enterprise for introducing a customer to its services.

Like many P2P companies, Qiantu takes advantage of data mining capabilities to continually refine its models to better predict which applicants will become reliable borrowers. Qiantu relies on historical data collected from applicants to identify patterns and adjust the points awarded for each rule of each model. For this reason, as mentioned earlier, Qiantu still puts an application that was rejected due to not meeting minimum requirements through the model section of the approval algorithm.

4.1.3 Pricing Model

After an applicant is approved for a loan, the interest he or she must pay is decided by Qiantu based on its operating costs and the return expectations of the fund group that is advancing the customer capital (see Figure 5). Since the repayment period for Flash Fund is only 7 or 14 days, the interest the customer must pay on the principal he or she receives is decided as a lump sum. For example, if an applicant is approved for a loan of ¥1,000 RMB, he or she would sign a contract with Qiantu Financial Group, its partnering fund group, and the lender, indicating that he or she will pay ¥1,120 RMB on the loan due date (see Appendix C). The additional ¥120 RMB includes Qiantu's origination charge and the returns owed to the lenders. Since Qiantu does not interface with lenders except to sign the loan agreement, we focused our recommendations on strategies that involve borrowers.
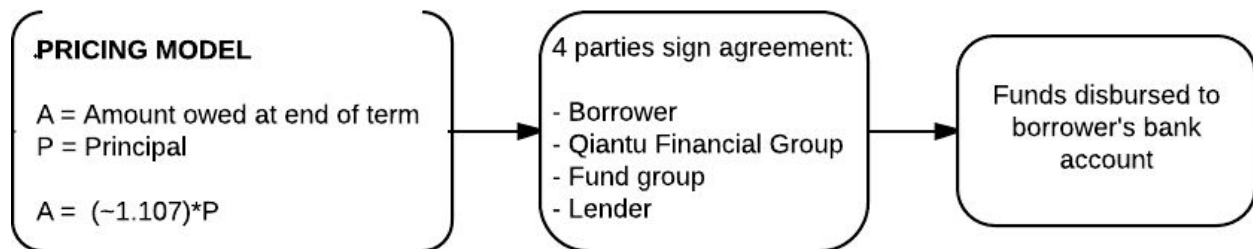
Figure 5. Flash Fund Pricing Model

4.1.4 Post-loan Management

Unlike in many established P2P companies, on the day a payment is due, the funding group receives the amount owed by the borrower in full from Qiantu regardless of whether the borrower repaid the loan on time. Thus, Qiantu can only reimburse itself if the borrower pays back his or her full loan amount. Qiantu is most negatively affected if the borrower becomes

delinquent. If a borrower pays back his or her loan on time, then no further steps are taken by Qiantu. Otherwise, Qiantu has an involved post-loan management system for recovering missing or delinquent funds (see Figure 6).

Qiantu's process for recovering overdue payments falls into two stages. Stage 1 consists of the first 30 days after a loan payment is missed. Within this time period, Qiantu will make phone calls to the borrower to remind him or her of the overdue payment. Qiantu will also contact relatives, employers, and any other phone numbers provided by the applicant or collected from other data channels in the application process. If within these first 30 days Qiantu has not received a payment, the company enters Stage 2 and recruits the help of a collection agency. This agency then takes over the job of pursuing the borrower and recovering the funds. If this third-party organization is able to collect the money, Qiantu receives the total amount collected in full, minus a small fee that the company has to pay for the agency's service. If the missing payment is never recovered, Qiantu is never reimbursed for the money it paid the fund group.
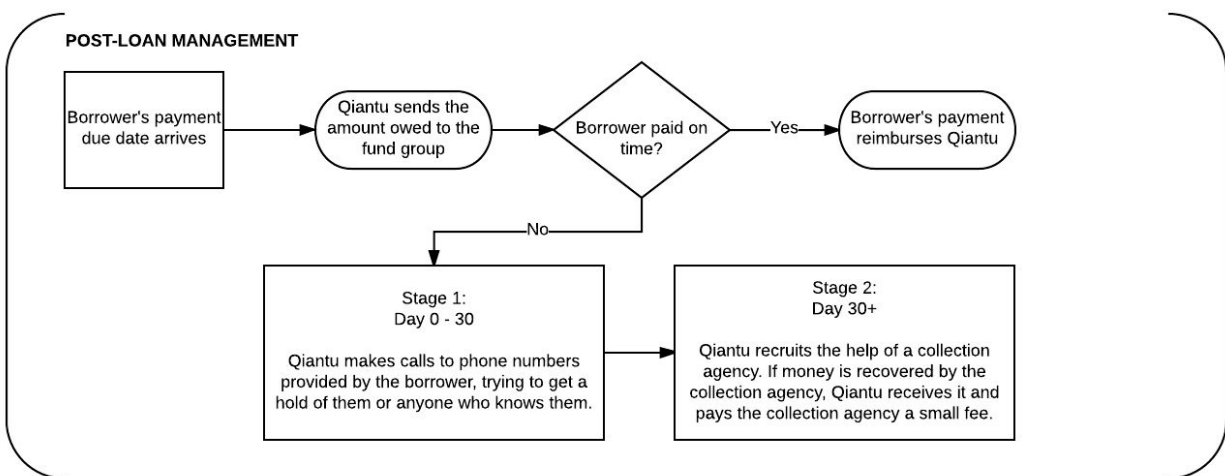
Figure 6. Flash Fund Post-loan Management

4.2   Analysis of Outside P2P Lending Strategies

In this section, we discuss the results of the information we gathered from interviews, our survey (see Survey Results in Appendix P), and sorting the data we collected about the notable and/or well-established P2P companies we researched. Our findings about each company were limited by the information that was readily available online at the time we conducted our research, and so any numbers we present regarding how many companies implement a certain feature or credit risk management strategy may be lower than the actual number. The entirety of our online research about each of the 12 companies can be found in Appendix J. In each subsection, we will discuss the general groups that we created for credit risk management at each stage of the lending process, as well as mention any specific instances where a company employed an interesting strategy not common to the other companies.

4.2.1   Application Process

In this section, we analyze what information applicants are required to submit by the P2P companies we researched, the strategies these companies utilize to verify self-provided information, and what external data channels they pull from to check a customer's creditworthiness. The list of categorized information from which we synthesized these results can be found in Appendix K.

Strategies to Consider

Requesting information about an applicant's level of education is an interesting strategy used by at least two companies, Upstart and PPDai. While both ask for the applicant's highest level of education, only Upstart asks its applicants to provide standardized test scores, which are

used for admission to colleges. We believe that similar information may be able to help Qiantu

better predict an applicant's creditworthiness. Through our survey, 90% of the 10,000

respondents said they would be willing to provide information regarding their level of education.

Therefore, Qiantu may want to consider investigating the correlation between education and

creditworthiness to determine whether education level should be required in the company's

application process.

In addition to education details, Upstart and PPDai also ask their applicants to provide

family and household information. PPDai specifically requires applicants to report their marital

status, while Upstart asks applicants how many dependents

they claim to support. In our survey of Qiantu's customers,

83% and 97% of respondents were willing to provide

information regarding their number of dependents and

Figure 7. Number of Dependents

marital status, respectively (see Figure 7 and Figure 8). We

hypothesize that this information may help calculate how

much discretionary income an applicant has, based on his or

her income and the number of people he or she must support.

An applicant's amount of discretionary income may

Figure 8. Marital Status

influence his or her ability to repay, and therefore, Qiantu may want to consider asking for this

information in its Flash Fund application process.

From our research, we found that income and expenses are used by at least six companies

to assess one's credit risk. To verify income, many companies require applicants to provide legal

documents, such as tax forms and bank statements. We believe that there is such emphasis on

requesting and verifying income because it is a very straightforward method of determining a borrower's ability to repay. Although Qiantu currently examines monthly income, the company could consider requiring applicants to submit an estimate of their monthly expenses; if Qiantu knows the applicant's income, requested loan size, and how much he or she spends each month on various bills (house, utility, etc.), the company may be able to better predict whether the applicant can afford to repay the loan. Our survey results indicate that Qiantu's user base would be highly receptive to implementing this change, as 85% of respondents reported that they would be willing to provide such information in their loan application.

At least half of the companies researched have shown that they collect their applicants' credit history from either a credit agency or a banking institution. These institutions tend to place emphasis on the numerical representation of the borrower's credit history, such as the American FICO score or the German Schufa score. Afluenta and Zopa have shown that they collect credit information from two different credit bureaus in order to ensure that they have all the information they need on an applicant. The unstructured credit reporting system in China makes this strategy especially relevant (see Interview with Professor Xiu in Appendix E), as a single reporting agency likely will not have access to all relevant information about an applicant's credit history. Therefore, Qiantu could consider implementing a two-agency strategy similar to those of Afluenta and Zopa.

Other Strategies

At least three of the companies we researched ask their applicants to report the reason for obtaining the loan. Of the three, Zopa requires the applicant to provide information that would be specific to the type of loan; for example, if an applicant reports he or she is taking out a loan to

pay for a car, he or she is required to supply the car's make and model. On the other hand, Yirendai (2015) has reported that the applicant's purpose for the loan has no monotonic effect on his or her loan decision. We believe that because Qiantu's Flash Fund loan sizes are small, an individual's reason for applying is not of great consequence.

Employment verification is one of the more popular strategies used by companies to help avoid fraud and ensure creditworthiness. At least 7 out of the 12 companies ask their applicants to provide information about their current employment status. China Rapid Finance (CRF) specifically reported that it sends teams to visit the applicant's work place and take pictures of the applicant to verify his or her employment status. We believe such an involved strategy would not be appropriate for Qiantu to consider. One of Flash Fund's most attractive features is the speed with which borrowers can receive loan decisions and funds; this speed would be greatly reduced if a strategy similar to CRF's was employed.

There are various other elements of the loan application process that Qiantu already employs:

- At least 9 of the 12 companies we researched collect personal identification information from applicants through multiple data channels.
- At least 6 of the 12 companies verify personal information to check for fraud and inconsistencies.
- At least 3 of the 12 companies we researched ask their applicants to provide their bank account information.
- At least 7 of the 12 companies have shown that much of the data that they collect about their applicants comes from third-party agencies.

- At least 2 of the 12 companies have shown that they check whether the applicant has previously used the platform.

- At least 3 of the 12 companies that we researched asked their applicants to provide proof of residency.

4.2.2   Approval Algorithm

In this section, we will be discussing our findings regarding how P2P companies use various pieces of information to arrive at an approval decision. The list of categorized information from which we synthesized these results can be found in Appendix L.

Strategies to Consider

Debt-to-income ratio (DTI) is one of the common factors used by at least four of the companies we researched to determine whether an applicant can be approved for loans on their platform. Both Lending Club and Prosper have set hard limits on the DTI an applicant can have, 40% and 50%, respectively. In our interview with Luke Deer, a respected alternative lending researcher, he emphasized the importance of DTI in a mature approval algorithm and suggested that it was a more relevant decisioning factor than income alone (see Appendix F). Qiantu may want to consider including DTI as a measure of creditworthiness in its approval algorithm. Calculating DTI can be accomplished by adding up an applicant's monthly debt payments and dividing the amount by his or her gross monthly income. Qiantu already requests an applicant's income in its application, so the company only needs to acquire information regarding an applicant's debt and monthly expenses, such as utilities, rent payments, transportation, and food.

Therefore, to employ this strategy, Qiantu may also want to consider monthly expenses in its application process as discussed in Section 4.2.1.

A policy regarding the maximum number of loans a borrower can have at a given time is among the prominent characteristics of most companies' approval algorithm. At least seven of the companies we researched have such a policy. Three of the seven companies allowed borrowers to have up to two loans, while an additional two companies simply specified that borrowers could have multiple loans. Zopa and Upstart also allow multiple loans, but have set a maximum total loan principal. We believe giving borrowers the option to take out more than one loan is a good way to improve customer satisfaction. While this also may increase credit risk, companies can set an upper limit for an applicant's total loan principal and DTI to mitigate this concern. At the moment, Qiantu only allows one loan at a time per repeat customer, and thus, Qiantu could consider adjusting this policy. Qiantu makes larger amounts of money accessible to repeat customers who demonstrate good behavior. Currently, if a reliable repeat customer has approval for up to ¥2,000 RMB through Flash Fund, initially takes only ¥500 RMB, and realizes he or she needs more, the customer must wait the full loan term before requesting a new loan.
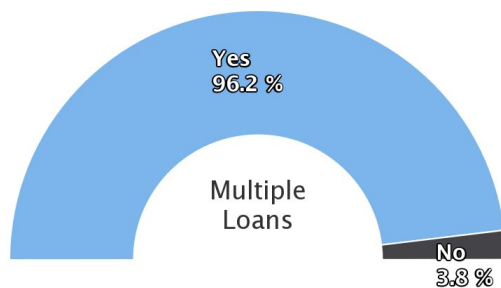
We found that 96% of Qiantu's Flash Fund customer base were interested in the option to take out another loan (see Figure 9). Therefore, Qiantu could consider either allowing multiple loans as long as the total principal does not exceed a certain limit, as Zopa does, or creating a top-up feature that allows such a borrower

Figure 9. Multiple Loans

to increase the size of his or her loan during the repayment period, as Auxmoney does.

Another strategy that can be considered is the use of geolocation, which can be defined as the process of identifying a person's specific geographic location and is a technique that may be useful in the approval algorithm of a P2P company's lending process (Ionescu, 2010). In an interview with Luke Deer (see Appendix F), he referenced an experience he had using geolocation on a dataset from an Australian P2P company to determine whether an applicant could be approved based on the average creditworthiness in his or her home location. Because people living near each other may have similar socioeconomic status, if an applicant lived in an apartment building in an area where other residents had defaulted or become delinquent on a loan, then he or she may be more likely to also default due to similar economic pressures.

Given the lack of structured credit reporting in China, we believe that using geolocation may be able to offer insight into the creditworthiness of a borrower and his or her ability to repay based on the credit quality of the given area. However, we have minimal research to support our hypothesis regarding the effectiveness of such a measure in China, therefore Qiantu may want to consider whether further research on this topic would be worthwhile.

At least 4 out of 12 companies we researched check an applicant's employment status and job stability. Prosper and Afluenta consider an applicant's credit risk to be higher if he or she is self-employed; Afluenta specifically requires self-employed applicants to have been working for at least 12 months, as opposed to the six months required for applicants who work for a company. We believe that these companies make it more difficult for self-employed workers to obtain loans because their source of income and job security might be less stable, resulting in a perceived increase in credit risk. Qiantu could consider conducting further research on the

difference in credit risk posed by self-employed and salaried applicants, and potentially impose higher restrictions on self-employed applicants.

Whether an applicant has previously filed for bankruptcy is also considered by P2P companies to assess his or her financial stability. At least 3 of the 12 companies we researched reject applicants who have filed for bankruptcy in the past, although we suspect this number would be higher if we had more detailed information on all the companies we researched. Qiantu could consider rejecting applicants who have filed for bankruptcy within a certain time frame, as recent bankruptcy may indicate that an applicant would not be able to repay his or her loan.

At least three companies we looked at consider applicants' behavioral patterns in their approval algorithm. For example, China Rapid Finance considers whether the applicant is active on social media during work hours. Such behavior may indicate the applicant has a lower job stability, as he or she may have a higher likelihood of being laid off. With Qiantu's network of data channels, we believe the company could monitor applicants' social media usage to determine if they are active frequently at work for purposes unrelated to their jobs.

Auxmoney implements another form of innovative behavioral data monitoring by considering whether a first-time applicant has visited the company's Frequently Asked Questions (FAQs) webpage. Auxmoney believes that applicants are demonstrating a higher level of responsibility by reading through the loan conditions and attempting to fully understand the impact the loan can have on his or her finances. Because in China access to credit history is unstable and behavioral patterns are often used by companies as measures of an applicant's responsibility in the absence of a credit history, Qiantu could consider incorporating such a strategy. If Qiantu added an FAQs tab on its Flash Fund app, the app's touch event handler could

be modified to record user interaction with the page, and the information could be stored between sessions with the iOS Core Data framework or any one of the Android equivalents.

At least three of the companies we researched set a maximum number of credit inquiries an applicant can have made within a certain timeframe. Lending Club, Prosper, and Upstart require applicants to have fewer than five, six, and seven inquiries, respectively, within the past six months. Credit inquiries are made by lenders and credit card issuers when an individual applies for new credit. Many inquiries within six months demonstrates that an applicant may have applied for many new forms of credit in a short timeframe, and thus, he or she is often considered by lending institutions to be higher-risk (Devaney, 2017). We are unsure whether this strategy is relevant given the state of consumer finance in China, but Qiantu could conduct further research as to whether the number of credit inquiries an applicant has correlates with his or her creditworthiness.

Based on our research, at least three companies have incorporated machine learning into their approval processes. Doing so allows a company to optimize its approval models constantly by finding patterns in large amounts of information on loan performance and delinquency on the company's platform. We found that Qiantu implements Big Data to update its approval models regularly from the data results of rejected applications processed by these models (see Appendix G). However, we were not able to verify whether Qiantu's approval models are upgraded manually or automatically by computer. Therefore, Qiantu could consider utilizing machine learning to optimize the models in its approval algorithm if it does not do this already.

Other Strategies

We found that at least five of the lending companies we looked into have a set minimum monthly or yearly income that an applicant needs to have for obtaining a loan. Setting such a restriction may help quickly filter applicants who cannot repay the loan they are requesting. Flash Fund loans are small enough that we believe setting a minimum income would not be necessary. However, it may be more useful to implement such a strategy in the credit risk management system of Easy Money, Qiantu's installment loan platform. Doing so would allow Qiantu to be more confident that its borrowers would have sufficient income to pay back the loan during the loan term.

Based on our findings, at least 2 out of 12 companies set a minimum number of revolving credit accounts applicants must possess in order to receive approval. Lending Club requires applicants to have two accounts, while Prosper requires three. However, in the context of China, where many people lack credit cards and usage is in decline, this strategy may not be as relevant.

Additionally, the following are strategies and features of an approval algorithm that Qiantu already implements and therefore does not need to consider:

- At least 2 of the 12 companies, Prosper and Yirendai, adjust their approval models based on historical data about the performance of loans on their platforms.

- At least 4 of the 12 companies we investigated consider FICO credit scores in their approval algorithm and set a minimum score applicants must exceed to receive approval. Qiantu receives information from Credit Sesame, whose scoring model is almost exactly the same as that of FICO (Credit Sesame, 2016; see Interview with Xu Shasha and Dr. Zhu in Appendix C).

- At least 3 of the 12 companies we researched have developed their own scoring models. The score the applicant receives, based on his or her personal, credit and/or behavioral information, is used, at least in part, to determine whether he or she is approved for the loan.

- At least 3 of the 12 companies automate parts of their process for fast approval. All Flash Fund loan applications are processed automatically.

- At least 7 of the 12 companies we researched require applicants to be over the age of 18. Interestingly, Afluenta and Younited also have maximum age constraints. Afluenta rejects applicants who are above the age of 73, and Younited rejects those who are above the age of 75.

- At least 3 of the 12 companies we researched explicitly require applicants to provide a valid bank account.

- At least 6 of the 12 companies our team researched require proof of citizenship and/or permanent residency in the country the company is based in.

- At least 4 of the 12 companies checked whether applicants have committed some type of misconduct.

4.2.3 Pricing Model

In this section, we analyze the different methods companies use to decide how to charge a customer for a loan. The list of categorized information from which we synthesized these results can be found in Appendix M.

Strategies to Consider

One of the strategies we believe Qiantu could consider is adjusting the origination fee borrowers must pay based on their level of creditworthiness. This could be done by implementing a loan grading model, which is a system for scoring approved borrowers based on their perceived creditworthiness. At least 8 out of the 12 companies our team researched have a system for grading borrowers, and each defined their own tiers of creditworthiness. For example, PPDai borrowers are assigned a score on a scale between Level I and Level VIII, whereas Prosper borrowers receive a grade of either AA, A, B, C, D, E, or HR. For at least 4 companies, the better a borrower's loan grading score or credit score, the lower the origination fee he or she must pay, and vice versa. By adjusting the pricing model in this way, Qiantu could compensate itself for approving riskier loans and reward safer borrowers with lower fees.

Within the pricing model of a loan, P2P companies have shown they provide incentives to borrowers for providing information or repeatedly using the platform. At WeLend in Hong Kong, borrowers can receive up to a 20% reduction in their interest rates for providing their Facebook, LinkedIn, and education details. Qiantu could consider implementing such a feature in order to reward applicants for helping the company better predict their creditworthiness.

Other Strategies

Putting in place systems for protecting lender's investments is a strategy implemented by multiple companies we researched. Investors at Younited Credit cannot invest in loans directly; instead they invest in one of five fund pools. These pools invest in many loans, diversifying the lender's investment, so that if one loan is not repaid properly, each lender only loses a very small portion of his or her money. However, Qiantu only handles the borrowing side of the P2P

lending model, and thus we believe the company does not need to consider this investor-based strategy.

Younited Credit also has a feature for allowing borrowers to buy insurance at the time of loan origination. This insurance will cover the borrower's payments if he or she is unable to repay due to "accidents of life." Having insurance could be useful for larger and long-terms loans because such accidents are more likely to occur during the term, and the loan principal is of more consequence; however, because Qiantu's Flash Fund loans have a short loan repayment period and a relatively small principal amount, we believe Qiantu does not need to consider implementing such a system for its borrowers.

Additionally, the following are strategies and features of an approval algorithm that Qiantu already implements and therefore does not need to consider:

- At least 5 of the 12 companies we researched have fixed interest rates on loans. While each borrower may be charged a different interest rate, once that rate is decided it does not fluctuate during the loan term.

- At least one other company we researched adjusts maximum loan size depending on borrower creditworthiness (see Prosper Approval Algorithm in Appendix I).

4.2.4   Post-loan Management

In this section, we analyze the strategies used to handle repayment and recovering money from delinquent borrowers by the P2P companies we researched. The list of categorized information from which we synthesized these results can be found in Appendix N.

Strategies to Consider

In our online research, at least 5 out of 12 companies stated they contact their borrowers regarding loan repayments, either through e-mails, phone calls, or text messages. In addition to the common methods of communication, RateSetter also sends letters to remind borrowers of due payments. In a more extreme case, if a borrower is 14 days late on a payment, Yirendai will visit the borrower's home. Currently, Qiantu only contacts borrowers regarding overdue loan repayments and recovering missing payments via phone calls. However, from the results of our survey of members from Flash Fund's user base, Qiantu may want to consider implementing other types of communication in its post-loan management system. Figure 10 shows that out of 10,000 respondents, about 73% ranked receiving phone calls from Qiantu as their last or second-to-last choice for method of communication. On the other hand, 87% ranked WeChat as their first or second choice for communication with Qiantu about upcoming and late payments. This was followed by QQ: 70% of respondents chose the QQ platform as their second or third choice for communication with Qiantu. With the use of scripting languages, Qiantu could improve the efficiency and effectiveness of its post-loan management by automating the process of notifying borrowers regarding payments. Contacting borrowers via their preferred method may also increase customer satisfaction and improve quick recovery rates for late payments.

Once a loan repayment is classified as late, companies have different methods to address the situation. At least 6 of the 12 companies we researched will charge extra fees for late payments. These companies tend to charge the borrower based on a percentage of the outstanding loan or a flat fee. We believe charging a late fee as a way to cover the expense of contacting borrowers is a valid strategy for credit risk management. Qiantu does not currently

charge a late fee; the company could do so to promote timely payments and reimburse itself for

the resources used to recover the late payment.
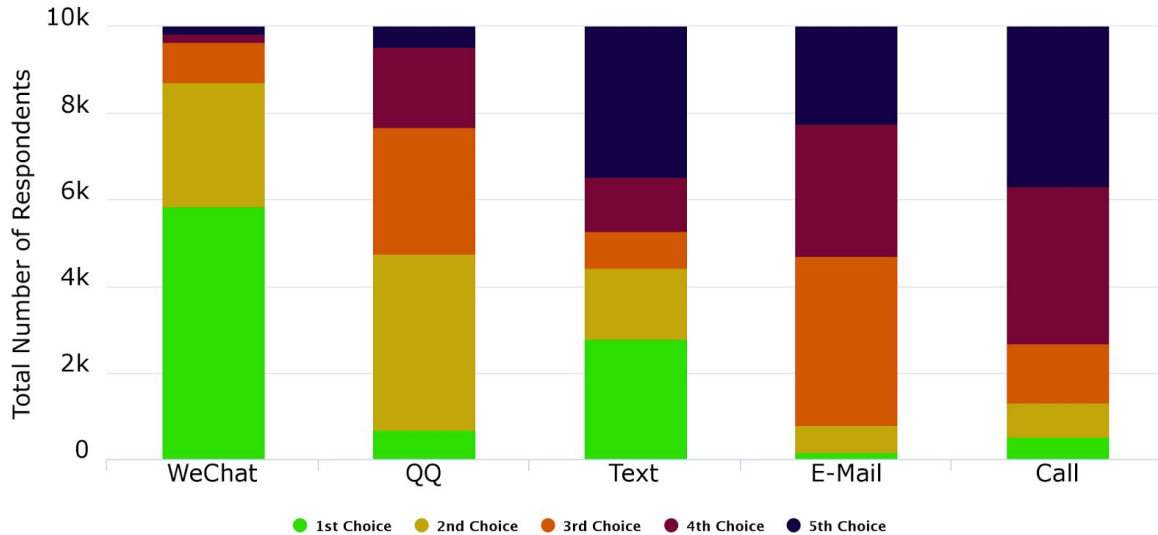
Figure 10: Communication Preferences

Once a payment has been missing for a certain number of days, we believe most

companies declare the loan charged-off. We know that at least three companies declare a loan to

be charged-off when it is past due for more than four months. Auxmoney, however, cancels the

loan four weeks after its last late payment reminder to the borrower. We found that at least seven

companies, as well as Qiantu, use collection agencies to attempt to recover any outstanding

balances after a loan is declared charged-off. For many companies, if the money owed is never

recovered, the investors are not paid. However, Qiantu currently pays the fund group their

expected returns regardless of whether the borrower repays. Qiantu could consider only paying

the fund group the portion it is owed from the amount the borrower pays back instead of taking

the full capital loss from delinquent loans. This change will likely require renegotiating terms

with the fund groups and their lenders, however.

One interesting strategy employed by WeLend is giving borrowers additional options for repayment, such as allowing customers to repay in cash at any partnering 7-Eleven convenience stores. According to the results of our survey of Flash Fund users, 71% of respondents would like the option to repay a Flash Fund loan in cash. Qiantu could consider partnering with other companies such as Family Mart or Watson's to provide a similar service, but Qiantu should first decide whether pursuing this feature would be worth the investment of time and effort.

At least four companies report delinquent borrowers to the respective credit bureaus in their region. We believe that Qiantu currently has a blacklist of delinquent borrowers that it will refuse to give loans to. However, to help promote the creation of a structured credit reporting system, Qiantu could consider reporting this list to the companies from which it gathers information, such as AliGroup, if it does not already do this.

Other Strategies

At least 2 of the 12 companies have a method of dealing with adjusting repayment schedules. Lending Club allows borrowers who have fallen on hard times to only pay the interest on their loans over a three month period, while borrowers on the PPDai platform may pay a fee to extend their loan's repayment term. Given the short loan repayment period of Flash Fund loans, adjusting repayment schedules does not seem like a useful strategy to consider. However, this strategy may be more useful for installment loans with longer repayment terms, such as those originated on the Easy Money platform.

Traditional P2P companies that are intermediaries between borrowers and investors can guarantee investors steady returns through risk reserve funds. Risk reserve funds are pools of capital, funded with fees charged to borrowers or investors, which are designed to reimburse

lenders in the case that the loans they invest in become delinquent. At least five companies we researched have their own risk reserve funds. Given the size of Flash Fund loans and the fact that Qiantu only handles the borrower side of the P2P lending model, we believe that a fund to protect investors would not be useful to the company. However, Qiantu could consider suggesting this strategy to its partnering fund groups to promote a safer lending process for investors.

At least six of the companies that we researched indicated that they have a policy for handling early repayment of a loan. Five of the six companies do not charge the borrower for making early payments. On the other hand, Auxmoney actually penalizes the borrower for paying off the loan early, with a fee equal to a percentage of the outstanding loan amount. Since early repayment reduces the amount of returns that investors receive on a loan, Auxmoney likely has this feature to discourage prepayment. We believe that Qiantu does not need to consider any changes regarding early repayments as borrowers owe one lump sum for taking out a loan; early repayment does not impact the amount the fund group receives.

4.3   State of P2P in China

The peer-to-peer (P2P) lending industry was born in China out of a need for more alternative lending options for borrowers (see Interview with Professor Xiu in Appendix E). The application processes for loans issued by state-owned banks were long and difficult for consumers to pass, requiring collateral and a guarantor; this resulted in the credit needs of a majority of the Chinese population not being met. The benefits of P2P loans for consumers are quite obvious: no collateral is required, and online P2P loan applications can be approved in minutes (see Interview with Weidai in Appendix D). Although the P2P industry arose as a direct

result of the traditional state-run economy, its development has been separate and, for the most part, completely independent of the control of the government.

For a long time, the lack of government presence and regulation in the P2P industry has given companies opportunities to deal with the nation's underdeveloped credit reporting system by creating new strategies for evaluating creditworthiness. When an applicant does not have an adequate credit history, P2P companies can perform credit decisioning in innovative ways by examining his or her e-commerce purchases, social media activity, utility bill payments, phone calling behavior, and a myriad of other factors (see Interview and Xu Shasha and Dr. Zhu in Appendix C and Qiantu Rule Set in Appendix H). This is due in part to China's historic lack of strict data privacy laws (Chen & Wong, 2017); this type of credit decisioning would not be possible in the United States and especially Europe.

Another area in which Chinese P2P companies have enjoyed relative freedom is discriminatory lending. While companies have access to lots of non-traditional sources of data, when they stray from approving loans solely on the basis of the applicant's credit history and financial stability, they have the potential to develop practices that inadvertently discriminate based on race or gender (see Interview with Professor Sweeney in Appendix B). In the U.S., which has a sensitive racial history and a highly diverse society, discriminatory lending, whether intentional or not, is strictly illegal. We suspect that these types of laws do not exist in China. One of the strategies our team proposed that Qiantu could consider for its application process was to examine applicants' education level. However, implementing such a practice may discriminate against applicants who are less educated but could potentially be reliable customers. Another strategy that we suggested Qiantu could consider was the use of geolocation in its

approval algorithm to help determine an applicant's creditworthiness based on socioeconomic factors in his or her geographic location (see Section 4.2.2). While statistics about the average crime rate, income, and loan default rate in the area around an applicant's residence may help the company make a loan decision, it could also lead to the development of an approval model that is discriminatory in nature. Therefore, Qiantu may want to consider conducting further research into the possible discriminatory effects of utilizing these credit risk management strategies before attempting to implement them.

While the lack of regulation in the P2P industry has been an opportunity for P2P companies, the threat of government involvement has been a source of great concern (see Interview with Weidai in Appendix D). Companies fear making any business decisions that may later become illegal, should the government suddenly decide to start enacting and enforcing regulatory laws. This ambiguity surrounding the future of the relationship between the P2P industry and the government was cited as a major reason why Lufax, one of the major Chinese P2P lenders, has deferred its move to go public until 2018 (Weinland, 2017). For the companies that have made such careful decisions, their caution has paid off; a string of high-profile cases of underhanded practices and irresponsible lending in the P2P industry has recently given the government enough cause to clamp down (Weinland, 2017). As of June 2017, a new data privacy law was enacted to restrict greatly what information companies can buy and sell, and what data they can require customers to provide (Xia, 2017). Additionally, the news broke in November of 2017 that the government would imminently start enforcing a law that requires the APR of any loan to be below 36% (Bloomberg News, 2017). This regulation will likely destroy the P2P payday loan industry, not to mention further restrict consumers' limited access to credit.

Our sponsor is not free from the consequences of the APR regulation; Qiantu will be heavily impacted by this change. Based on the way APR is calculated, the fees Qiantu charges on its payday loans may only be equal to 12% of the principal, but the loan is for only 14 days, which causes the calculated APR to be upwards of 300% (Latham, 2017b). To lower the APR of its loans, Qiantu could increase the loan sizes without increasing the size of the fees, or decrease the size of the fees without lowering the loan sizes. However, if Qiantu were to implement either of these options, the company might not generate enough profit to maintain growth or satisfy partnering fund groups.

The other alternative for Qiantu, and the option we think may be most appropriate, is to increase the term of the loan. APR calculation punishes short-term loans, so if the length of the loan repayment term was adjusted, the APR drops significantly. If the loan term of Qiantu's 14-day loans were extended to 6 months, the APR would go down from 313% to 24%, which is well within the government-imposed limit. If Qiantu were to restructure its lending model to have 6-month repayment terms on payday loans, where borrowers are charged an equal sixth of the total amount owed every month, then it could ensure that Flash Fund loans are below the maximum APR. Incentives for early repayment could also be put in place, so that the legal repayment term is six months, but many customers would repay in less time. However, we are unsure how this would affect the government's view of the loans' APRs.

Regardless of whether Qiantu heeds our suggestion, this update in the regulation of Chinese P2P lending will significantly affect the company. If Qiantu does follow our recommendation, increasing the length of the repayment period on Flash Fund loans could increase the amount of credit risk and other risks in unforeseen ways. The adjustment would

likely require an overhaul of the company's post-loan management and the models used in the approval stage. Since Flash Fund is by far Qiantu's main product, if Qiantu instead chooses to close Flash Fund and refocus its resources on developing Easy Money, the company may need to reduce in size substantially until it can regrow and continue making an acceptable profit through Easy Money loans only. The final option available to Qiantu is to close completely. Our group would be disheartened to see Qiantu choose this option; we have enjoyed working on this project for Qiantu, and we wish the company many more prosperous years.

4.4   Summary

By examining the sorted lists of data we gathered from online research of other P2P companies, we created a preliminary list of recommendations based on strategies we believe Qiantu does not currently implement that were common to multiple companies or were unique and relevant in the Chinese economy. Based on our survey of Qiantu's users, we determined that they seem very willing to provide additional information in the application process which may help Qiantu better estimate creditworthiness. After adding and removing some recommendations based on their relevance in Qiantu's business model and Chinese society as a whole, we generated a final list of recommendations from which we believe Qiantu's current credit risk management could benefit. In the next chapter, we will summarize our primary recommendations for Qiantu and any additional strategies that the company may want to consider implementing.

5.   CONCLUSION AND RECOMMENDATIONS

Qiantu Financial Group is a relatively young P2P lending company in a maturing and unstable industry that is saturated with competitors. Qiantu has developed its own credit risk management strategies for its main loan platform, Flash Fund, but the company is interested in improving them in order to stabilize its growth. To support Qiantu's goal, our team examined the risk management practices of notable and/or well-established P2P companies around the world, and compared them against those of Qiantu. Our goal was to develop recommendations based on the best practices for credit risk management, so that Qiantu may adopt relevant ones into its own portfolio of strategies.

Based on our research, Qiantu's loan process and credit risk management system exhibits almost all of the essential strategies that we identified in our study of other P2P companies. To take out a loan on the Flash Fund platform, Qiantu requires applicants to submit their identifying information, income, and employment. The company rigorously verifies the applicant's identity, and retrieves credit and behavioral information from outside sources to assist in evaluating the applicant's creditworthiness. Qiantu has a sophisticated approval algorithm that is monitored and regularly updated to improve its estimation of what constitutes a safe credit risk. Once a loan's repayment date is missed, Qiantu makes a dedicated effort to contact the borrower internally, and enlists the help of a debt collection agency after a certain point.

Because Qiantu already implements a majority of the industry "best practices," many of our suggestions are more specialized. The list includes many recommendations that are based on features that we found to be unique to a small number of companies, but that we believe would

be relevant to Qiantu based on our research. It is important to additionally note that much of the information about the lending and approval process of a P2P company is proprietary. Therefore, our recommendations are based on strategies that we were able to identify through information that was readily available online and that we suspect Qiantu does not currently implement. We encourage Qiantu to determine which credit risk management strategies that we are recommending are worth investigating and potentially adding to its current set of protocols.

5.1   Recommendations

The following set of recommendations aims to strengthen Qiantu's existing system of credit risk management. Our recommendations are organized below by which stage of the lending process they fall under.

5.1.1   Application Process

We highly recommend that Qiantu consider:

- Asking applicants for their education level as an assessment of creditworthiness and conducting some form of verification.

- Asking applicants to report their number of dependents and marital or relationship status.

- Asking applicants for monthly expenses (e.g., rent or housing maintenance bills).

Qiantu may also consider:

- Obtaining credit information from more than one agency to ensure that there is no missing information on an applicant.

5.1.2   Approval Algorithm

We highly recommend that Qiantu consider:

- Including debt-to-income ratio (DTI) as a measure of creditworthiness.

- Giving reliable repeat customers the option to have two loans or top-up an existing loan.

- Adding a Frequently Asked Questions (FAQs) section to the Flash Fund app, and analyzing users' time spent reading the FAQs as a measure of responsibility.

- Determining whether geolocation can be used to predict general creditworthiness based on the socioeconomic factors present in the applicant's location.

- Rejecting applicants who have filed for bankruptcy within a certain timeframe.

Qiantu may also consider:

- Determining if self-employed applicants pose a higher credit risk than applicants employed by a company.

- Determining if the number of credit inquiries an applicant has correlates with creditworthiness.

- Determining whether having a car is an indicator of an applicant's creditworthiness.

- Determining whether an applicant utilizes social media excessively while at work.

5.1.3   Pricing Model

We highly recommend that Qiantu consider:

- Increasing the repayment period of Flash Fund loans to lower the Annual Percentage Rate (APR) and meet new government regulations on the P2P industry.

- Adjusting the origination fee it charges borrowers depending on their creditworthiness.

5.1.4 Post-loan Management

We highly recommend that Qiantu consider:

- Contacting borrowers via WeChat and QQ instead of through phone calls.

- Charging a late fee to borrowers who submit payments after the due date.

- Not taking the capital loss if borrowers fail to repay their loans.

Qiantu may also consider:

- Creating multiple methods, such as cash, for customers to repay their loans.

- Reporting delinquent borrowers to the companies from which Qiantu gets credit information.

5.2 Closing

Through our examination of Qiantu Financial Group's credit risk management strategies and research of notable and/or well-established P2P companies, we were able to synthesize a list of recommendations Qiantu can use to improve its current credit risk management system. Our analysis of the credit risk management strategies of other P2P companies indicates that Qiantu implements a majority of the "best practices." We have taken steps to ensure that our recommendations are relevant given the state of consumer finance in China, the purpose of Flash Fund, and the preferences of its active users. We believe that by implementing our suggestions, Qiantu will strengthen its system of credit risk management and continue to mature as a P2P company.

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APPENDIX A: Sponsor Description

Qiantu Financial Group (**钱兔金服**) is a small private peer-to-peer (P2P) lending enterprise in Hangzhou, China, that was founded in 2015 (Graphiq Inc., 2017; S. Xu, personal communication, September 17, 2017). The company was created as a subsidiary of Yuntu Inc., and is run by Yuntu's co-founders, Jerry Zhou and Peter Pan (Baidu, 2017a; Baidu, 2017b; LinkedIn, 2017). Qiantu's mission is to "provide consumers and small [businesses] with safe and inclusive financial services globally" (S. Xu, personal communication, September 17, 2017). In order to achieve this goal, Qiantu has launched two mobile lending apps. Flash Fund, the more popular of the two, provides payday loans which are often only ¥500 or ¥1,000 RMB for a term of 7 or 14 days. Easy Money is Qiantu's platform for installment loans, which have sizes ranging between ¥2,000 and ¥5,000 RMB for 3 or 6 month loan terms. Qiantu's reports its average monthly users to be about 400,000, and in August of 2017, its total monthly transactions reached ¥700 million RMB (Graphiq Inc., 2017).

While most P2P companies directly connect borrowers and lenders on their platform, Qiantu is only an intermediary between the borrower and an outside fund group (S. Xu, personal communication, November 14, 2017). Qiantu partners with multiple fund groups, such as Weidai (**微贷**), that interface with investors. Qiantu's role is simply to screen and approve loan applicants, and direct the fund group to invest in applicants that Qiantu deems safe credit risks.

Due to the enormous potential consumer finance market in China, the industry is saturated with competitors to Qiantu's lending apps (Information Technology Weekly, 2017; Jing, 2016; The Economist, 2017). Some of these rivals include Haodai (**好贷**) (2017), RRJC (**人**

人聚财) (2017), and Yooli (有利网) (2017). These hundreds of enterprises do not need to be based in Hangzhou to compete with Qiantu because the web services and apps that they provide are available to anyone with Internet access.

APPENDIX B: Interview with WPI Professor Kevin Sweeney

B.1   Before the Interview:

We arrived at the Gateway Park building early in business casual dress. We introduced ourselves as an IQP group working on a project that involves research into how consumers interact with online P2P lending enterprises and how Western and Asian business models in these companies differ. We then asked if the interviewee mind being recorded for the sake of creating an accurate transcript, and asked a few questions about his career and history with FinTech, to ease into more specific questions.

B.2   During the Interview:

At the interview, we had two group members present. One team member conducted the interview, while the other took notes.

Prompt:

Once again thank you for taking the time to share your experience with us on such short notice. As we mentioned earlier, we are working on writing a proposal for a project. This project aims to advise a Chinese app-based lending company on risk management when remote clients have very little accessible credit history, as is the case in China. We have prepared a series of questions regarding how consumer lending is handled.

To help facilitate our note-taking today, we would like to record our conversation today. For your information, only project group members will be listening to the recording which will be deleted upon being transcribed. Is this alright with you?

We plan to use information gathered here in the background section of our project proposal. Is it alright if we quote or paraphrase your words in our writing? Would you request to remain anonymous? Do you wish to be sent a draft of the sections containing information from this interview to be sure your words have not been misinterpreted?

If Yes: *Thank you. If at any time please let us know if you want to turn off the recorder or keep something off the record.*

If No: *Thank you for letting us know. We will be taking notes only.*

B.3   Transcript:

Julian: Firstly, could you just describe FinTech as you see it briefly?

Prof. Sweeney: Sure, so, FinTech is really what you… in its broadest definition is any technology -enabled financial tool that is used to move money in one form to another. That is the simplest and broadest definition. The definition includes a lot of subset areas, and certainly, at WPI, we're gradually trying to define it in the context of how we can be influential, but it includes everything sort of traditional financial services being intermediated by new technologies or being affected by new technologies, so that's banking, asset management, insurance. Those are the big ones but in terms of financial services, it goes broader than that. So it is any way – I can kind of look at it – anywhere money is involved and technology is involved, you have FinTech. The ability to move money, the ability to record transaction, the ability to have interaction that involve transfers of value from one person to another. So, FinTech, obviously block train and to the extent that is implemented in cryptocurrency and also all sorts of other applications… All of those things in one form or the other. But, there are examples of things that people would intuitively say falls under the umbrella, but are artificial intelligence and the way that it is

applied to investment analysis and a whole bunch of other things like cyber security – any of those. The key is money and tech. It is not financial services and tech, I think it is money and tech, where… because financial services… all financial services are a group of industries – the sector that basically defines itself around helping people manage transactions, money, and resources. So to the extent technology does that it is FinTech, even if it is not part of the financial services industry, which is why a lot to start – I mean, peer to peer is arguably an example of something that historically wouldn't be defined as a financial service. It is a newly-created, sort of a whole
"blue ocean" concept in terms of being in a new space. Last couple of years now, the question is, "Does it get regulated like a financial service. Is it a financial service?" But, it is moving the money using technology. Does that seem reasonable?

Julian: Yeah, We're focusing more on the lending… As opposed mobile payment, blockchain, and all of that.

Sweeney: Understood and all of those fall under it, so… but I kind of defined it at its broadest.

Julian: So, even using like Venmo and stuff like that… you consider…

Sweeney: That is definitely FinTech.

Julian: Okay, yeah. So, that's like mobile payment, and…

Sweeney: Anything where there is a monetary – something involving money – so it could be transaction, it could be managing your assets, it could be a lending relationship, it could be an insurance relationship. There is actually now even sort of broader definitions, which they call it RegTech, which includes all the regulatory technologies that can be used as an oversight tool for these things so… as you build a peer-to-peer lending tool, there may be a sort of a commerce technology that manages the oversight rather than just traditional human oversight. So, you have a technology to manage, to overseeing in a regulatory… So that all falls under the bundle. The big question for you is to finding those things that are either directly or tangentially related to peer-to-peer.

Julian: Yeah, of course. Are you noticing any national or international trends in FinTech and its development?

Sweeney: Yeah, I guess so. Well, I can tell you… this is sort of on the broad observation, but I think… in terms of particularly Asia versus the United States… China, actually I can get to

China. China, the sort of very fundamental difference is the way that we interact with mobile devices.

Julian: Yeah, that was what we've been researching.

Sweeney: At its heart, China is a market where you are a single, typically a single app, or nearly a single app model, where you do multiple things in your life via a single app. Most of which have grown out of online shopping that they have migrated to or social… well, two tracks, either they were an online shopping tool or they were a social media tool but they are all sort of coalescing around the idea that a typical user, I think in China, expects not to have a phone that looks like mine that has 18 different apps. So, I have an area in my phone that says "money", and then I open it and I have a bunch of apps that some are for research, some are… I got LifeLock, I got a credit one, I got my different banks. There isn't a way that I can have it easily unified in one place. So I think if there are a sort of macro difference between the two is the interaction in that space. I think the other big difference is say, I'm a lawyer by training, is you are talking about very different kind of regulatory structures, and so that's not new because of FinTech that's been a… I actually did some work in China. I've done work in Hong Kong, I've done work in Taiwan, relative to… acquiring or starting financial services and businesses, primarily insurance and asset management. The regulatory scheme in the People's Republic are substantially different from most others. So, Hong Kong and Taiwan carry a more somewhat comparable regulatory platform. China [is a] very different platform. So, if I… so you have a user set of issues then you have a regulatory set of issues that are different… the regulatory is more of because it's just grown up differently… It's not that they regulate – they have the same concerns but they might focus on risk management in a different way. They certainly focus on foreign investment in a different way, so there are rules on who can actually even participate and how much. So, those are some of the other variations. So, those are sort of the external factors that are gonna, by definition influence the outcomes.

Julian: Yeah, we definitely saw that China is very cautious in how it lets outside parties deal with its economy.

Sweeney: I can speak to that in just a… when I first was working in China, my old company, so I'm a Professor of Practice… I come from financial services we did a transaction where we are going to provide insurance services and partnership with State Grid, which is the largest electric company in China, and there were all kinds of rules on… we could only own X amount… there was an amount of equity we could hold, the amount of voting rights we could have that we're all sort of… to ensure that there wouldn't be a foreign company that actually retain control. That has changed a bit but… I think it will influence the structures of things like peer-to-peer – how can you… can you have peer to peer that extends outside of national borders and things like that.

Julian: So, do you think online peer-to peer-lending is an integral part of consumer finance today?

Sweeney: No. I think it's growing. It's becoming… Well I mean, that is sort of an universal… I can't speak to what it is in China but maybe it is more integral? But I think in the United States, it's still only a small percentage of the total lending as far as I've… any data I have seen. So, I think right now the question ends up being how it become… It still does not have a platform really extends to the average consumer's… sort of comfort with using… so it may be a perfectly good choice but there's still a lack of clarity around the cost, there is still pricing issues, it's difficult to make comparisons between it and a traditional lending platform. The flip side is I think it's growing. Obviously, it is typically faster. It can be cheaper, not always. It's often potentially more expensive, but perhaps it allows more consumers who wouldn't have normally qualify for traditional lending and opportunity. But I think it is still… I haven't seen the recent numbers. But I've looked at this when I was teaching the course in Spring, and we were still talking about less than… not even… less than a single digit, not even close to it in terms of what I would have called it a serious penetration. But I mean, I think it is evolving, and they also have some problems that as peer-to-peers have come online… So I forgot the name of the Canadian peer-to-peer platform but Canada's… this gets to the regulatory question. So, Canada is, for example, has taken on a much more aggressive view that they should be regulated like any other finance company and so there has been fits and starts. They were up, and then they basically had to shut down, and I apologize, I can't remember the name of it but if you just google Canadian peer to peer, and you'll see…it is basically they presumed that the government wouldn't regulate them and the government decided to regulate them, so they had to take six steps back. I could see that – that's one of the challenges, is to how you going to start something completely different, to what degree are you… and even the question of regulation. Because you have two sides of the transaction in peer to peer, you have the lending transaction – should it be subject to regulation? That typically is less regulated consumer finance companies don't face a lot of regulations but then there are the investors and there are all these questions of security and law – are they investors, are they direct lenders… that is what the Canadians are doing… I would look at... just because the Canadians are the ones I know are really dealing with this head on and… It might be worthwhile because that is going to be the issue of how did the Chinese authorities view the two halves of the transaction. Does that make sense?

Julian: Yeah that does. We figured that government would be, like, a bigger role.

Sweeney: Be really sensitive to the fact that there are two completely different regulatory regimes involved. And so when you think about lending, most people think of consumer finance or banks, you know, they think of the asset side, which is the… so in a lending organization, your

loans are your assets, and your liabilities are the capital that is being provided to you. And so the question is: whose balance sheet is it on? So, when it's peer-to-peer, does it ever even get on the balance sheet of the company that's facilitating – is it a facilitator? And then if it's a facilitator, is it facilitating securities transactions, or some other type of investment that might be subject to regulation. And then there are all these other rules. So you gotta look at, how would you regulate it as a lender, and how would you regulate it as an investment. And I know the Chinese authorities have both regimes, the question is how does their regime, how do those two regimes there even view it. Are they paying attention to it? If they are, are they doing what Canada did, which is said "we're gonna pose securities law rules on the investment side"? Things like that, might be questions you want to ask, because that's going to affect you significantly. I'm sorry, I don't know if I'm going way off on tangents…

Julian: No this is great, we don't have too many questions.

Sweeney: You can tell, I'll just go on if you don't get enough.

Julian: So, one of the companies we've been looking at is Upstart, which is a little different than other ones because Prosper and Lending Club both allow retail investors, but for Upstart you have to be an accredited investor.

Sweeney: Yup, which gets right to the heart of the securities law issues. So an accredited investor is somebody who actually has, who meets threshold requirements, in terms of either assets, income, or some other measure of wealth, and by doing that they don't have to make the same disclosures. So they're [Upstart] basically acknowledging that securities laws might apply by doing that. Because they're acknowledging it and then they're using an exception to the law, to avoid being regulated.

Julian: So it's a strength for them because they're anticipating what could potentially happen in the future, but they're also limiting their investor base.

Sweeney: That's right. So they're basically saying… so accredited investors can invest in what are called private placements, and private placements are basically anything where either you can be an institutional investor, or a qualified individual who meets certain criteria. If you meet those criteria, all of the… so if you've ever looked at an issuance of a security or stock, if you've ever looked at a prospectus, I'd actually go out and just find a prospectus, see if any of these offer prospectus… they look like telephone books, I don't know if I have an example of a prospectus, I don't, but they're loaded with information. There are disclosure requirements on a publicly-traded prospectus for ease of reading, certain this that have to be disclosed, access to information, and so what they're [Upstart] is saying is "we don't want to deal with that." And

then if I have accredited, sort of sophisticated, investors, the presumption is that they know how to ask questions. So, because they know how to ask questions, you don't have to disclose as much. They have their lawyer, they have their advisors, so if you're either wealthy enough or you're a company you can… so they're basically saying "let's go with that group of investors". There's actually some logic to that, both from a regulatory perspective, but it also means I don't have to, I'm not raising little bits of capital. Presumably, a private, an accredited investor is expecting to plow a serious amount of capital in. You know, they're not gonna make a few hundred dollars or a couple thousand dollar investment. Even a small scale, so I actually qualify as an accredited [investor], I can private placement investments – I'm not a high- high-end, but I would expect to be making a fifty or a hundred thousand dollar investment, and I'm on the low end. A higher-end might say, "I'm not even gonna get involved if I wasn't making a million or two million dollar investment." So thats a lot different from the traditional peer-to-peer, it's not really peer-to-peer, what you're doing is you're aggregating small high-end investors, where the true peer-to-peer model is –

Julian: Crowdfunding.

Sweeney: – crowdfunding. Somebody's gotta, you know you wanna put five hundred dollars in and you're hoping to get the return on the back end because there's twenty other people putting five hundred dollars in, and so suddenly it's a ten thousand dollar loan to XYZ.

Julian: Yeah, so another thing that Upstart does is they, in addition to looking at FICO score and whatever, they also look at the background, the educational background, field of study, so they're using a little more non-traditional information to approve loans, in the case that their potential customers have a little bit more of a minimal credit history. So do you see the use of non-traditional information as a strength or a weakness here?

Sweeney: I think it's a strength, provided there's some statistical correlation. In other words, the danger, there's a couple of dangers of using non-traditional [information], I think a lot of underwriting standards for lending in general, bank underwriting standards, don't make a lot of sense because they miss some critical factors. But the dangers of using new data, the thing that FICO score does for you is it provides some statistically meaningful indicator, it aggregates a bunch of history – your credit history, your employment history, criminal history – into sort of a common platform and says "we have sufficient data to say that somebody who's a 805 is a much better risk than someone who's a 605, and that those two [numbers] mean something." I don't know that the fact that someone went to WPI or the fact that someone has a Ph.D., inherently means they're a better or worse risk. It might, it might not, so what you'd want to know is that they are really employing some significant quantitative integrity in terms of making those choices. Are they really asking, are they running models that actually prove that there's a

correlation. So for example, we actually just worked on a project, a group of students, on a project that, and faculty, that ultimately it didn't work out, but there was, there's a correlation interestingly, between the energy efficiency of a home, and the default rate on mortgages. And so, arguably, if… there's a University of North Carolina study that shows that, but we were looking at a firm that actually could predict the energy efficiency of your home without actually testing it. So if you could take data set A, correlate it with data set B, which says that there's this… that the mortgage default risk… And if the data set A is right, in other words we've predicted your energy efficiency, you might get a slightly more precise underwriting guideline. Similar concept, but there's a comprehensive quantitative analysis the University of North Carolina did to show that there's a correlation, and it makes some sense because if my house is less energy efficient, when, if there's a steep change in energy prices, and let's assume I'm sort of at the edge of my credit, and suddenly, I'm in my oil fueled home and my oil cost doubles overnight, my cash flow becomes an issue. You can intuitively see where there's a correlation between the two, and there is in fact a statistically significant [correlation], the question is: if I've got a Ph.D versus a BA versus a high school diploma, is there, and I suspect there is, but is there an equivalent statistically meaningful outcome, or is it just that we're presuming something that creates potentially some other issues? So in the United States, you can't do what's called red lining, and red lining is basically when you make choices based on race or gender, relative to underwriting a loan. If educational level has an inadvertent effect of creating a red lining scenario, you'd actually be violating the law, so you could conceivably back your way in, even though you weren't saying we're gonna… because if you have a statistically meaningful impact on African Americans, because of some choice, some… you have to be careful of that as well. So you have two sets of issues – one: is it meaning relative to the loan? … and in the US, I don't suspect this is an issue in China – I don't think they have the same issues around discrimination. The second question you have is: by asking the question, are we backdooring into, without even realizing it, a potentially discriminatory practice. Do you start seeing how complicated it gets? That's the roadmap you kinda have to ask both questions. If you can answer both questions, well no problem. If you can't, you potentially have a real problem.

Julian: So also, I don't know if you know, Upstart uses machine learning to approve loans. So they are approving a lot more [applications than] a FICO score would recommend. So what do you think about that use because that is also kind of going into red lining. Is it less biased because it is a machine, an artificial intelligence?

Sweeney: I don't…. Well first of all machine learning versus artificial intelligence there's even there to – so I don't know that we have fully migrated to the point that the technology actually creates true artificial intelligence. So the question is: what algorithms are we using to make the choices and who – what assumptions underlie those. So, regardless if it's a person or machine, if i have flawed assumptions going in, I have flawed data going out. So there's that question. You

have to sort of validate that it makes sense. I suppose that on one level – you can tell I'm a lawyer because I can always give you both sides of an argument. But on the one hand, there is a – I suppose a "perceived neutrality" associated with machine. Again, that's not true. Machines operate only on assumptions. Their biased assumptions create outcomes. So really, and to some degree whether it's human or machine, most human input in the decision is using a series of decision trees. So largely, it's not a lot different from machine learning. The difference - so the good side of human and the bad side of human. The good side of human is that a human can make qualitative choices and decisions – and this is where someday when there's true artificial intelligence you can get there – that recognize the flaws in whatever matrix you set up –whatever decision matrix you set up – that's the good side. That same qualitative analysis also allows for bias.

Julian: Yeah, in red lining.

Sweeney: Well in other things. redlining is one example. Any kind of bias. [For example] "I really love this particular industry. I think it's a great industry. I don't know why but I've always lent to a bunch of customers and they were successful in it so it must be a good place to lend." That's a flawed bias. It has nothing to do with individual credit, it has everything to do with y'know lenders - they're out there, they're doing business, they kinda get – they build an information set. Sometimes that information set is really helpful because they see nuance that a machine can't, sometimes it creates new biases. So, I'm not sure that one is better or worse than the other.I think what is important is are you asking the set right sets of questions regardless of whether you choose a human process or you choose a machine process to make sure that there aren't biases built in and if there are, what are you doing to mitigate that? Is there human intervention that mitigates the risks of machine. And likewise, could a machine provide some form of intervention that actually detect human bias if you're going down the human road? Those are the things that I think can be useful.

Julian: So a lot of Upstart's loans are actually approved completely automatedly. So obviously with FinTech there is a lot less interaction between lender and consumer especially face-to-face, does that affect the risk management strategies that companies use.

Sweeney: Substantially, so every organization – so any lending institutions – so I'm on the board of a bank and I chair the finance and risk management committee of the bank so I sit and we have conversations all the time about risk, and there are multiple levels of risk. But the core risk that banks or commercial finance firms… is lending risk. And lending risk, and sort of woven inside of it there's individual credit risk, so that's the underwriting risk, there's interest rate risk, there's other market risks beyond interest rate risk and those get managed in a bundle. The institution has it own risks so there's operational risks, there's technology risks there's a bunch of

other factors, you know, privacy risks, cyber security risks – all those things that have nothing to do with underwriting loan but are wrapped around it. If I'm sort of reverting to a much more machine a much more technology-driven process, I have two sets of issues one on the underwriting risk side, I probably can do a pretty good job of monitoring things like interest rates and do a pretty good job of monitor market risk because those are the things that, in aggregate, can manage algorithmically. It's much harder – and this gets back to my idea you know sort of machine artificial intelligence gets to the right place, to figure out whether a machine is making the right sort of balancing decision relative to an individual's credit. Because I can do a matrix on the three of us and we can come out looking identical but for different reasons, and those different reasons might be the reason, one of those factors might the one that should have said "I'll lend to this person or not or that person." And so that is I think going to have to redefine the way you approach commercial, I mean consumer, lending. On the one side… the other side I just said there's all these other risks, when we look at a bank we also or any lender the risk management arm of the institution has to consider things like cyber security, data breaches all those things. I think the question is that… technology doesn't increase the probability of that but it changes the way you might be managing it. Maybe it actually reduces it, because maybe most data breaches are because of human error, maybe it increases it I don't know the answer to that. I think in both instances you want to evaluate how does it change it – my intuition says it does change it, my answer is yes, but more, i think you have to be looking both from an immediate credit underwriting risks and from a enterprise risk management perspective. Does that make sense?

Julian: So another thing is in China, obviously a lot of consumers don't have access to credit, even though they have – a lot of them are having discretionary spending, better quality jobs, but are P2P services good avenues for helping people that have minimal credit to receive lending?

Sweeney: Intuitively, I would say yes, but I'm not sure the answers particularly – I don't know enough about the Chinese market – the lending market to say it's the right thing or the wrong thing. I'm probably the wrong person to answer that, I just don't know. Up until this point I've been comfortable – that sort of gets into an area that maybe at the heart of one of the questions you have to ask yourself is how do you even define the end customer – I wouldn't even know what… so a middle-income Chinese citizen is going to be different from a middle-income U.S. citizen, so how do you define that in terms of assets, how do you define that – and so those are all questions I don't know whether it would be a good thing or a bad thing or whether it'll be creating a potential bubble. I mean any time you create a new forms of credit availability, the credit can get out ahead of the consumer and you create the potential for a bubble. That is essentially why we had a crisis in 2008, we opened up, inappropriately through sub-prime lending, we extended credit to markets we shouldn't have extended credit to. And it was based on this notion that everyone should own a home – which was actually a flawed concept. In the U.S.,

historically only about half of the population owned a home but there was this idea politically that it was good to have more people to own homes and then they gave freedom to banks and other lenders to lend at a standard you wouldn't normally lend at and then it became a contagion that caused a variety of things because we started repackaging the loans and etcetera. I could see if you start relying on P2P and it becomes a material part of creating access to credit in any market, if it doesn't have the same underwriting and regulatory standards that you could end up in a place where you create a contagion effect – people over-leverage themselves because they can get the loans and when they're in that market they start buying things they shouldn't be able to buy in terms where they stand in their personal wealth and income and at some point it all collapses on itself – you know, job growth doesn't happen as quickly as people expected, or incomes don't grow, unemployment increases by a significant amount, and suddenly it becomes a huge problem. What I'm identify is all these problems that could happen. I don't know whether that'll happen in China or not. You'd want to understand some of the sort of macro- and micro-economic relationships between sort of what's the scope, how big it could get, and if it got this big what will that mean because – by the way, any time that kind of risks start rearing its head, the Chinese authority is going to say "we're going to regulate this". You have to figure out how can you be proactive to mitigate that.

Julian: Well I was going to say, in the US it seems, mostly like, especially Lending Club and Prosper want consumers that have a pretty strong and pretty extensive background of a credit history.

Sweeney: Yeah, they're basically saying "look we know it might be hard, but we can price the loan – we can give it to you quicker." I think a lot of the things that a lot of the P2P do is that they cut out the bureaucratic aspects of lending, but if they're lending to the same credits they could have gotten at a bank and they're pricing it well and they're cutting out bureaucracy – that's a good thing. If on the other hand you're "democratizing" it and extending it, that's not an inherently bad thing but you have to ask a whole bunch of new questions.

Prompt:

Thank you, I believe those are all the questions we have for you today. We really appreciate the chance to have spoken with you, given your busy schedule. If we think of any other questions we would like to ask, would it be alright to contact you? How would we do so? Again, thank you for your time, and good day. [Exit]

B.4   After the Interview:

We replayed and transcribed the contents of the interview in detail. After transcription was completed, the recording was deleted.

APPENDIX C: Interview with Xu Shasha and Dr. Zhu of Qiantu

C.1   Before the Interview:

This interview was conducted between members of our IQP team, the head of Qiantu Financial Group's Risk Management Department, and the Administrative Assistant of Funds. Before the interview, we sent a confirmation WeChat message to our sponsor with a set time to meet them at their office. We also asked for permission to record the interview for the sake of creating an accurate transcript. We recorded the conversation using one of our smartphones. We arrived at the sponsor's office 10 minutes early and dressed casual to match the dress code of the rest of Qiantu's employees. Just before the interview, we discussed what we hoped to get out of our discussion, which was a deeper understanding of Qiantu's current credit risk management and lending process.

C.2   During the Interview:

At the interview, we had two group members present. One team member conducted the interview, while the other took notes.

Prompt:

Thank you for taking the time to share your knowledge with us. Our goal for this interview is to understand everything about Qiantu's current consumer credit risk management.

To facilitate our note-taking today, we would like to record our conversation. For your information, only project group members will be listening to the recording which will be deleted upon being transcribed. Is this alright with you?

We plan to use information gathered here from this interview as part of the results in our project report. Is it okay if we quote or paraphrase your words in our writing? Your name would remain anonymous.

Do you wish to be sent a draft of the sections containing information from this interview to be sure your words have not been misinterpreted?

If Yes: *Thank you. Please let us know at any time if you want us to turn off the recorder or keep something off the record.*

If No: *Thank you for letting us know. We will be taking notes only.*

C.3   Transcript:

JL: Julian
JW: Joan
S: Swish
Z: Dr. Zhu

S: Actually, Easy Money, the model for Easy Money we borrowed from other mature platforms, not built by ourselves, and so Flash Fund, the model I mean, is built by ourselves, and we always update it. So the difference between them, maybe comes just like some variables and rules.

JL: Are you talking specifically about the algorithm for approving customers or just overall?

S: The algorithm, our risk management department manager will tell you later.

JL: Okay.

S: And the second question, I think that this process I had just sent to you.

JL: Is that all of the information that you receive from the borrowers?

S: Not at all. But some information, they are secretive, so maybe I can't give all [of it] to you, but the most important four elements, I mean, the information are [here], I printed it. {hands papers}

JL: Yes, I remember.

S: One is Flash Fund and one is Easy Money. Here the four informations are the most important.

JL: And so, what model are these credit scores, is it a number or just the whole history of their credit. Because in America-

S: Yes, I know in America, your personal information is protected right?

JL: No I mean, in America, we have agencies that keep track of your credit history, and they create a number and that represents -

S: Yes, we also use this number, we have a partner Sesame Credit. It is a credit reporting agency from AliPay, so maybe it is the most authoritative agency in China. So we use the score from it.

JL: Do you know what the range of scores? Or is that something handled by the employees? Like in America, the FICO score goes from 300 to 850.

S: We only accept at least 660.

JL: 660. Okay. Is it…. It might be the FICO score.

JW: Yeah.

JL: Do you know if it's based off of the FICO score or is it something different. Like, what is the lowest possible score a person could have?

S: I don't know.

JL: Okay.

JL {to JW}: That is something we could look into on our own. Yeah, okay.

S: So the third question. You can see on the paper, the fourth item here is credit score, this comes from Sesame Credit, and we have a final score, from these two parts, and it is a very complex algorithm, but I can tell you simply that some items are fixed number. I can explain it. You

know, girls and boys have different gender, so their score is different, because most [of our users] are boys not girls. Maybe, when girls and boys are dating, the boy pays the bills, so the boys [need the money] more. So the boys' score might be higher, and the girls' are lower. That means fixed, I mean for example, the score of the boy is 10 and the [score of the girl] is 8. And this is a fixed number, it won't change. But some items are changing. Just like the Sesame Credit score. Not everyone has the same score, but all the girls have the 8 and all the boys have the 10.

JL: So they get points based on what their personal info is? So if they're a boy, they get 9, and that contributes to whether you approve them for the loan?

S: No, just some parts of this. Other items also will be calculated in the final score. So the final score has two parts, one is a fixed score, and the other is a changing score. And the changing score depends on the user's personal information.

JL: And what do the scores tell you? What does the fixed score tell you? I'm confused.

JW: The fixed score and changing score, they both add together to form the final score?

JL: Like if you have a fixed score, so a boy has a 9 and a girl has an 8, what does that tell you? What is the purpose of the number?

S: I know what you mean, but I can't answer that. Because this score is decided by our risk department, not me, so I don't know why they set a score for boys and another score for girls.

JW: Does credit score go into the fixed score and the changing score, or is it separate? How many scores do we have?

JL: I don't know.

S: I also don't know.

JL: The information comes from….

S: The information comes, mostly comes, from Sesame Credit, and other partners but maybe you don't know them. I mean maybe you are not familiar with these agencies. Sesame Credit agency is the most famous in China, so I just take an example.

JL: So, when a borrower applies for a loan, what is it that they tell you? What information do they give you? Is it just their name and then you look up everything about them or do they give other information too.

S: They also give us other information. I can just list some of them, but not all. Just like, age, gender, and their ID number, bank note number - bank number. And their family address, their emergency contact, and also the school they graduated from. And if they have a job, their

company number, their company name, and their company. And most important is their salary.

JL: Alright so, do you know whether or not Qiantu verifies any of this information. Do they check to make sure it's correct?

S: Yes, that's our…. Yes, check. We also [verify] whether the information is correct or not.

JW: What do you guys verify through computer?

JL: Versus -

S: So that is a question you [listed] right? Actually, Flash Fund, we [verify everything through] computer. But, we may some borrowers' information at random to check whether they are right or not. But Easy Money, 90% of the orders we will verify by computer, but the rest, I mean the 10% of the others will be verified by our colleagues.

JL: Which department…. Is that risk management department or…?

S: A part of the risk management. And we have about 10 people for menu verification.

JL: Can you tell us a little bit about the face recognition?

S: Just take a photo, and…. How to say? Close your eyes and open your eyes, and smile or not, just [having] some action on your face is okay.

JL: And so do you compare that against…. What do you compare that to? Like what is the face recognition comparing.

S: By their ID card, the photo on the ID card. And we also ask them to send some of their life…. Daily photos.

JL: So they send you photos of their daily life? Interesting.

S: Yes, interesting, very interesting. All kinds of photos will be sent to us.

JL: Alright so another, how long does it take to approve a loan?

S: Several minutes.

JL: Just several minutes? Alright.

S: Yes, just several minutes. But if they want to get the money, it may take several hours.

JL: Several hours?

S: Yes, it depends on our fund partners. Maybe they [give] the money to them a little late, but we verify the information very fast, so we call it Flash Fund.

JL: Is that the same amount of time for easy money? They both take only about a couple hours, a few hours?

S: Yes, but our verification may be a little longer, because some of…. 10% of the others will be verified by our colleagues, so maybe it will be a little late.

JL: Interesting. Okay so, should we wait to talk to Ms. Zhu about the algorithm itself?

S: Okay, Ms. Zhou is not here today, yes, he is out for a meeting, but Dr. Zhu….

JL: Yes, thats…. Sorry, my pronunciation was wrong, that's who I meant. Dr. Zhu. Okay.

JL: Do the funds get disbursed to the bank account, or AliPay account or…. Like where does the money go for the people?

S: Actually, we recommend the borrowers to our fund provider, they also are a company. Some of them will re-verify our borrowers, so it takes them time to give the money to them. And…. I'm sorry, I forget what's your question?

JL: When the fund group gives the money to a borrower, where does it go? Does it go to a bank account or AliPay account?

S: A bank account.

JL: Bank account.

S: Yes, if our orders which were passed by us, and also, passed by them, they will give the money to the borrower's bank card.

JL: Can you tell us about how Qiantu decides a borrower's interest rate, at all?

S: Okay, I can take an example for you. When a borrower wants to borrow ¥1000, [we] set the application for ¥1120. This is the number on their agreement, yes the agreement between Qiantu and the borrowers. But the actual money they get is only ¥1000. So the ¥120 is for us. You know, the total service fee. They repay us…. In other words, the ¥120 is the interest. So the interest rate is ¥120…. Divide ¥120 by ¥1120, so it is about 10.7%.

JL: Okay, so how much of the ¥120 goes to you, and how much goes to the fund group. No not you [specifically], I mean the company.

S: I know, I can tell you…. Actually it depends [on] our fund partners. Because different fund

partners [have] different needs. So maybe some will get more, and some will get less. But the average percent is about 20, 20%. So ¥120 multiplied by 20%, ¥24 goes to our fund providers. And the interest rate is fixed. 10.7% is a fixed rate.

JL: That explains why we were a little confused the other day. So it's decided at the time that the loan is created, that this is how much money you have to pay in addition to how much we're giving you. So like…. If they want ¥1000, then at the time that they receive the loan, you say "you owe us ¥1120."

S: Yes, "you owe us ¥1120."

JL: Okay. Alright, so is that the same system in Easy Money and Flash Fund.

S: This situation is for Flash Fund.

JL: I figured.

S: Yes, and the Easy Money…. The Easy Money you know is long-staging.

JL: Installment.

S: Installment, right. We have 6 months, and 3 months periods.

JL: For Easy Money?

S: Yes, for Easy Money. And Flash Fund is 7 days and 14 days, two kinds. And Easy Money is 3 months and 6 months. Both have two kinds. And the interest rate for Flash Fund is a fixed rate, but Easy Money has two interest rates: for 3 months it's 3%, and for 6 months it's 2.5%.

JL: That's regardless of the person's final score? So, if they are approved, then that's how much they pay?

S: Can you [explain]…?
JL: Okay so, in other companies like Lending Club, the borrower is approved, and they're given sort of a ranking, and then based on their ranking, they pay a different interest rate. If they're safer….

S: Yes, I know what you mean. If they are safer they will get a [lower] rate, right? But we have the fixed rate.

JW: So as long as the borrower is approved, then….

S: Yes, even if they repay the money before the actual repayment…. In the month, they repay the money in the month, they also pay us 10.7% interest rate. There is no discount -

JL: For paying early? Okay.

S: Yes, but they will get other good things. Just like some coupons. Discounts. And they may upgrade their….

JL: Upgrade the amount that they can borrow?

S: Yes! So that is why you can see, not on this paper…. I sent the PPT, and the amount between Flash Fund is ¥500 and ¥1000, right? Actually, for the safer users, we will upgrade their money, so they can borrower ¥2000 and ¥1500, even ¥3000. So that is for their goodness. So that also encourages them to repay the money in the months.

JL: So they get decided to be a good borrower, and they can increase the amount of money, only if they've borrowed before? So the first time, maybe they only can borrow between ¥500 and ¥1000. But if they borrow again and they're good, then a little more?

S: Yes.

JL: So it's only for repeat customers. And so, for a 3 month, and a 6 month…. Alright, so sorry, for Flash Fund, its all due in 7 or 14 days. So that's the day that they pay everything or can they pay over time, between that…. Over the 7 days or 14 days. Do they have to pay it all at once, or can they pay in sections over time.

S: Once. Flash Fund is once, and Easy Money, for 3 time or 6 times.

JL: So once a month.

S: Yes, once a month.

JL: I think you told us a little bit about this when we first came here, a couple weeks ago. But can you tell us a little bit about how Qiantu handles late payments, inside the company.

S: We only make phone calls.
JL: Only make phone call.

S: Yes, only make phone calls.

JL: Yes, I remember in the PowerPoint it shows Day 3, Day 15, Day 30. The phone calls go to their phone number, the emergency contact…?

S: Yes, all the numbers that they provide us. Some will even use QQ or WeChat. That's also the other information that they provide us when they apply. Most of our users are very young, so they are afraid of their parents, or their leaders. So if we can't get the money back, we will make phone calls to their parents, their leaders, or even their teachers, anyone who can control him [or

her].

JL: You also…. I think we said in the meeting, if they're late on a payment, then you don't borrow with them ever again?

S: Yes.

JL: Oh wow.

S: Like a blackmail list.

JL and JW: Blacklist?

S: Yes.

JL: So late borrowers get blacklisted?

JW: Is there a time or is it forever?

JL: Forever.

S: Maybe forever.

JL: And then so, obviously after a certain amount of time, [you] still can't get the money, so then you ask a third party agency?

S: Yes, we will recommend them to other party agencies. You know we have our risk management to select the good users right? The ones who we reject, we also recommend them to other platforms, and get some money back. We provide the users to them so we get some money. Can you understand.

JL: So if they don't pass the approval, then you recommend them to other platforms.

S:Yes, and get the money from the other platforms.
JL: So the other platforms pay you?

S: Yes, that is also a deal.

JL: Oh, so they pay you because they gave you a new customer?

S: Yes. But that is not common. Only several times.

JL: Well because if you don't think that they're good, then maybe the other companies don't think that they're good.

S: Maybe their risk control is not very strict, they may accept them and give them the money.

JL: So one thing I'm just a little confused on is, I remember in the PowerPoint you showed there's Plan A and Plan B. Where does that go in here? {gestures to diagram} Is that in here, in the "check"?

S: Yes, in the check.

JL: Okay, that was just for me.

S: Actually, Plan A and Plan B, I can tell you something about that, but not very detailed.

JL: Please do.

S: Yes. In our company, we set two models. Plan A is for good users, and Plan B maybe for just so-so [customers]. And we use Plan A to select the best users, and Plan B goes for ordinary users. In order words, these two plans just say that…. Just help us to differentiate good users and bad users.

JL: So if someone fails Plan A, and goes to Plan B, and they pass, do you watch them a little [more] closely, or are they the same at that point?

S: It must be [that you] look [at] them closer.

JL: You look at them closer? Even after you give them the money? Do you monitor them, do you keep watching?

S: We keep watching. It is used to help us keep some good users, so we set Plan A, but most of the users go to Plan B.

JL: So, is there any…. Do they get any benefit by passing Plan A? Like if they are good, if they pass Plan A, does anything special happen?

S: Just the good benefits.
JL: More money?

S: Yes, more money, and good credit record. Right. And some coupons.

JW: There's also coupons for ordinary users as well, right? It's just…. Is it more or are they different.

JL: Are there coupons for ordinary users?

S: Yes. Actually, the users [who] passed Plan A, are the good users we just referred [to] before. I

mean, the users who passed Plan A are the good users who can get good things. That's the same thing.

JL: So if you pass Plan B, then maybe you only get between ¥500 and ¥1000?

S: Not between, just two numbers: ¥500 and ¥1000.

JL: Oh.

S: Yes, no ¥600, no ¥700, just two kinds: ¥500 and ¥1000. But the good users may get ¥2000 or ¥1500.

JL: Is that the same for Easy Money, [the loans] are only a certain number? Or Easy Money there's an interval?

S: Yes.

JL: Which one?

S: Actually, our major product is Flash Fund, so we paid more attention to our users from Flash Fund, not Easy Money. So that's why we don't have our own models for Easy Money. So we go to the fourteenth question?

JL: Oh yes. Sorry.

S: Are there any questions from question 1 to 13?

JL: No.

S: No? Let's go on to the fourteenth question. When the borrower [doesn't] pay money to us, over 15 days, or 2 weeks, we will consider the loan is to be non-performing, because we set the model based on the fifteenth day, so we will see the result….so we will see the data fifteenth day….how to explain it?

JL: Chinese?
{35:25 - 36:18}

JW: 中文可以吗？

S: 可以。我们就是... 因为我们建模型的时候嘛就是以第15天的这个表现为标准的，所以我们一般都只关注这第15天。看他们... 如果超出这15天了，他们还没有还... 那我们就会认为他们可能不会还了。那我们就要采取行动了。是这样子的...

JW: 采取行动... 就是给他们打电话吗？

S: 对。就是打电话。因为我们在一个月之内，我们都是打电话的嘛... 所以在第15天和第30天之间，我们会打电话。但是一旦超出了第30天，我们就会可能找外面的专门用来催收的一些机构帮我们要回钱。

JW: 就是借钱以后，如果15天后他没有还，就打电话给他。再过15天以后，如果他还没有还就...

S: 对，就找外面的机构。

JW: 好

JW: So like, after the loan is disbursed to you, you have a 15 minute pay period.

JL: Minute or day?

JW: Days.

JL: 15 days, yes.

JW: So within 15 days, if you have not paid it, they will make a phone call, until another 15 days.

JL: Oh, that's defaulting on a loan. That's missing….making a late payment. Non-performing is like you're not going to try anymore, you just give up.

S: Yes, we give up.

JL: On the fifteenth [day]?

JW: No, there's 15 and then another 15, so it's a 30 day period.

JL: Oh okay.

S: So we have 15 days to call back.

JL: So after 30 days, then [you're] not going to try to….

JW: They hand it off to the third party.

JL: They hand off to the third party, okay.

S: And over 90 days, I mean three months, we will send…. We will sell them to other agencies, and get part of the money.

S: 就是我可以用中文再解释清楚一点。就比如说，30天以外，就是一个月以后嘛，一个

月到第三个月… 就是到第三个月以后啊，我们确定是要不回来了。然后我们就会把他们这个… 就是说这个人欠我们钱，我们会把他卖给其他这些专门用来催收的一些机构… 这个就是… 没办法了嘛，对吧。那我们就把他卖掉。那我们还能稍微追回一些补偿吧。对吧。但是在就是说第31天到第89，到第90天之间，我们是…这两个月嘛… M2 and M3, 我们就是找了几家机构帮我们追回钱的。那我们当然会支付机构一些费用嘛，因为他们帮我们要回来了嘛，那我们肯定要给他们费用。但是这钱呢，还是给我们的。就是要回来的这个钱还是给我们的。我们只是给他们费用。

JW: 就是付费用给他们，让他们帮你们要回钱。如果他没有还呢？就是在31天到89天之内，钱没有要回来，那就不追了对吗？

S: 对。我们就把他卖掉了。

JW: 就是完全放弃了，对吗？

S: 对。完全放弃了。卖掉了，稍微获得了一点补偿吧。因为我们卖个人家这些客户的时候，他们肯定… 那万一… 因为他们的手段比较高一点。他们要得回来嘛。对吧。但是那如果我们不把他卖掉的话，我们就一分钱也要不回来了。

JW: Okay, so like….

JL: What did I miss?

S: I also want to listen to English, how to say.

JW: So after they sell it to a third-party organization, they will also have this time period 31 to 89 days.

JL: How long?

JW: 31 to 89 days. So if they get it back….if the borrower….yeah if the third-party agency is able to get it back, then they will give that money….to Qiantu and Qiantu will only have to pay them a fee, pay them for getting their money back. So in some way or form, they are still getting a portion of the money back without losing….

JL: Okay, so after 90 days, then what happens?

JW: They totally give up.

JL: Then they give up and it's up to the collection agency.

S: Yes.

JL: Okay, yes so that's good information.

S: And I think that is a wise decision for us.

JL: Yes, that's common in a lot of….

S: A common phenomenon. So, maybe I can invite our Dr. Zhu here to answer your…. The aregism, right?

JL: Algorithm.

S: Algorithm, okay. Wait a minute.

{Missing audio}

Z: And I will go through the rules, and the rules will let me go to the model, and then the models will give me a score. Yes, if the score is higher than a certain point, then I will go to the second model.

JL: So there's two models?

Z: Right, yes. Actually the second is much simpler than the first one. If the second model says you can go, it means that your score is higher than a point, then you can go to the face recognition. It's the last stage, and if you go through that facial recognition, then you just get approved. So there are rules and models.

JL: And can you explain anything about the first model that they go through? That's the logistical redirection?

Z: Yes, logistical redirection. We build the models using that algorithm. For example, if you are older, actually it's not good to use the age, but sometimes….I mean, I just take example. If you are older, you will get a higher score maybe….Actually, when I was [in the] US, I bought the car insurance. I got a driver's license, and then I was trying to buy the car insurance from [the] Internet. And the the lady [tells] me I have very high car insurance - it means I have to pay all the money for the car insurance every month, because I have no driver experience, so this is similar, like a model. Actually they also have a model for me.

JL: Okay, so they take a bunch of the information and then decide….

Z: Decide the score, yes.

JL: And, does that change over time or is it fixed.

Z: We try to….We watch the model, we watch the performance every day actually. But if you found the bad rate….the percent of bad people goes through the system….I mean the higher percent of bad people that you give money, then you have to check the model, then rebuild it.

JL: Can you describe a little bit more about the second model that they go through?

Z: The second model? Actually, the reason why we have the second model is we use the outside data, yes. Because outside data is pricey, we have to pay for that.

JL: Okay, oh….

Z: If you use the first one, it's not expensive.

JL: So if they don't pass the first part then there's no point in paying to get the information. Is that what comes from AliPay?

Z: Yes.

JL: So they make you pay for the information?

Z: Right now it's free actually, but after a few months, it should charge.

JL: So you just started getting information from AliPay, or have you been doing this?

Z: For….before I come here.

JL: [Since] before you came here, okay. So, it's free now, but soon it won't be.

Z: That's a strategy for….Actually, I think the big data in China is quite different. In [the] US, you protect privacy. It's very different. You can't think [like we are in the US] to think about China.

JL: Agreed.

Z: The rules and laws are different.

JL: That's what we learned when we were studying in America. So, that gives you access to more information, more kinds of information. Do you know what kinds of information you use then to determine….We thought that in the US that maybe you look at what kind of websites people visit on the Internet.

Z: Yes, that's the kind of information. But, all the information is authorized by the user. Yes, of course. That's the limit I think, the bottom….the bottom limit.

JL: So where do they authorize it, can they say, "I will let you check this, this, and this."

Z: Yes, when they apply, we get a reminder, that if you want to get a reminder, you have to….There is an agreement between….

JL: Okay, and if you sign the agreement, then [Qiantu] can look at all of this [information]. Okay, that's what I was thinking. And they have to sign the agreement in order to be….[approved]?

Z: Yes.

JL: If we could….I don't know, if you don't want to talk about it, but a list of more of the rules, all of the rules, I don't know if that would be possible.

Z: Many rules, just take two examples. I have told you earlier, if you use phone number less than three months then you [will be] rejected….

JL: Well I mean do you have a list of rules on paper, or are they only in code.

Z: In code.

JL: They are all only in code, oh okay.

Z: Users don't know that.

JL: Yeah no, but does the company have a paper with a list of the rules.

Z: The company?

JL: Qiantu.

Z: You mean, in the app?

JL: No, just that we could see.

JW: That we could look at.

JL: Like that we could have a paper, with a list of all the rules, because we want to compare Qiantu to other companies, and see what they do versus what other companies do. Does that make sense?

Z: It is in Chinese.

JL: She understands Chinese.

JW: Is there such a list, that we can look at or write down.

Z: 这个可以提供吗？[Can we provide this?]

S: 这个... [This…]

JW: 这是不是太机密了？[Is it too private?]

JL: Maybe too private?

S: Yes, it's a private. I'm sorry.

Prompt:

Thank you, I believe those are all the questions we have for you today. We really appreciate the chance to have spoken with you, given your busy schedule. If we think of any other questions we would like to ask, would it be alright to contact you again? How would we do so? Again, thank you for your time. [Exit]

C.4   After the Interview:

We thanked Dr. Zhu and Ms. Xu for their time, and left the office. We replayed the recording to transcribe the interview, and subsequently deleted the recording.

APPENDIX D: Interview with Weidai 微贷（杭州）金融信息服务有限公司

D.1   Before the Interview:

Before the interview, we confirmed the set time at our interviewee's office with our HDU student partner. Because the interviewees did not speak English, we asked our HDU student partner to help facilitate and take notes on the conversation. We made sure to pick an appropriate date and time for the interview in which both the interviewee and the HDU student was available. We arrived at the sponsor's office 10 minutes early and dressed in formal business attire. To start off the interview, we introduced ourselves as a WPI student group working on a project that involves researching and comparing the risk management strategies of various P2P lending companies in order to improve those of our sponsoring company.

D.2   During the Interview:

At the interview, we had two project group members and one HDU student partner present, along with her friend who speaks English very well. Our team members asked questions, while the student partner translated and took notes on the conversation.

Prompt:

Once again thank you for taking the time to share your experience with us on such short notice. As we mentioned earlier, we are working on a research project which involves studying the risk management models of Western and East Asian countries. We have prepared a series of questions regarding how your company handles consumer lending risk management.

To facilitate our note-taking today, we would like to record our conversation. For your information, only project group members will be listening to the recording which will be deleted upon being transcribed. Is this alright with you?

If Yes: *Thank you. Please let us know at any time if you want us to turn off the recorder or keep something off the record.*

If No: *Thank you for letting us know. We will be taking notes only.*

We plan to use information gathered here from this interview as part of our project report. Would you request that the company for which you work remain anonymous?

If our report contains information gathered from this interview, is it okay to make our report available on a public database?

If Yes:

Is it okay if we quote or paraphrase your words in our writing? Your name would remain anonymous.

If Yes:

Do you wish to be sent a draft of the sections containing information from this interview to be sure your words have not been misinterpreted?

D.3   Notes:

1. Internet credit/loan:
   - Strengths – Easy data acquisition; Quick access to capital

     ● Weaknesses – Competition; Expensive to get consumers; Related operational models not developed; Not enough data collected

2. Main consumer base (customers approved for loans):
   - Age range: 18-35 (Below 30)
   - General salary: below ¥5000 RMB per month
   - 75% male
   - Higher acceptance at the online level

3. Characteristics of the industry's current state:
   - There exists representative institutions/organizations
   - Industrial chain has been formed, including the supporting diversion agencies, data agencies, risk management outsourcing, collection of repayment outsourcing, one-stop service and so on

4. Future Development Trend of the Credit Industry:
   - High uncertainty of policy
   - Requirements of risk management, increased difficulty in data flow control
   - Interest rates on lending continued to decline, with rising costs for data
   - Diversion (of capital) makes more money than lending platforms
   - About 5% of the credit organizations survived in the industry from competitions
   - Currently, within the industry, there are about 10,000 companies in the process of doing online loans. Generally, the interest rates are around 18% (by years)

5. Small loans are generally not based on the ability to repay, but are judged upon the borrower's willingness to repay. Around 20%-40% of the customers will overdue their repayment, but generally speaking, to the lending organization, 5%-6% of bad debts is acceptable.

6. Main Missions of Risk Management:
   - Anti-fraud: mainly through identity verification and facial recognition technology; another through obtaining customer's permission/authorization for acquiring some additional sources to determine the possibility of credit fraud.
   - Collection (of repayments): call by telephone; outsourced to outside organizations/agencies

7. Challenges Faced by the Credit Industry:
   - Rising costs of acquiring customers
   - Long loans
   - Credit risk costs increase
   - Personal fraud loans are frequent

8. In the general, approval time is within one minute, but if the customer needs additional check/examination, the process requires about a few hours.

9. Loan will be transferred to customer's accounts of partner banks/platforms.

Prompt:

Thank you, I believe those are all the questions we have for you today. We really appreciate the chance to have spoken with you, given your busy schedule. If we think of any other questions we would like to ask, would it be alright to contact you again? How would we do so? Again, thank you for your time. [Exit]

D.4   After the Interview:

Our interviewee and team members added each other on WeChat at the end of our interview for further and/or future questions and clarifications. Because the interviewee did not approve to being recorded, we reviewed our HDU student partner's notes and did not transcribe the interview.

APPENDIX E: Interview with HDU Professor Xiu Fengli

E.1   Before the Interview:

We made a phone call to the interviewee to set up a date and time that would work for an in-person interview. We arrived 10 minutes early and dressed casually. At the start of our interview, we asked for permission to record the conversation for the sake of creating an accurate transcript. After we acquired permission from the interviewee, we used one of our smartphones to record our conversation. To start off the interview, we introduced ourselves as a WPI student group working on a project that involves researching and comparing the risk management strategies of various P2P lending companies in order to improve those of our sponsoring company.

E.2   During the Interview:

At the interview, we had two project group members. One team member conducted the interview, while the other took notes.

Prompt:

Once again thank you for taking the time to share your experience with us on such short notice. As we mentioned earlier, we are working on a research project. This project aims to advise a Chinese app-based lending company on improving its services and risk management model. We have prepared a series of questions regarding the current state of the P2P industry and risk management in China.

To facilitate our note-taking today, we would like to record our conversation. For your information, only project group members will be listening to the recording which will be deleted upon being transcribed. Is this alright with you?

We plan to use information gathered here from this interview as part of the results in our project report. Is it okay if we quote or paraphrase your words in our writing?

May we use your name in our project or would you prefer to remain anonymous?

Do you wish to be sent a draft of the sections containing information from this interview to be sure your words have not been misinterpreted?

If Yes: *Thank you. Please let us know at any time if you want us to turn off the recorder or keep something off the record.*

If No: *Thank you for letting us know. We will be taking notes only.*

E.3   Transcript:

J: Joan Wong
X: Professor Xiu Fengli

X: 这里有问题是关于这个…消费者，P2P服务这一款的消费者。消费者正常的话应该面对的是个人，不是公司。是不是参与者？

There's a question here about… consumers - consumers of P2P services. A consumer should be a peer, not the company. Do you mean participants?

J: 这个问题，应该是因为我们想了解一些这个P2P市场…

This question should be for us to better understand the P2P industry…

X: 只能是我的理解跟你们说一下啦。对吧？因为我不能，我只是… 我不能代表我们所有的消费者但是能给你，就是我了解的信息，我可以跟你共享一下。

So what I can do is discuss with you guys what I understand, right? Because I can't, I'm only… I can't represent all of the consumers, but what I can give you is the information I know, which I can share a little bit about with you.

J: 嗯… 我们大概就是…

Yes, we are probably…

X: 我说话你能听得懂吗？能跟得上吗？完全跟得上吗？

Can you understand what I am saying? Do you follow? Completely keep up?

J: 应该可以。

I should be okay.

X: 应该可以啊。因为我找的资料是中文的，所以如果我再给你翻译过去，可能我翻译的又不太准确。

Should be okay? Because the information I found is in Chinese, so if I translate it to English, my translation may not be so accurate.

J: 没关系。因为我们已经录音了，那么我回去还可以再听一遍。

No problem. We have this conversation recorded, so I can replay it when I get back.

X: 好的，好的。

Okay, okay.

J: 如果我们还是不懂，可以联系您吗？

If we still don't understand, may we contact you?

X: 可以。

Yes.

J: 谢谢。

Thank you.

X: 描述一下对这个P2P网贷的理解，是不是啊？

Briefly describe my understanding of online P2P lending, is that right?

J: 嗯。

Yes.

X: 因为我有上这个课啊，我当时给学生讲的就是这个P2P网贷呢，应该是算是一种小额借贷。它最大的一个优势吧，或者是一个特征，应该是对银行系的一个补充。因为这个中国的体系可能跟国外的不太一样。中国呢，其实很多人都面临的一个问题，就是贷款难的问题…很多人都没有办法从银行那里获得贷款。你也知道从银行贷款，它的这个条件要求比较高，比如说要有抵押，还有就是要有担保人之类的。那很多这个私人企业或者个人呢，他没有抵押物或者是担保人，所以他们很难从银行获得贷款。也就是，银行可能是满足了百分之三十或者百分之二十个人的贷款，但这剩下一部分的人呢，他们要想获得贷款，一方面呢，他们可以选择这种民间的借贷，就是高利贷。但是你也知道这高利贷的利率非常的高，所以对他们来讲这个成本要考虑，风险也很大的。所以这P2P网贷的这个，是对对于贷款问题的一个补充的一个解决的方法。他们可以，一部分的人啊，可以通过这个网上的形式获得贷款。所以我觉得这个P2P网贷应该是一个比较好的一种金融模式。但是到后面你们也有啊，中国人会经常使用这些服务吗？

Because I have a course on this. At that time, what I have told students about this online P2P lending was that it should be considered a microfinance. One of its biggest advantages or feature should be that it is a supplement to the banking system. Because China's system may be different from that of foreign countries, many people face one problem: difficult loans. Many people cannot get loans from banks. You know that to get a loan from a bank - there are strict requirements. For example, collateral and guarantor - along those lines. Without these, whether it is for any individual or enterprise, they would have a difficult time trying to get a loan. That is, the bank may meet 20-30% of people's need for loans, but the remaining portion of people would have to seek alternatives. On one hand, they can choose this kind of private lending, which is usury. But you know that the interest rates on usurious loans are very high, so the cost is to be considered and the risk is also big. So this P2P loan is a supplementary solution to the problem of loans. They can, a portion of the people, can get loan in the form of online lending. Therefore, I believe that P2P loans should be a better financial model. But you guys also have later… How common is it for Chinese citizens to use these services?

X: 会使用，你可以看这个中国发展的这个趋势。从07开始，中国有第一家。或者最早的是06年的这个宜信。就是有规模的，应该是07年这个拍拍贷。它出来之后呢，前两年的时候，因为大家对这个新事物嘛有点陌生，不明白它其中的这个操纵原理，再加上零几年的时候，这个电脑或者是移动客户端的信息没有这么…使用率没有这么高。所以呢，这个它的这个发展不是非常的好。但是到了12年，11年的时候，就是呈现了这个急速上涨的一个趋势。

Yes, people will use them. You can see this trend in the development of China. Starting in 2007, there was the first P2P company in China. Or maybe the earliest one was in 2006 - CreditEase. If at a

greater scale, it should be in 2007, PPDai. After this company came out, two years ago, because everyone was little unfamiliar with this new thing, did not understand the principles behind P2P operation and management. Plus early in the 2000s, computer or mobile client information did not… the usage rate was not as high. Therefore, the development of P2P was not very good. But until 2011 or 2012, the trend had rapidly grown upward.

J: 嗯。

Yes.

X: 很多人都会选用这个。所以那个平台的数量，就是P2P网贷的数量，就是成这个直线上升的。具体的数量，其实你们可以网上查。都是网上一些数据...

Many people will use this. Therefore, the number of platforms - the number of P2P loans, is linearly increasing. In fact, you guys can look it up online for specific numbers. This just some data online...

J: 嗯，可以。

Yes, we can...

X: 但是在这个过程中，我们说这个是在发展。但是在发展的过程中，也存在着很多的问题。对吧？

But during the process, we're talking about this development… but in this development process, there are also a lot of problems, right?

J: 问题？

Problems?

X: 对，有很多的问题。比如说这个... 它的这个数量，一开始的时候，最高的时候，可能达到6000多家。但是到目前来讲，存在的可能只有一两千家，就是有近三分之二都是问题平台。

Yes, there are many problems. For example, this… P2P numbers. In the beginning, the highest at that time, the number of companies had reached more than 6000. But currently saying, existing companies may only be 1000-2000. That is, nearly two-thirds of them were problematic platforms.

J: 对，我们也...

Yeah, we also...

X: 因为这个风险很大... 你可能也了解这个P2P，它跟这个银行贷款最大一个区别就是它没有抵押。所以这个信用风险问题非常的突出... 国外的话，可能好一点，因为国外的这个个人真信体系

，它比较完善，对吧？因为你们都拥有信用等级相对好一点，有就是信用等级能够体现他的信用风险。但是在中国这一块儿呢，我们这信用体系建设还是处于这个逐步发展的一个阶段。所以这个个人信用完全没有办法去衡量出来，所以就产生了信用风险，就是违约的问题。还有一个问题就是这个平台本身也有问题…很多平台跟着这个潮流建起来了，很多那些小的平台呢，因为大家看到就是有利润的，就是一个受大家欢迎的，有需求的。所以很多平台就建立起来了，但是在发展的过程中…

Because this has a greater risk. You might know that P2P - its biggest difference from bank loans is that it doesn't require collateral, so the problem of credit risk is very prominent. Abroad might be better because foreign countries' personal credit systems are more well-established, is that right? Because you guys have a credit system which is comparatively better - there is a credit rating that reflects his credit risk. However, in China, our credit system is still in a gradually-developing stage. Therefore, there are no absolute ways to measure one's personal credit risk. As a result, this produces a credit risk problem: the issue of default. Another problem is the platform itself. Many platforms formed, following this trend. Many small platforms, because everyone saw the profit of the industry, how popular it is amongst everybody, how it is demand-driven, how it meets people's needs. So, many platforms were established, but in the process of development...

J: 不稳定？

Unstable?

X: 对，不稳定。就是平台把这个…有的人就把闲散资金放到这个平台上。那这个平台发表之后呢，他可能就跑路了，把携款带走了。所以这个是比较突出的一个问题。所以到这个最近几年这个平台的数量呢，虽然有增加，但是总体趋势呢，就是减少有比增加的多。所以总体呢，还是逐渐减少的这样一个趋势，到现在为止，这个平台估计有两千多家吧。

Yes, unstable. Many people put their idle capital in the platform. After waiting for approval from this platform, the customer may just run away, taking his money with him. So this is a more prominent issue. Therefore, in recent years, the number of platforms, although have increased, but the overall trend - the number is decreasing more than it is increasing. Overall, it is a gradually-declining trend. Around 2000 or more companies.

J: 我们也看到了。因为我们在做调查的时候，就知道一开始有很多家…刚开始的时候的确有增加，可是后来就减去了很多。突然就…

We saw it as well. Because when we were researching, we knew that there are many companies at the start, but then, declined a lot. Suddenly...

X: 因为平台它们就是有问题的。就那个…募集起来的钱可能就拿走了。因为这个没有担保，没有抵押嘛，私人信的这种很容易就出现问题。可能国外这一点就好一点是不是？比国内的这种就是好一点点？

Because these platforms have issues. The money raised by the platform may be taken away. Because it does not have collateral, guarantor, and well, it is very easy for issues to come up for private credit. Maybe in foreign countries, this aspect is better, right? Compared to China, this is a little better?

J: 应该好一点点吧？好像是应该比国内在这方面有经验？就比较有更长的历史...

Should be a little better, right? It seems like they have more experience in this area? Longer history...

X: 我就是说这个平台呢，总体来讲还会有新的平台出现，但是减少要比增加的多，所以预计今年到明年呢估计还是会以下降的一个趋势。总体数量上来讲呢会是一个下降的趋势。

What I'm talking about this platform is: in general, there will be more platforms emerging but decreasing will be more than that of increasing. Therefore, it is estimated that there will still be a downward trend between this year and next year. In general, there will be a downward trend.

J: 那在中国，最常用的P2P借贷服务公司有哪几家？

What are P2P lending services most commonly used for in China?

X: 对，你们可以去... 如果你们可以联系上的话... 比较大的目前来讲就是拍拍贷，人人贷，还有陆金所也很大。其实很多，还有比如说这个站头网上的，还有有利网，红岭创投... 这些都是比较大的。我不知道你们能不能联系上？

Yes, you guys can go to… if you guys can contact… for bigger companies currently is PPDai, RenRenDai, and Lu Jin Suo is also big. Actually there are a lot, for example, there are also Yooli, Hongling Chuangtou… These are all relatively big. I don't know whether you guys will be able to get in touch with them?

J: 我们会尽力。我们已经有回应了，但是都拒绝... 可能是资料太机密了... 下一个问题是通过P2P借贷服务借款的消费者是否具有典型的人口特征？

We will try our best. We actually got some response back but are rejections. Maybe because the information is too private. The next question is: is there a typical demographic of consumers who borrow through P2P lending services?

X: 对，我看到这个问题，我就想问一下你们这个 "typical demographics" 是什么意思？

Yes, I have read the question, and I was wondering about what you guys mean by "typical demographics"?

J: 这就是问有哪些人或是人群最常用这些服务的。

This is asking what people or which group of people most commonly use these kinds of services.

X: 这个我昨天晚上，我就在网上查这个P2P的消费者。相关的文书，我没有找到。就是在网上看到一个报道，它写的好像是男性要比女性多一些。就是借贷的男性比女性多。为什么呢，因为男性它说的是相对来讲，相对女性来讲呢，他就是这个风险的爱好者。因为这毕竟P2P网贷呢，它相对银行系的贷款，它的风险是大很多的。女生可能是属于风险的规避或者谨慎，她没有参与，男性那么多。男性多一些 …

This, I looked up P2P consumers online last night. I can't find any related literature. I have read an online report, it says that there are relatively more males than females. I mean more males who borrow than females. Why? Because relatively speaking, males are risk lovers. Because after all, P2P loans, relative to banks, it is riskier. Females, in this aspect, may be a risk aversion and are more cautious.

J: 消费者风险比较大还是P2P公司的风险比较大？

Relatively speaking, is it consumers who take on a greater risk, or the P2P enterprise?

X: 就是你参与到P2P借贷里面，你自身会面临的风险比较大。就是说不管是你借款还是你放贷的话都有风险的。你放贷，你有可能你的钱被平台拿走了。你借款，你有可能出现自身违约的风险。所以这个我是看到有这样的一个调查的结果，正式的那种academic的，没有找到相关的调查。但是，它说男性参与量数量比女性高，同时… 但是女性的总额要比男性要高。女性参与的话，她这个… 到这个P2P网贷上借贷的量要高于男性。这里说，可能是因为女性掌握这个财产大权。女性是这个方面的… 具体的，其他的那种学术类的，我没有看到。这只是我看到的一个报道而已啊。你们如果要找这种消费者的人口特征，你们可以做个questionnaire那个调查一下…

As long as you participate in this P2P lending process, you, yourself, will face a greater risk. I mean whether you are taking out a loan or you are lending the loan, you will have risks. If you lend out loans, your money may be taken away. If you take out a loan, you may default or face the risk of becoming delinquent. Therefore, I read a report - a research result, but I cannot find related research from formal academic sources. It says that the number of male participants is higher than that of female. At the same time, females who do participate, the total net loan amount is more than that of males. Here it may be because females have the right to master property. Females in this aspect… the specifics, if you want to know the demographic characteristics of this consumer base, you guys would have to do a survey questionnaire.

J: 好的。

Okay.

X: 我不知道你们有没有关注到学生贷款这一块儿。大学生贷款… 其实很多在学校里面。因为当时我们在做这个课程设计的时候，我说你们就你们熟悉的网贷做个调查，很多人都写大学生网贷。确实，它说在这个学校里面有很多很多面向大学生的… 你们可以对大学生做这个调查。

I don't know if you guys have given focus on the student lending aspect. College student loans… actually a lot in school. Because when we were designing the curriculum, I asked them to do research on their online loans they were familiar with and many of them wrote about college student online loans. Indeed, there are many college students in this school. You guys can do this survey on college students.

J: 对，我们开始的时候是这么打算的。但是后来跟我们的sponsor聊过，他们的客户基本上都不是学生，因为客户需要有稳定的收入。所以我们后来犹豫了，到底应不应该做…

Yes, at the start of the project, we were planning to do that. But then after our discussion with our sponsor, its customers are basically not students because they need to have a stable income. Therefore, we were hesitant whether we should...

X: 因为… 我为什么会推荐你们做这个调查呢… 因为你们在学校里面，做这个questionnaire肯定是方便的。你到那个社会上，一方面就是很难接触啊。可能接触到，但是他们给的信息可能不是非常的真实。可能会影响到你们这个研究的报道…

Because the reason why I recommend you guys to do this research… is for sure going to be convenient. If you go to the society, it would be difficult to contact, but the information they provide may not be as accurate. This may influence your research report...

J: 对，大学生也有可能是将来的客户…

Yes, college students may also be future customers...

X: 可以试试看，你们就考虑一下。我只是给个建议，并不是一定要这样…

You guys can consider and try it out. I'm only giving you guys a suggestion, not that you guys must do it this way...

J: 好的，我们会考虑。谢谢您。下一个问题就是在中国，使用P2P平台借贷的好处和坏处分别是什么？

Okay, we'll consider it. Thank you. Our next question is: What are the benefits and drawbacks of borrowing via P2P platforms in China?

X: 好处和坏处，其实我刚才已经差不多跟你聊过了。好处就是，个人或者私人企业，他们如果没有办法从正规的渠道获得贷款，那他们可行的选择就是到网上去参与这个P2P。那么这只是其中的一个方面的这个好处。 另外一个就是我们说，对整个形势来讲，这个普惠金融嘛。中国的普惠金融你可能听说过，我不知道它是怎么翻译的…

Advantages and disadvantages. Actually, I have just talked about it with you almost. The good thing is that whether it is for any individual or private enterprises, it is very difficult for them to get a loan through formal, traditional channels. Therefore, their viable option is to go online and participate in this P2P. This is one of the advantages. Another one is what we have discussed, to the entire situation, China's inclusive finance, which you might have heard about. I don't know how to translate it...

J: 没关系。

No problem.

X: 它是对于这个金融体系的一个普及嘛，特别是在农村这些地方。这些银行或者是传统的，正规的这种体系，是没有办法触及到的地方。这个P2P网贷也是一个补充，现在只要你能上网，即使没有网络，没有电脑，但是你的手机可以上网就可以接触到这所为的Internet finance。是不是啊？坏处呢，就是风险的问题。可能遇到了这个挑战或者是问题就是风险。这个平台本身也有风险，个人参与者也有风险。所以我们说，在这个P2P的这个发展过程中要相应的这种法律规范有限制，个人的征信体系，信用体系要建立起来，可能对于这个P2P的进一步的发展有帮助。

It [P2P] is an universalization of the financial system, especially in rural areas. The banks or traditional, formal systems cannot reach these areas. The online P2P lending is a supplement of this. Now, as long as you can go online, even if you don't have the Internet, network, computer, but if you have your phone that can go online, you will have access to Internet finance, isn't it? The bad thing is the problem of risk. The problem or challenge that you can encounter is risk. The platform itself also has risks. Peer participants also have risks. Therefore, we say that in the development process of P2P, the legal norms are limited. The establishment of personal credit system and credit system may be helpful for the further development of P2P.

J: 您认为P2P行业目前的发展趋势是否会延续？您为什么会这么认为呢？

Do you believe the current trend in the P2P industry will continue? Why or why not?

X: 这个趋势，虽然在增加，但是平台减少的数量超过了这个平台增加的数量。但是如果你去看它这个成交量，它是增长的，而且每年增长地很快。所以你可以预计的话，这个P2P会是成为 一个上涨的趋势，就是会迎合大家的需求，但是它的这个将来的发展一定会越来越规范。比如说，国家会出一些政策或者是… 相对，个人这种贷款方面，个人的这种信用体系的建设以及这个跟其他的银行系的平台或者是一些企业的会越来越完善。所以说这个P2P目前有这种问题的存在，但是将来我觉得，个人觉得应该还是会继续发展下去的。它是一种传统，银行系的一种很有力的补充，能把这个社会闲散的资金聚集起来。比如说有一些人，有一部分人，个人他可能有闲散的资金不会存到银行里去或者银行给的这个利息率比较低。投资到股票或者是在圈的话，他可能分析不好，但是他可以通过这种借贷的方式来放放贷款，毕竟这个利率是非常高的。相对的，当然这个成本也比银行系统… 你去接款的成本也是高一些的，所以我就说，能够把社会的闲散资金利用起来，能满足个人和企业的一个资金需求。

This trend is increasing, but the number of platforms increasing is less than that of decreasing. But if you look at the volume of it, it's growing, and in fact, it's growing very fast every year. So if you can predict, this P2P will become an upward trend, that is, in meeting everyone's needs, but its future development will become more and more standardized. For example, the government will have some policies or... Relative to this personal loan, the construction of personal credit system and this platform will be more and more perfect than those of other banking systems. So this P2P has this problem at the moment, but I think in the future, I believe, personally, it should continue to grow and develop. It is a kind of tradition, a powerful supplement to the banking department, which can gather the idle funds of the society. For example, there are some people, a portion of the people, individuals who may have idle funds that will not go to the bank, or the interest rate is low in the bank. When investing in stocks or in circles, he may not be able to analyze well, but he can lend money through this type of lending, because the interest is very high. Relatively, of course, it is also higher than the banking system. The cost of your payment is higher. So I say, it can make use of the idle funds of the society to meet a capital demand of individuals and enterprises.

[Conversation clarifying "services" as financial P2P lending companies. Professor Xiu mentions the following companies: 人人贷，陆金所， 宜人贷，拍拍贷，积木盒子， 有利网，红岭创投]

Prompt:

Thank you, I believe those are all the questions we have for you today. We really appreciate the chance to have spoken with you, given your busy schedule. If we think of any other questions we would like to ask, would it be alright to contact you again? How would we do so? Again, thank you for your time. [Exit]

E.4   **After the Interview**:

The interviewee was sent a follow-up thank you e-mail by our team. We replayed and transcribed the exchange in detail. After the interview had been fully transcribed, we deleted the recording.

APPENDIX F: Interview with Luke Deer

F.1   Before the Interview:

Before the interview, we made sure to set a time to call Mr. Deer and added his profile on Skype to our list of contacts. We asked for permission to record the interview for the sake of creating an accurate transcript, and did so using one of our laptops. To start off the interview, we introduced ourselves as a WPI student group working on a project that involves researching and comparing the credit risk management strategies of various P2P lending companies in order to improve those of our sponsoring company.

F.2   During the Interview:

At the interview, all four of our project members were present. One team member conducted the interview by asking the questions we had outlined beforehand, while the others took notes and asked supplemental questions that came up as part of the conversation. We asked

Prompt:

Once again thank you for taking the time to share your experience with us on such short notice. As we mentioned earlier, we are working on a research project. This project aims to advise a Chinese app-based lending company on improving its services and risk management model. We have prepared a series of questions regarding the current state of the P2P industry and risk management in China.

To facilitate our note-taking today, we would like to record our conversation. For your information, only project group members will be listening to the recording which will be deleted upon being transcribed. Is this alright with you?

We plan to use information gathered here from this interview as part of the results in our project report. Is it okay if we quote or paraphrase your words in our writing?

May we use your name in our project or would you prefer to remain anonymous?

Do you wish to be sent a draft of the sections containing information from this interview to be sure your words have not been misinterpreted?

If Yes: *Thank you. Please let us know at any time if you want us to turn off the recorder or keep something off the record.*

If No: *Thank you for letting us know. We will be taking notes only.*

F.3   Transcript:

Jeff: So, first question, what do you think are the benefits and drawbacks of borrowing via P2P platforms in China?

Luke: Borrowing via….for borrowers? The benefits I think are that its quick, it's much quicker than borrowing from banks because the bank system isn't as developed for retail borrowers. The bank system is much more developed for large enterprises, or for people with assets. And so I think for unsecured borrowing, for small loan amounts, I think it's incredibly beneficial for consumers in China to be able to borrow from P2P, because you can borrow uncollateralized, and you can get money quickly. And I saw an interesting study, not on China, [inaudible] transaction costs, the transaction costs for [inaudible] borrowing are very low, not just financial, but also rather than having….so one of the biggest users of consumer loans, say China Rapid Finance you might have heard of, 18 to 25 year-old men, or young people, or students, the fact that they can go and take someone out for dinner, or go out and do something with friends and be able to get a small loan amount without having to go to their parents is….so there's a low transaction cost, it expands access to finance for large numbers of people who otherwise would face high transaction cost getting money, whether in terms of financial terms or emotional terms

or whatever else, that's a benefit. Risks are that people get into unsustainable borrowing debt patterns, and they are paying back very high interest rates that it becomes more like a payday lending phenomenon.

Julian: Is the interest rate in P2P lending a lot different from what you would see in a bank?

Luke: I don't think so, no. For uncollateralized, unsecured borrowing, I think the interest rate is probably similar, but you may not even be able to get a loan at that rate if you don't have an existing credit history or other assets such as mortgages. And so it's probably similar or the same. Similar, or in some cases it will be lower, for borrowers with good credit histories and that can verify that, they're gonna be able to access cheaper loans. For others where it's maybe similar to what they can get through a bank, they may not be able to get it through a bank because they don't have the credit history and so it's…. Although the interest rate is comparable, the access is there, which it isn't maybe through a bank.

Jeff: So the second question is: what are the most popular P2P services in China today?

Mike: That you know of.

Luke: I don't have a list in front of me, but you can find by the value of loans issued, if you look at….You guys got some Chinese language? Wangdaizhijia.

Group: Yes.

Luke: Yeah? You can onto their website, and you can sort the platforms by the value of loans issued. P2P platforms. and so it will list the top 500 or something. So its wangdaizhijia.cn I think. Yeah you can find which are the largest ones in terms of the value of loans issued. And it changes a bit all the time.

Jeff: Can you repeat the name of that site please?

Luke: It's Wangdaizhijia. I can write it in the….

Jeff: In the chat?

Mike: Yeah that'd be great.

Joan: Thank you so much.

Luke: And I'm not sure if it's….it's maybe .cn or .com, but if you….

Jeff: That should be good enough.

Julian: Okay, yeah that's perfect. Thank you.

Luke: So they have a data section, and they have….it lists all the….it lists a lot of information actually. It lists about the companies, by, you can sort it by volume, you can sort it by….you can go and look at numbers of borrowers and numbers of lenders, across the industry, you can look at interest rates, you can copy that data and you can do some stuff with it.

Julian: That's awesome. Because part of our project is, we're trying to look at P2P companies that are a little less established, ones that are….that haven't been around too long. So we've done a lot of research on established companies around the world, because that information is pretty easy to find, but it's a little harder to find names of companies that aren't really out there.

Luke: Yeah, for sure. This….I mean, I think it lists the top 500 or so, I mean, apparently there's about 1800. It's gonna be harder to find the smaller ones, but maybe have a look at….look by establishment date, I think you can probably sort….you may have to copy and paste the data, but you should be able to find an establishment date, may be able to find some more recently established companies.

Julian: Thank you.

Jeff: And then, I don't know how relevant this question is, but, what do think….in general what do you think would lead a P2P company to become popular, like CRF for example? What do you think set them apart from other companies?

Luke: So CRF….so they….so it's sort of how early they started, the space is much more competitive now than it was. And so, I think the fact that they had a decade or more of experience in working with credit risk, consumer borrowing, and they basically had a consulting business which they built over the course of ten years, consulting to banks in China to issue credit cards and to run credit risk systems meant that they had technological risk management, and capital, which meant that they were able to launch an independent business, and so they could….I don't know….why this makes them popular, I mean I think they had the capacity to do something which was sustainable and scalable, quickly, and to get over the sort of competition hurdles they could partner with large partners, like I think they partnered with TenCent. So, they had capital, they had a management team, they had technology, so they were able to establish a business and scale rapidly. I think even if you can make a profitable business there is a cost per acquisition per customer, and one of the reasons why they are IPOing or [inaudible] want to get money, is they want to be able to finance acquisition of investors, for competitive reasons, to grow the business, and so, if it costs 100 RMB to get a customer, it's a bit like Facebook advertising or something if you've got….and you're going to make 200 dollars profit, you can spend 100 RMB on acquiring that customer, if you've got the capital to deploy, and so having that capital is good. Having an institutional basis to launch a business is good, and so if you've got an existing relationship with an e-commerce company, you know like, what's that one that's just….there's that Ant Financial one that has just filed for IPO, they were backed by Ant Financial Qudian, and so they had an existing partner that they were able to market to, or that they were able to use credit data from. For the user I guess it's just ease of….low threshold to be able to apply for a loan, and speed at which they can get approved, and the sort of customer experience. I think low transaction cost for the consumer is big….

Jeff: And then, given the unstructured access to credit history in China, which non-traditional factors do you believe Chinese P2P companies need to consider when screening for a potential customer?

Luke: Non-traditional….I don't know much about this, but it's a really interesting topic to get into. Actually, there's another podcast I saw, there's an interview with a guy, Tony Ning, I think from CreditEase, the CEO of CreditEase, it's on the US San Francisco Fed's website, they've got a podcast, and I think he talks about alternative financing, that's worth having a look, I'll find the link and I'll send it to you. Yeah, so the sort of alternative credit data they're looking for, I really think which is sort of transactional-based, which can give some view of the financing activity of the consumer, and so, tele-mobile phone usage and payments is obviously a big one, in terms of alternative credit scoring. Any sort of retail online transaction accounts that they've got which are maybe not traditional bank accounts or traditional credit lines, but are things like spending on Taobao, or using AliPay data, JD, or any of the e-commerce platforms where the consumer has had either an account history, or a line of credit, there's sort of non-traditional credit data I think.

Julian: So that's still relevant, even though it's not….they already have the money in their account when they're buying these things, it's just a direct transaction, so is that….that's still indicative of a good credit risk?

Luke: It's indicative of….if they're spending….you don't know….right, so there's still risk. But if they're spending….I don't know, how much a month, someone from China might know, but let's say they're spending 2000 RMB a month, via their AliPay account. If they are able to continue to do that and they've got a 12-month history or a 24-month history of spending 2000 RMB a month, it's indicative that they're able to continue to do that. You don't know, maybe they're borrowing from other P2P companies, and that's how their financing it, they're borrowing from 12 other….they're borrowing 2000 RMB a month from 12 other P2P companies and that's how they've done it, but that's probably a minority of cases. And so basically current transactions, it's a backward-looking measure but it is one measure of credit capacity, or financing capacity. And so people would think, "okay well that's a reasonable basis on which to lend." At least that amount.

Jeff: So, our sponsor specifically asks applicants to submit pictures of themselves in their daily lives. Do think this is something that's useful for anything other than….well they use it for identity verification, do you think that's useful? Submitting daily pictures?

Mike: In addition to other ways to….

Julian: They do facial recognition, and they compare, it's a pretty rigorous process and compare it to your government ID, but they also ask you to send pictures of yourself and whatever you're doing….Thought it was pretty funny.

Luke: Daily pictures?

Julian: Well, not every day, but send them pictures of you in your daily life.

Mike: Like throughout the day.

Joan: And family members, friends….

Julian: Like I think (was it CRF?)….but one company goes to visit you at work.

Luke: And is that for….it maybe the case there's different levels of verification or ID verification they want for different lending. And so for CRF I think that was probably the case for what's called the lifestyle loans, which are larger-value loans, and so they would want additional verification beyond just the minimum required information, the ID card, and so for that, I think that makes sense. Because it's gonna cut down on fraud, and it's gonna get….it's gonna mean they know more about the customer, you know if they're not working where they say they are or they don't live where they say they are, then why would you give them a loan right? So, additional identification verification, I think that would be useful, but yeah if it's daily photos or weekly photos that seems unnecessary. [Removed]. And they also do this sort of site verification for SME lending, as well, where it's businesses. They want to go and visit the site, and go and see that it is actually there, the assets, they've actually got a business and so on. And the other thing they do, I don't know about CRF, but some of them that have to….the submission is they have to do a video of them holding up their ID card and speaking to it.

Group: Oh, OFO does that too.

Luke: They hold up….it's not just scanning my ID card, but [inaudible] I'd be holding up my ID card saying this is actually me, so that you can see that person who's borrowing is actually the person who's borrowing. I think that's reasonable.

Julian: Have you done the facial verification where you have to move your head in certain ways, and make expressions….

Joan: Blink your eyes.

Julian: ….and blink your eyes.

Luke: I've never had to do that, no.

Julian: Even to get a SIM card we had to do that, and I think that's another thing our sponsor does….it's pretty rigorous.

Luke: Yeah right, really, wow. So where are you guys now? You're not in….

Group: We're in Hangzhou.

Luke: Where?

Group: Hangzhou, China.

Luke: Oh, you're in Hangzhou.

Group: Yeah.

Luke: So it is quite early there. I spent some time in Hangzhou, I was in {zheda}. Zhejiang University, yeah.

Group: Oh….

Mike: We're actually in the Hangzhou university right now. So, right across.

Luke: Yeah, I mean I think the facial recognition technology is probably useful for verifying ID. I think the thing is that the ID card system is OK. You can't necessarily tell that the person borrowing the money is actually that person. I think some extra technology would be useful. I had to do….I think it was just a photo. So I had to take a photo of me holding my card to join BTC-C China. The Bitcoin China exchange.

Julian: Do you think that that sort of advanced facial recognition is something that the US has to do. Or, not only the US, but the rest of the Western world should be also doing? Or is that only relevant in China because of the different circumstances.

Luke: I think it's probably more relevant for developing countries where there isn't already large amounts of existing….like there isn't a developed credit system. And so it's probably useful for identity verification.

Mike: Do you think that takes away from the fact that a lot of people want loans really quickly, but then they have to go through this long identification process?

Luke: I think it's probably pretty quick, isn't it? I mean this is the thing about mobile, is that you can do a video of yourself pretty quickly. If you download the [CRF] app it's probably got a little video thing or you press "Take a video" to authorize your account, and they can do it fairly quickly. So I think it's probably quicker than other ways of verification.

Jeff: So, from the research that we've done for companies, we've noticed that many of them collect and use data about customers' online behavior to assess creditworthiness. Do you think this approach is necessary in China?

Julian: And not just their e-commerce transactions, but also what websites they're visiting in general.

Luke: In general, yeah. I would have questions about that from a privacy point of view, or a consumer protection point of view.

Julian: Well, their laws are a lot more lax. They don't have laws about that.

Luke: I know they say all it's permissioned, right? So I think when you tick the box to apply for….you say "yes you can go and search for things on me, I give permission to do it" so they always cover themselves, but I would question whether that's necessary, to get browsing data.

Jeff: I know one of the….for one of the companies, they look at whether or not you go through their Frequently Asked Questions page to see if you're invested in the loan. So, if they see that you just go straight into the site and ask for a loan, versus if you go to the site and browse the site to make sure that you trust the site….

Luke: Okay.

Julian: And also that you're really taking in how important it is and the agreement that you're going to be [getting] into.

Luke: Yeah, okay, in that case I think that would be useful. It's not just any site or it's not just all your browsing history, but if they require so….Sydney may require….there's the responsible lending requirement, it's under the Credit Act, which is regulated by the securities regulator, and says that lenders can only lend to people who are aware of their fin-…. Have thought some…..that have the capacity to really understand what they're doing in terms of the loan. If they get a better credit rating for reading about the risks involved in taking the loan, what their obligations are, and so on, then that's probably a reasonable thing to do. I think that would be a good thing to do. At least for the first loan.

Jeff: Can you describe what kind of data channels companies tend to use in order to collect information from their users?

Luke: I don't….I've only….I sort of probably know about as much as you about that. I don't really know what….so they would look at their e-commerce activity, they would look at their mobile accounts, they would look at their….any records they've got in the credit bureaus, through the national credit registry, or they would check with the….any of the private credit bureaus, the six of those which are licensed, I think those would be the main things, I don't know….they probably check….geolocation is a big thing, and one of the reasons for that is, I think they can do a risk assessment based on geolocation, so that they correlate….and you can do this, we've done this….I've done this….we looked at a platform in Australia, we had 200,000 loan applications, we had 1,600 loans that were successfully funded, and we didn't geolocate down to the street, but we did to a social demographic area, and we could see that….where they were, more likely or less likely to be able to repay loans, for instance certain amounts. So that's sort of useful. The way they use geolocation in China is also to look at particular clusters. If they find that they've had a whole lot of bad loans from one particular apartment building in rural Hangzhou, then they're gonna probably not extend that loan. But if they found that it's come from another area where its good credit quality, and the other metrics match up, then they're more likely to extend it, so I think the geolocation stuff, I think it's required that they turn on

geolocation. They also use it to verify work or school or living arrangements. But yeah, I think it's probably useful.

Jeff: So, do you know if-

Luke: The other, sorry, [inaudible] I'm not sure how much it's used, but is the social data. Like social channels, like WeChat Friends and Weibo and all that sort of stuff. The findings on that I don't know, it depends on what the models are, I've seen studies on the US, I don't know about China, where people with lots of online friends are more likely to get loans, and then….but different studies said on the same data that they also are less likely to repay, or they are more likely to repay, depending on that. So I think everyone wants to know whether social media friendships is an indication of good credit quality or not. The other data they use is phone records, and again I don't know….

Joan: Our sponsor does that too.

Luke: That is that they go, "okay, give us your contact list." So they check everyone, all your friends' phone numbers, and they can match who do you most call, and the people you most call, are they good borrowers or are they dodgy? And I don't know….I guess as an individual borrower you could give them that information, it's not particularly great probably in terms of privacy for your friends, but yeah that's certainly used.

Mike: That's actually one of the methods that our sponsor uses.

Joan: They ask for ask for like how-

Luke: Who is your sponsor?

Joan: Qiantu Financial. It's a relatively young company.

Julian: It's a young company but they say that they have 400,000 borrowers a month, so….That seems pretty good to me.

Luke: It does seem very big. I think there's different sets of [inaudible] depending on who you are.

Group: Yeah.

Jeff: Do you know if P2P companies in China can determine the amount of debt a borrower currently has, and if so, do many of these companies examine debt-to-income ratio as part of their approval algorithm?

Luke: I would think they would. Yeah, I would think they would have to. I don't know. I know it's a standard metric in any sort of credit risk algorithm, and so it's, so like the case in Australia and the US that it's a standard variable in any credit risk models. And debt-to-income is usually

better….a more important variable than just income. But the problem with that is, do they have access to the information.

Group: Exactly, yeah.

Jeff: We don't know if [our sponsor does].

Julian: Because at the end of our project, we are supposed to provide suggestions to our sponsor with how they can improve their risk management model, and one thing that we don't think that they mentioned ever is that they look at debt-to-income ratio, so maybe….we're kind of looking at that as maybe something that we should mention to them, that they're missing.

Luke: Yeah no, it's definitely a really important factor.

Julian: Definitely.

Luke: From just any credit risk modeling, it's, yeah….

Julian: In a lot of Western companies, that's a make-or-break right there.

Luke: Yep.

Jeff: Alright, and then, do you think there's a difference in the rigor of application process and approval algorithms for small, shorter-term loan products compared to those of larger, longer-term loan products?

Luke: Yes. It should be. That's sort of clearly the….. At Wangdaizhejia that's the case. Not Wangdaizhejia, sorry, CRF. So their consumption versus lifestyle loans. So larger loans are gonna have more….should have, from a credit risk perspective, they should have a greater amount of underwriting and due diligence on the part of the lender, or the platform. Definitely.

Julian: But is the amount of information that they're collecting from the user more, or are they just doing more verification on that data?

Luke: I don't know, I think it would be more verification. Although they may require more information as well. So they may require things like debt-to-income ratios, which they may not require for a consumption loan, so if it's a small loan amount, it sounds like their model is if they….what they do is they have a graduated lending model, and so if they just lend a small amount initially and if you can repay that off, then they'll extend that. And the rates of interest are really quite high, so they manage risk in that way by extending on the basis of history of repayment. So I'd say they probably do require more information for a larger loan, or they should. Debt-to-income ratio.

Jeff: And can you describe how Chinese P2P companies handle their loans after they are approved.

Luke: I can only guess by sort of international practice, which is they probably would probably have their money within 24 hours or 48 hours. And I'm not sure what the processes are in terms of managing repayment, like how actively and at what stage they get involved, I think it would differ for loan size and so on. But they would have to manage repayment, and so one of the factors with credit risk is: the worse quality the borrower, the more work it requires, the greater cost to the platform, both in terms of investors, and credit risk, and work in terms of recovering lost payments, or writing them off, or making that assessment, and so there's a tension between expanding loan volume, but doing it in a way which is reducing….which is maintaining a level of credit control or credit risk management. So if they lower quality, it actually costs them more to manage that repayment side, and the recovery side.

Mike: So to kind of switch topics, in your interview with CRF, well you interviewed CRF recently, so we were just wondering what your opinion on the viability of the predictive screening was?

Luke: I don't know. So what you do is, with a credit screening model is, you can look at back….you can look at the history of the data, I mean I would think their model is probably pretty good insofar as by that volume of loans, they've got a pretty big pool of data to be able to assess credit risk from, based on past history of loan borrowers. And so what you can do is you can go….based on this data, you can essentially do a regression on that data and against all the factors that you include in the underwriting process, and you can say that "this underwriting process predicts 90% of credit outcomes" for borrowers. Okay, so that's your predictive model. So when they say they've got a predictive model it's just that they've got….in 90% of cases, based on that data, they'll be able to predict the credit risk of that person. And then there's 10%, which is either unknown variables, or just idiosyncratic risk that you just can't get away with. Uncertainty happens to people, they lose their job, I don't know, stuff happens.

Julian: Stuff happens.

Luke: So yeah, I don't know about their particular model and what that prediction is. But you can basically….you can add variables which add to further predictive power and maybe you can get that model to 92% or 93% or something, but there's always going to be a margin of uncertainty.

Jeff: So many well-established companies in other countries assign borrowers a letter grade that influences their interest rates, do many companies in China do this?

Luke: I think they do, I think it's fairly standard for P2P to do that. It didn't seem to me that that was clear that China Rapid Finance did that. They had a type of fairly flat interest rate structure.

Julian: So does ours. If you get approved, there's one of two options, 7 or 14 days, and they also have another product that's 3 or 6 months, and whatever your credit is, if you pass their approval, you get this rate or this rate, and that's it.

Luke: Okay, and do they work on a similar basis? So, my understanding from CRF was that that rate can come down based on repayment history, and so….so it may come down….that was my understanding from the interview. I know other platforms have run loan grades, like PaiPaiDai, who I interviewed 2015 or something. I was looking their way, they definitely have credit grades.

Jeff: Do you have a podcast of that interview?

Luke: I don't, no. It was in Chinese and I only understood, sort of, some of it [inaudible] I was doing it with guests. It was in that report on the rise of P2P lending in China. I'm not sure if it's got the different credit grades and it doesn't have that level of detail unfortunately, but yeah they definitely had credit grades, and they looked a lot like credit grades, A grade, B grade, C grade, etcetera. So it's international. But it may be that….as the sectors developed and scaled, and they've tried to tap into this large-scale, very small amount, short-term financing, and if they're very short term financing products they don't have grades. And it's just this flat rate.

Julian: Yeah so my question is, is it necessary, if you're doing a 7 or 14-day loan for like 500 RMB….

Luke: Probably not. It's probably a whole lot of extra work but for longer terms I'd say it makes sense. And you would hope with more credit information, that you're progressing beyond more payday-style loans towards some that are more risk-priced rather than, you know….There's more accuracy in the pricing or better deal for consumer anyway….

Jeff: So, we were reading that FICO's given some Chinese Internet finance companies access to it's cloud-based algorithm. Do you think the FICO will become the standard for credit scoring in China as it has elsewhere in the world?

Luke: Yeah, I don't know about where it's going to go in China, the FICO. But there definitely will be some credit scoring system developed in China. So I'm not sure whether it will be FICO-based or….but they're sort of similar, right? In Australia, there's different credit….the credit system is much less developed than the US, and there are different credit providers who have their own scoring and often they don't make sense, and so one will do….well one of them does….because they don't have comprehensive data….and so this is the problem with China as well. So they'll have partial data, and they'll have….one will have data on consumers' loan repayments, mortgages, the other one will have telco data, and they might tell completely different things about whether a borrower is creditworthy or not. That's sort of what we're being told recently. And that's definitely the case in China, that there isn't comprehensive credit data, that there's competing credit agencies, and I don't know how that will develop.

Jeff: Have you heard about China recently trying to develop a social credit system. How do you think that will play a role in the future? Because it seems like that's meant more for seeing how the people….how involved they are with the Chinese government, and the Party.

Julian: I think it rewards you for that, but it's just supposed to measure trustworthiness, somehow.

Joan: Yeah and it ranks citizens.

Luke: I don't have an article on this….there's a woman I know called Tracy Xiang, who you can probably subscribe to her. You may need a VPN to get that one. But she's doing a couple of articles on the social credit scoring, and it's a really interesting thing because I think in the West there's a lot of "Oh it's George Orwell, it's 1984, it's coming to China, and it's sort of gonna be here and it's basically gonna judge how people are, what they're political attitudes are." That it's gonna be used as a tool for social control. She's quite critical of that idea and said that….this sort of fits with a view of technology, one view of technology in the West, but in China, she sort of thought that there are lots of….A) there are already quite extensive systems for social control, and that those exist already, like if you're in a work unit or in a local housing unit, or school unit, or university unit, there's plenty of tools for social control. In fact, they're gonna be far more effective than that, and she basically said that it's not really about social control, they've already got those tools in place, and it would be difficult to use anyway to monitor in terms of social control. What she said was that it's actually about alternative credit scoring, and that's really what the system is about. So it's about using alternative or nontraditional credit data where there isn't already. So….again you'd have to have some who had some data or access to that sort of data they're using. But she's doing a few articles on it, so if I do get them, I'll put them on.

Group: Thank you.

Luke: But I think it is more about drawing….trying to provide a comprehensive credit data system, and using nontraditional data, like mobile telco payments, or….

Joan: I think they're looking at what you buy, and then assessing your creditworthiness that way.

Luke: Okay, yeah, that makes sense, in terms of using that online transaction history. Again….that's not all great, people who want privacy and all the rest of it would want to use cash. I think there's this embrace of digital, and that we should get rid of cash, that we should have a cashless society, I mean I think you can have different positions. I actually support the use of cash and people's right to have cash and I don't think we should have a completely cashless society because I think there are aspects of people's lives that they should have autonomy in terms of what they spend and buy on that shouldn't be subject to surveillance, and I think….

Julian: I mean, we would've been in trouble if we couldn't use cash, the system to getting into China's e-commerce, it's very difficult for foreigners. We need the cash.

Luke: That's right, and people who don't have mobile devices, and computers, and all the rest of it, which is still plenty in China, they would be excluded from that. That's why, in India, where they've gone to sort of demonetization, there's been a massive backlash against it, particularly among the rural poor because….

Group: Yeah.

Jeff: And then, moving on, in general do you think there are areas of risk management in which Chinese P2P companies can improve.

Julian: Specifically credit risk management.

[Removed]

Luke: Yeah I think probably. P2P companies are very broad things, obviously there are ones which are, if they are more based on….just trying to get investors' money as quickly as possible and grow as quickly as possible, then that's obviously not great for….they're not really concerned about credit risk management. And a lot of the early P2P companies that did that went bust because essentially they were….they just did it as a way to make money and put up a port online and said "we are a P2P company, we're gonna offer you 12/15% return, give us your money." And that didn't really….there wasn't really assets, and they didn't really have good credit systems in place, so that was a problem. Areas where they can improve I think is really around this whole social….comprehensive credit reporting, and having information on things like debt-to-income ratios and having a picture of that across individual platforms. So I think probably is contributing to the development of comprehensive credit reporting. But yeah you'd have to look at the company….

Julian: I remember reading that the amount of P2P platforms went up to 3,000, and then probably a lot of those were like the companies you were just discussing, where they really just wanted to move money as fast as possible, and now we're down to a more stable number of companies that actually know what they're doing.

Luke: Yeah, definitely.

Prompt:

Thank you, I believe those are all the questions we have for you today. We really appreciate the chance to have spoken with you, given your busy schedule. If we think of any other questions we would like to ask, would it be alright to contact you again? How would we do so? Again, thank you for your time. [Exit]

F.4   After the Interview:

We replayed the interview recording in order to create a transcript, after which we deleted the recording. Additionally, we connected with Mr. Deer on social media and sent a thank you email.

APPENDIX G: Flash Fund Lending Process

POST-LOAN MANAGEMENT

Borrower's payment due date arrives → Qiantu sends the amount owed to the fund group → Borrower paid on time? —Yes→ Borrower's payment reimburses Qiantu

No →

Stage 1:
Day 0 - 30

Qiantu makes calls to phone numbers provided by the borrower, trying to get a hold of him or her or anyone who knows the borrower. →

Stage 2:
Day 30+

Qiantu recruits the help of a collection agency. If money is recovered by the collection agency, Qiantu receives it and pays the collection agency a small fee.

APPENDIX H: Qiantu Rule Set

After determining whether the applicant is new or returning, the first step in Qiantu's approval process is to check whether he or she meets a set of minimum requirements. The following is a translation of the set of rules obtained from Qiantu's CEO, Jerry Zhou, which describe situations that are grounds for an applicant's rejection.

Rules Before the Model:

1. **Borrow_history:** Applicant's maximum overdue days is greater than 28.
2. **Borrow:** This order has been blacklisted.
3. **Triple_carrier:** The information from cell phone operator does not match up with information on the ID card.
4. **Triple_carrier:** Mobile operator does not have any call records or the number of call records is less than 30.
5. **Triple_carrier (Flash Fund) :** Mobile network time is shorter than three months.
6. **Triple_carrier (Flash Fund):** Mobile network time is longer than four months but shorter than six months, and Sesame Score is lower than 630.
7. **Triple_carrier:** The number of collection calls in the operator's call records is greater than or equal to four.
8. **Triple_carrier:** The number of collection calls in the operator's call records within the past two months is greater than or equal to two.
9. **Triple_carrier:** The number of abnormal calls in the operator's call records within the past two months is greater than or equal to two.
10. **Triple_contact:** There are less than 10 entries in the contacts.
11. **Triple_contact:** Call contacts are in 借贷宝 hotline. (Model score is 660 or lower or fraud score is 690 or lower.)
12. **Triple_contact:** For non h5 user, the acquisition of contacts failed.
13. **Triple_carrier:** The call records of operator are less than three months old.
14. **Triple_carrier:** The number of abnormal, frequent contacts of operator is 10 or greater.
15. **Triple_carrier:** The number of frequent business operators is three or greater.
16. **Triple_carrier:** For h5 operator, the number of frequent contacts (excluding abnormal) are less than 5.
17. **Triple_carrier:** Mobile operator is in 借贷宝. (Model score is 660 or lower or fraud score is 690 is lower.)

18. **Triple_carrier:** Mobile operator has not been certified or failed.
19. **User_risk:** The first person whose contact information is provided by the applicant is bounded by many users.
20. **Triple_carrier:** The two people whose contact information is provided by the applicant have no operator contact records.
21. **User_risk:** QQ account number has been used.
22. **User_profile:** Users' company name and school/education status contains 'sensitive words.'
23. **Grade:** Model score is 640 or lower, or fraud score is 690 or lower.
24. **Grade:** Model score is higher than 650, and fraud score is higher than 690.
25. **Grade (New customers):** Model score is between 640 and 650, fraud score is higher than 690, and Sesame Score is 610 or lower.
26. **Grade (New customers):** Model score is between 640 and 650, fraud score is higher than 690, and Sesame Score is higher than 610.
27. **User_profile:** Applicant is in the mobile blacklist.
28. **User_profile:** Born after 1999 (18 years old)
29. **User_tag:** Members of the Risk Management Department had marked as "*miss.*"
30. **User_profile (Flash Fund):** GPS location of home is government-restricted address, or applicant is a student.
31. **User_tag:** Members of the Risk Management Department had marked as "*frozen.*"

APPENDIX I: Prosper Approval Algorithm

"Bad": going 60 days past due within 12 months of the application date

Inputs:
- Debt-to-Income Ratio
- # of inquiries in the past 6 months
- Other variables....

Model generates probability of "bad" based on historical data from Borrower Loans and a consumer credit bureau's data archive. Built on a population of Borrower Loan applicants so the model would apply specifically to Prosper customers

Probability of Bad	Prosper Score
> 13.00%	1
12.00 < x <= 13.00%	2
9.50 < x <= 12.0%	3
8.00 < x <= 9.50%	4
6.90 < x <= 8.00%	5
5.90 < x <= 6.90%	6
5.00 < x <= 5.90%	7
4.20 < x <= 5.00%	8
3.50 < x <= 4.20%	9
2.70 < x <= 3.50%	10
0.00 < x <= 2.70%	11

Prosper Score: 1 - 11

Calculating a Prosper Rating

Inputs: Prosper Score (1 - 11), FICO Score (300 - 850)

Prosper Score	599-619	619-639	639-659	659-679	679-699	699-719	719-739	739-759	759-779	779-799	799-829	829-850
1	22.25%	22.25%	22.25%	22.25%	22.25%	22.25%	22.25%	22.25%	22.25%	22.25%	22.25%	22.25%
2	22.25%	22.25%	22.25%	17.75%	17.75%	17.25%	16.75%	14.25%	14.25%	14.25%	14.25%	13.75%
3	22.25%	22.25%	16.25%	15.25%	15.25%	12.25%	12.25%	12.25%	12.25%	12.25%	11.25%	10.75%
4	22.25%	22.25%	12.25%	11.75%	11.75%	11.25%	11.25%	10.25%	10.25%	10.25%	9.75%	9.75%
5	22.25%	22.25%	11.75%	11.75%	11.75%	11.75%	11.25%	10.25%	10.25%	9.75%	9.75%	8.49%
6	22.25%	22.25%	10.75%	10.75%	8.99%	8.74%	8.74%	8.99%	8.99%	8.74%	8.49%	8.49%
7	22.25%	22.25%	8.99%	9.75%	8.24%	6.74%	7.99%	7.99%	7.99%	7.74%	7.74%	7.74%
8	22.25%	22.25%	8.99%	8.49%	8.24%	6.74%	6.24%	6.24%	6.24%	5.99%	5.99%	5.99%
9	22.25%	22.25%	7.99%	7.74%	5.99%	5.49%	5.99%	5.74%	5.74%	5.74%	5.74%	5.74%
10	22.25%	22.25%	6.74%	5.24%	5.99%	5.49%	3.99%	3.99%	3.49%	3.24%	3.24%	3.24%
11	22.25%	22.25%	4.49%	3.49%	3.24%	2.74%	3.99%	3.74%	3.49%	1.24%	0.74%	0.74%

Base loss rates determined using data on historical performance of Borrower Loans with similar characteristics

If a borrower has:
- Prosper Score of 9
- FICO08 score of 710

And wants a 60-month loan term; then the score would be calculated like this:

Base Loss Rate: 5.49%
Adjustments:
-Loan Term: 2.25%
Final Loss Rate: 7.74%
Prosper Rating: C

Represents the default rate for the borrower as estimated by Prosper

Prosper Rating	Est. Avg. Annual Loss Rate
AA	0.00% - 1.99%
A	2.00% - 3.99%
B	4.00% - 5.99%
C	6.00% - 8.99%
D	9.00% - 11.99%
E	12.00% - 14.99%
HR	>=15.00%

Prosper Rating: AA, A, B, C, D, E, HR

APPENDIX J: Research Findings

Lending Club	Findings
Application Process	- Applicants must submit their income and employment information (Lending Club, 2017e). - Applicants must submit their address. - Applicants must submit their Social Security Number (government-issued ID number). - Applicants must have a valid email address (Lending Club, 2017k). - FICO score and credit history are collected from U.S. credit reporting agencies (TransUnion, Equifax, Experian) (Jayakumar, 2017). - Behavioral data about applicants are collected (Lending Club, 2017b). - Income Source Verification Process - applicants must supply documents such as paystubs, W-2 Forms, and other tax records. - Other data is also collected from third-party agencies. If applicant fails to provide data, or provides the wrong data, then the loan is either rejected or more information is collected (Lending Club, 2017f).
Approval Algorithm	- Lending Club (2017k) has a required minimum FICO 08 score of 660. - Applicants must be a U.S. Citizen or have a long-term visa. - Applicants must have a bank account at a U.S. bank. - Lending Club has a required maximum debt-to-income ratio of 40%. - Applicants must have at least two revolving credit accounts. - Applicants must have five or fewer credit inquiries in the past six months. - The maximum number of loans a borrower can have on the Lending Club platform is two. - Applicants must have at least a 36-month credit history (Jayakumar, 2017). - One scoring model is based on "traditional" information, and generates a score between 1 and 25, which measures the borrower's "Base Risk Grade" (Lending Club, 2017k).
Pricing Model	- The borrower's interest rates are determined by credit grades (A1-G5), which are assigned to all loans (Lending Club, 2017c). - Higher-grade borrowers receive lower interest rates.

	● All personal loans are fixed rate loans (Lending Club, 2017j). ● The origination fee Lending Club charges the borrower is higher the lower his or her grade is.
Post-loan Management	● When a loan is 150 days past due, it is considered "charged off" (Lending Club, 2017d). ● When a loan is charged-off, the remaining principal balance of the Note is deducted from the investor's account, and the loan is sold to a third-party. ● If a charged-off loan is recovered, the investor will receive a *pro rata* share of the amount, minus the fee paid to the collection agency. ● Late or delinquent borrowers are contacted via emails, phone calls, and letters (Lending Club, 2017a). ● Lending Club may waive late fees if the company believes that this will increase the chance of the borrower returning the loan back to "current status." ● Lending Club reports delinquent borrowers to credit bureaus every month. ● If no litigation is involved when collecting on non-performing loans, Lending Club charges investors 18% of the amount collected (Galland, 2017). ● If litigation is involved in debt collection, Lending Club charges investors 30% of hourly attorney fees. ● Lending Club (2017g; 2017j) offers a 15-day grace period to its borrowers for late payments, after which borrowers will be charged for a late fee, which is the greater of either 15% of the unpaid payment or $15 (Jayakumar, 2017). ● If the borrower is having difficulty repaying, Lending Club allows him or her to take part in a "hardship plan," where the borrower only pays interest over a 3-month period.

Prosper	**Findings**
Application Process	• Applicants must provide the purpose of the loan (Prosper, 2017b). • Applicants must submit their income information. • Applicants must submit information about their occupation and employment status. • Applicants must accept an agreement which gives Prosper the right to verify the accuracy of information they provide. • If information is inconsistent or verified to be false, Prosper will cancel or refuse the applicant's loan listing. • Applicants must provide a current government-issued photo ID which is authenticated using third-party reference materials. • If discrepancies or inconsistencies are found during the verification process, applicants must submit additional documents such as a recent utility bill. • A borrower's name, Social Security Number, address, and telephone number are verified using credit reporting agencies as well as through checking anti-fraud databases. • Income is verified on a subset of applicants using an algorithm to identify instances where self-reported income highly influences the borrower's Prosper Rating. • Income is verified using pay stubs, tax returns, or bank statements. • Employment is verified by contacting employers and checking databases.
Approval Algorithm	• Prosper considers the following data in its approval algorithm: credit score, number of credit inquiries, debt-to-income ratio, number of open credit accounts, bankruptcies (Gordon, 2015). • Self-employed applicants are considered high-risk. • Prosper has a required minimum FICO 08 score of 640. • Applicants must have at least three open credit accounts. • Applicants cannot have filed for bankruptcy in the past year. • Applicants must not have more than seven credit report inquiries in the past six months. • The maximum acceptable debt-to-income ratio is 50% (Prosper, 2017b). • Applicants must be at least 18 years old. • Applicants may not have more than two simultaneous loans on the Prosper platform. • Prosper calculates the estimated loss rate for a customer based on the historical performance of Borrower Loans with similar characteristics. • An applicant's Prosper Score and FICO 08 credit score combine

	to determine his or her Prosper Rating, which determines whether he or she is approved. ● Prosper Score indicates an applicant's estimated likelihood of going 60 days past due within the first 12 months of the loan's origination, which is determined using a model that was created to reflect Prosper applicants specifically and includes data such as 'credit inquiries in the past six months' and 'debt-to-income ratio.' ● Prosper Rating is the estimated loss rate for the applicant and is determined using a table. The base loss rates are based on historical data of other Prosper borrowers with similar characteristics.
Pricing Model	● Prosper (2017b) rates borrowers on a letter grading system: AA, A, B, C, D, E, HR. ● The maximum loan amount a borrower can take out with Prosper depends on the grade he or she receives. ● A borrower's grade influences the size of the origination fee and the interest rate he or she must pay (Gordon, 2015). ● Interest rates are fixed once assigned.
Post-loan Management	● If a payment does not go through due to insufficient funds, Prosper charges the borrower a $15 fee (Gordon, 2015). ● Borrowers are not penalized for making early monthly payments. ● Borrowers are charged a late fee if payments are more than 15 days late. ● Prosper (2017b) notifies major credit agencies when a borrower makes a late payment or misses a payment. ● Loans are considered charged-off when they are 121 days or more past due. ● After four months of no payment, the loan is sold to a collection agency and the proceeds are split among the loan's investors.

Upstart	Findings
Application Process	● Applicants must submit their SAT and/or ACT score (Latham, 2017). ● Upstart reviews applicant's university and degree, as well as his or her earning potential. ● Upstart verifies the applicant's education and grades. ● Upstart examines the applicant's FICO score. ● Applicants must submit their employment status and income information. ● Applicants must report the number of dependents they claim. ● Applicants must report how much they pay for their homes. ● Applicants supply their name, address, and date of birth (Upstart, 2017g). ● Upstart (2017f) requires multiple documents to verify income.
Approval Algorithm	● Applicants must have a credit score of at least 640 (Latham, 2017). ● Applicants must have a full time job, or a job offer. ● Applicants must have a 4-year college degree. ● Upstart does not have a required minimum income. ● Upstart does not have a required minimum credit history. ● Upstart does not have a required maximum debt-to-income ratio. ● Applicants must not have filed for bankruptcy. ● Applicants must have less than six credit inquiries in the last six months. ● Machine Learning - Upstart's approval algorithm is updated and adjusted by software each time a payment is made or a delinquency is found (Blitchok, 2017). ● Applicants who want a second loan on the Upstart (2017c) platform must have made on-time payments for six previous consecutive months, have no more than one outstanding loan at the time of application, and owe no more than $50,000 USD in outstanding principal.
Pricing Model	● Pre-2014, Upstart asked for a percentage of borrower's future income rather than having a predefined amount to be paid (Latham, 2017). ● Upstart has fixed interest rates. ● Upstart deducts an origination fee (1%-6% depending on borrower's credit score) from the loan balance before it is deposited. ● Loans through the Upstart (2017e) platform accrue daily rather than monthly.

Post-loan Management	- If borrowers are 30 days late on any payment, Upstart (2017d) will report any delinquencies or defaults to credit bureaus. - Upstart (2017b) does not charge penalties for prepayment. - Late fees are charged on late payments equal to the greater of 5% of monthly past due amount or $15 (Upstart, 2017g).

Yirendai	Findings
Application Process	- Applicants must provide their identification card information (Yirendai, 2015). - Applicants must provide their employer information. - Applicants must provide their bank account information. - Applicants must provide their credit card information. - Yirendai obtains the applicant's credit report from the People's Bank of China (PBOC). - Yirendai collects the applicant's online data from Internet service providers and mobile carriers. - Yirendai uses big data platforms to check for inconsistencies in applications. - Yirendai verifies and monitors the Internet Protocol (IP) addresses of applicants. - Yirendai employees speak with potential borrowers in person. - Yirendai collects online shopping and payment information from popular Chinese e-commerce websites. - Yirendai gathers credit data maintained by its parent company, CreditEase. - Yirendai requires personal identification information to be provided by an organization operating under the Ministry of Public Security.
Approval Algorithm	- Yirendai's (2015) approval algorithm is based on historical credit data accumulated over time through its platform. - Yirendai considers the behavior patterns of the applicant as he or she uses its website. - Yirendai utilizes open government databases to check whether the applicant has any known, committed crimes. - Applicants must not be blacklisted for fraud. - Yirendai currently has 250 rules in its approval algorithm. - Yirendai score is influenced by the purpose of the loan, usage and performance of the loans from other financial institutions, credit card usage and payment pattern, public record, income and debt condition, geographic location, job stability, and online merchant purchasing pattern.
Pricing Model	- Yirendai (2015) assigns each borrower a Yirendai score, generated by the company's credit scoring model after processing all the information. - The borrower's Yirendai score is used to determine his or her interest rate. - All loans have fixed interest rates.

| Post-loan Management | Yirendai (2015) sends reminder text messages to borrowers on the day payments are due. When a payment is late, Yirendai will send text messages between 1-14 days from when the payments are past due, followed by visits to the borrower's home. The debt collection process begins 15 days after a loan becomes delinquent, and is handled by CreditEase, the parent company. Yirendai has a risk reserve fund, which it adds to at the time of loan origination; after 15 days, the company withdraws the monthly amount due to the investors from that account. After 90 days, Yirendai pays the total outstanding loan principal to the investor. |

Zopa	Findings
Application Process	● The application process requires different information depending on the type of loan request; for example, a car loan requires information about the car you want to purchase (Baker, 2017). ● Zopa obtains an applicant's credit history from two credit agencies, to help ensure that there is no missing information (Selvam, 2016a). ● In 2009, eBay ratings were used as a form of e-commerce and behavioral data (Phillips, 2009).
Approval Algorithm	● Applicants must be over 20 years old (Zopa, 2017d). ● Applicants must have an existing credit history and a good track record of repaying debt. ● Applicants must be UK residents with three years of address history. ● Applicants must have a minimum £12,000 yearly income. ● Applicants must have an acceptable debt-to-income ratio. ● Zopa has developed its own Machine Learning algorithm, which is used to evaluate credit risk and fraud, and is updated over time (Galli, 2017; Vasileiou, 2016). ● Zopa focuses on the performance of a particular type of loan within the country when making an approval decision for that type of loan (Selvam, 2016b). ● Zopa puts more weight on credit history than credit score, and considers an applicant's active credit, settled accounts and payment history. ● Existing borrowers can apply for multiple loans, as long as the total combined outstanding principal does not exceed £25,000 total (Zopa, 2017b).
Pricing Model	● Zopa has a letter grade system (A*, A, B….E) to express the credit risk involved with each loan (Torney, 2016). ● APR rates range from 2.8% to 34.9% (Zopa, 2017a). ● Lower-grade loans give higher returns but also have a higher risk of default (Zopa, 2017d). ● Younger borrowers tend to have higher rates because they usually have shorter credit histories (Baker, 2010).

| Post-loan Management | • After four months of missed payments, Zopa (2017c) considers the loan a capital loss.
• If a loan is charged-off, the lost capital is taken out of the investors' wallets; if Zopa manages to recover the missing money, the amount it recovers is returned to the investors.
• Zopa offers a risk reserve fund, called the SafeGuard fund, which investors can opt into by paying a fee; if a loan defaults, investors who have SafeGuard can receive money from the fund for the outstanding loan principal and interest (Selvam, 2016c).
• Zopa's (2017e) loan book is very detailed and open to the public; when an individual borrower is late with a payment, the loan is posted to the public. |

RateSetter	Findings
Application Process	- Applicants must provide their age (RateSetter, 2017d; RateSetter, 2017f). - Applicants must provide a valid UK bank account or building society account. - Applicants must prove residency. - Applicants must provide their income, household income, and monthly expenses. - Applicants must supply information about their employment.
Approval Algorithm	- Applicants must be over 21 years old (RateSetter, 2017d). - Applicants must be UK residents for a minimum of three years. - RateSetter (2017f) takes information provided from applicants to screen them through one of the two credit score bureaus, Callcredit & Equifax. - The screening process is automated so applicants immediately know once they have been approved or rejected. - RateSetter has a second screening process where applications are manually checked through personal communication between an employee and the applicant. - RateSetter (2017a) only approves 1 in 5 applications.
Pricing Model	- RateSetter (2017e) charges borrowers a Risk Assurance Charge to fund the Provision Fund. It is a fee that is determined through the borrower's credit score. - RateSetter (2017a) allows investors to set their own interest rate contracts. They can either choose the Market Rate or Investor Rate.
Post-loan Management	- The Provision Fund reimburses all investors if a borrower becomes delinquent (RateSetter, 2017c). - RateSetter requires a Security fee from some borrowers such as vehicles or houses as collateral for situations where the borrower cannot pay back the loan amount. - Delinquent loans can either be fulfilled by the Provision Fund and/or the Security fee. - RateSetter (2017b) does not charge early repayment fees.

Auxmoney	Findings
Application Process	● Applicants must provide their personal information (Auxmoney, 2017e). ● Applicants must provide their salary statements. ● Applicants must provide their Schufa score. ● Auxmoney (2017a) also collects behavioral and web data. ● Auxmoney collects information from credit bureaus. ● Employees manually check all documents sent in by applicants. ● Auxmoney checks if the applicants have any history using its service.
Approval Algorithm	● Applicants must not have filed for bankruptcy (Auxmoney, 2017e). ● Applicants must not have prior arrest warrants. ● Applicants can only have one loan at a time, but if they have been paying their installments, applicants can then do a top-up loan to increase the amount. ● Auxmoney considers whether the applicant took time to read the Frequently Asked Questions (FAQs) page and the loan repayment information (Lomas, 2014).
Pricing Model	● Auxmoney (2017a) has a letter grading system (AA, A, B….E, X), where the closer to AA an applicant is, the safer a risk he or she is. ● There is a one time fee for borrowers which is dependent on the repayment term and credit rating (Auxmoney, 2017c). ● The lower a borrower's Auxmoney (2017b) score is, the higher his or her interest rate is.
Post-loan Management	● Auxmoney (2017e) charges a prepayment penalty of 0.5% to 1% of the outstanding loan amount. ● Borrowers are reminded three times, each two weeks apart about a missing loan payment (Auxmoney, 2017d). ● Loans become cancelled if there is no response four weeks after the last reminder. ● Terminated loans have to be paid within two weeks or the loan is sent to claim management who can take further steps to get the funds back such as legal action.

China Rapid Finance (CRF)	Findings
Application Process	• CRF has 200 data channel partners (e-commerce, travel companies, data credit bureaus, financial groups, etc.) from which it can pull additional information on loan applicants (Wang, 2017). • Banks are used to verify the applicant's identity. • Teams of CRF employees go to visit the applicant's place of work to take pictures and verify employment status. • Applicants are prescreened using various data channels and given a loan offer before they apply, so the amount of information they must input is very small. • Applicants must submit additional information (bank transaction records, pay slips, domicile registration records, phone and utility records) for anti-fraud verification on loans with a principal amount larger than 6000 RMB (China Rapid Finance, 2017).
Approval Algorithm	• Applicants must be over 18 years old (China Rapid Finance, 2017). • CRF's approval algorithm include non-traditional information such as online, social media, transactional, search, and browsing data. • CRF generates three scores for applicants: the application score (1-7) measures the likelihood of default, the fraud score measures the probability that an applicant committed fraud on the application, and the response score is the likelihood that the applicant will respond to a particular loan product offer. • Applicants are only allowed to take out one loan on the CRF platform at a time. • All approvals are automated (Wang, 2017). • Social media behavior is analyzed - if an applicant is on social media while at work, it reflects negatively on him or her.
Pricing Model	• "Low and Grow" strategy - customers with little credit history are offered small loan products first (consumption loans) and then will get access to longer-term, larger loans (China Rapid Finance, 2017).
Post-loan Management	• Customers who make timely repayments are rewarded with a lower cost of borrowing (China Rapid Finance, 2017). • Investors may opt to pay a 3% fee to join the SafeGuard program, which is a pooled fund that will cover any missing payments owed to that investor (Wang, 2017).

PPDai	Findings
Application Process	• PPDai (2017) requires applicants to take a photo of themselves with their identification card along with easily accessible information. • PPDai examines applicants' ages and genders. • PPDai examines applicants' occupations. • PPDai obtains applicants' credit histories, such as personal credit information maintained by the Credit Reference Center under the People's Bank of China. • PPDai collects previous loan data for repeat borrowers. • Applicants must submit their highest level of education. • Applicants must report their marital status. • PPDai checks applicants' information against fraud databases. • PPDai collects applicants' Internet behavior data, such as the number of visits to its website and various social media websites. • PPDai records the time spent completing the loan application.
Approval Algorithm	• PPDai (2017) uses Big Data analytics and machine learning to increase the amount of automation and optimize its operational efficiency. • PPDai's approval algorithm takes approximately an hour to complete if the manual review process is not triggered. • PPDai rejects borrowers who are in Level VIII.
Pricing Model	• PPDai (2017) has a segmented pricing model (Level I - Level VII) for its standard loans, with Level I containing the safest credit risk loans; a borrower's loan's Level is determined using PPDai's proprietary credit scoring model. • PPDai charges borrowers a transaction fee (loan facilitation service fee) as a percentage of the total loan principal. • Level I borrowers have the lowest transaction fee rate (3% to 3.5%), and Level VII have the highest (5% to 11%). • Investors are charged a service fee upon a successful loan transfer.

Post-loan Management	● Borrowers are charged a collection fee for successful collection of defaulted loans (PPDai, 2017). ● Borrowers have the option to extend their existing loan payment schedule for another one to four weeks up to a maximum of three times without going through another credit evaluation. Before each extension, borrowers are required to pay an upfront extension fee equal to 3% of the principal amount subject. ● PPDai charges certain borrowers, based on their estimated loan delinquency rate, a percentage of their original loan principal as a contribution to the Quality Assurance fund, which will reimburse investors if they become delinquent. This fee is paid in monthly installments. ● Investors who invest in loans that are not protected by the Quality Assurance fund can choose to contribute a part of their investment capital to be protected from underperformance (returns lower than expected) and market changes by an Investor Reserve fund.

Afluenta	Findings
Application Process	• Applicants must provide an email (Afluenta, 2017f). • Applicants must provide general personal information (Afluenta, 2017c). • Applicants must provide work information. • Afluenta uses data channels to determine whether applicants have a car (Afluenta, 2017d). • Afluenta obtains information through Equifax and Veraz about the type of phone an applicant has, what lines of credit he or she has, etc.
Approval Algorithm	• Applicants must be Argentinian citizens (Afluenta, 2017b). • Applicants must be between the ages of 18 and 73. • Applicants must make a monthly income of $7,000 ARS. • Applicants must not have made any late payments over 30 days within the last two years (Afluenta, 2017f). • Applicants must have a bank account. • Applicants must have a good credit history and prove their good payment behavior. • The set of requirements for self-employed applicants is different from the set for company workers (Afluenta, 2017b). • Applicants who are company workers must be employed for at least 6 months. • Applicants who are self-employed must be employed for at least 12 months.
Pricing Model	• Afluenta (2017a) scores borrowers based on the risk they pose using a grading system (AA, A - F). • Borrowers with higher grades receive lower origination and interest fees. • Loans get funded by individual investors over a period of ten days. If the loan does not get fully charged, then total amount funded at that point is offered to the borrower (Afluenta, 2017f).
Post-loan Management	• If a borrower misses a payment, he or she is charged extra interest which goes to the investor as compensation (Afluenta, 2017e). • If a borrower misses a payment, Afluenta analyzes data from credit bureaus to determine whether something has happened to affect the borrower's ability to repay and decides whether to cancel the late fees. • If a borrower goes missing or is still not able to make payments then the case is passed along to a third party collection agency.

Younited Credit	Findings
Application Process	- Applicants must provide the purpose of their loan (Younited Credit, 2017a). - Applicants can sign their Credit Contract Offer online using their cell phone number and a piece of identification or wait for the offer to come in the mail to sign on paper (Younited Credit, 2017b; Younited Credit, 2017i). - Applicants who sign online can receive approval within 24 hours. - Applicants who sign online can submit their justifying documents electronically; otherwise, they must mail the documents to Younited.
Approval Algorithm	- Applicants must reside in mainland France (Younited Credit, 2017e). - Applicants must be between the ages of 18 and 75. - Applicants must not be registered in the incident files maintained by Bank of France. - Applicants must justify stable income. - Applicants will be rejected for having too high of a debt-to-income ratio (Younited Credit, 2017c). - Applicants will be rejected for entering information that suggests unstable finances during the loan period.
Pricing Model	- Loans have fixed interest rates (Younited Credit, 2017d). - Borrowers are assigned a score of A, B, or C which represents how risky of an investment they are (Younited Credit, 2017f). - Lenders cannot directly invest in borrowers; instead, they add money to one of the five fund pools, each of which invests in a specific range of loan grades and terms. - Borrowers have the option to buy insurance on their loan to protect themselves if they become unable to repay due to "accidents of life" (Younited Credit, 2017h).
Post-loan Management	- Borrowers are contacted very quickly in the case of late payment (Younited Credit, 2017g). - The penalty for late payment is equal to 8% of unpaid monthly payments. - Late or missing payments are reported to the FICP and added to the borrower's personal loan incident file. - Younited does not offer a pool for reimbursing investors - if a borrower does not repay properly, investors are not fully reimbursed.

WeLend	Findings
Application Process	- Applicants must provide a copy of their Hong Kong ID (WeLend, 2017a). - Applicants must provide a valid disbursement account. - Applicants must provide proof of residence. - Applicants must provide proof of income for one month if on a fixed salary, three months if on a commission-based salary, or six months if working in the real estate industry (WeLend, 2017b).
Approval Algorithm	- Applicants' TransUnion credit scores must be above a certain threshold (WeLend, 2017g). - Applicants must be permanent Hong Kong residents (WeLend, 2017b). - Applicants must be over 18 years old. - Applicants must have stable employment and have been at their current job for at least two months. - Applicants must set up Direct Debit Authorization with their bank accounts. - Applicants must have a minimum income of $8,000 HKD per month. - Applicants may apply for multiple loans; however they need to create an application for each one (WeLend, 2017a).
Pricing Model	- Borrowers can set their own repayment schedule ranging from 14 days to 60 months (WeLend, 2017a). - Borrowers can connect with WeLend (2017c) for up to a 20% reduction on their interest rate: 5% deduction for providing their Facebook, 10% for LinkedIn, and 5% for their education details. - WeLend (2017e) charges borrowers an "Effective Rate" which is calculated using a standardized annualized interest method..
Post-loan Management	- WeLend (2017f) sends e-mail reminders to borrowers regarding late payments. - WeLend charges a $350 HKD late service fee on each late repayment. - WeLend needs to be notified 30 days in advance if borrowers wish to repay earlier. - WeLend (2017d) allows borrowers to pay their monthly loan payments through multiple methods such as visiting a 7-11 with cash.

APPENDIX K: Application Process

Lending Club   Prosper   Upstart   Zopa   RateSetter   Auxmoney

Yirendai   PPDai   CRF   Younited   WeLend   Afluenta

EDUCATION

- Applicants must submit their SAT and/or ACT score.
- Upstart reviews the applicant's university and degree, as well as his or her earning potential.
- Upstart verifies the applicant's education and grades.
- Applicants must submit their highest level of education.

INCOME / EXPENSES

- Applicants must submit their income and employment information.
- Applicants must provide their salary statements.
- Applicants must submit their income information.
- Applicants must submit their employment status and income information.
- Applicants must report how much they pay for their homes.
- Applicants must provide their income, household income, and monthly expenses.

VERIFICATION

- Income is verified on a subset of applicants using an algorithm to identify instances where self-reported income highly influences the borrower's Prosper Rating.
- Income is verified using pay stubs, tax returns, or bank statements.
- Income Source Verification Process - applicants must supply documents such as paystubs, W-2 Forms, and other tax records.
- Upstart requires multiple documents to verify income.
- Applicants must provide proof of income for one month if on a fixed salary, three months if on a commission-based salary, or six months if working in the real estate industry.

EMPLOYMENT

- Applicants must provide work information.
- Applicants must submit their employment status and income information.
- Applicants must provide their employer information.
- Applicants must submit their income and employment information.
- Applicants must supply information about their employment.

- PPDai examines applicants' occupations.
- Applicants must submit information about their occupation and employment status.

VERIFICATION
- Employment is verified by contacting employer and checking databases.
- Teams of CRF employees go to visit the applicant's place of work to take pictures and verify employment status.

CREDIT CARD
- Applicants must provide their credit card information.

CREDIT HISTORY
- Zopa obtains an applicant's credit history from two credit agencies, to help ensure that there is no missing information.
- Upstart examines the applicant's FICO score.
- Auxmoney collects information from credit bureaus.
- Applicants must provide their Schufa score.
- FICO score and credit history are collected from U.S. credit reporting agencies (TransUnion, Equifax, Experian).
- Afluenta obtains information through Equifax and Veraz about the type of phone an applicant has, what lines of credit he or she has, etc.
- PPDai obtains applicants' credit histories, such as personal credit information maintained by the Credit Reference Center under the People's Bank of China.
- Yirendai gathers credit data maintained by its parent company, CreditEase.
- Yirendai obtains the applicant's credit report from the People's Bank of China (PBOC).

IDENTITY
- Applicants must provide an email.
- PPDai examines applicants' ages and genders.
- Applicants supply their name, address, and date of birth.
- Applicants must provide their age.
- Applicants must provide a copy of their Hong Kong ID.
- Applicants must have a valid email address.
- Applicants must submit their Social Security Number (government-issued ID number).
- Applicants must provide their identification card information.
- Yirendai requires personal identification information to be provided by an organization operating under the Ministry of Public Security.
- Applicants must provide a current government-issued photo ID which is authenticated

using third-party reference materials.
- Applicants who sign online can submit their justifying documents electronically; otherwise, they must mail the documents to Younited.
- Applicants can sign their Credit Contract Offer online using their cell phone number and a piece of identification or wait for the offer to come in the mail to sign on paper.

VERIFICATION

- Yirendai employees speak with potential borrowers in person.
- Yirendai verifies and monitors the Internet Protocol (IP) addresses of applicants.
- Yirendai uses Big Data platforms to check for inconsistencies in applications.
- Employees manually check all documents sent in by applicants.
- Applicants must submit additional information (bank transaction records, pay slips, domicile registration records, phone and utility records) for anti-fraud verification on loans with a principal amount larger than ¥6000 RMB.
- Banks are used to verify the applicant's identity.
- Other data is also collected from third-party agencies. If applicant fails to provide data, or provides the wrong data, then the loan is either rejected or more information is collected.
- PPDai checks applicants' information against fraud databases.
- PPDai requires applicants to take a photo of themselves with their identification card along with easily accessible information.
- Applicants must accept an agreement which gives Prosper the right to verify the accuracy of information they provide.
- A borrower's name, Social Security Number, address, and telephone number are verified using credit reporting agencies as well as through checking anti-fraud databases.
- If information is inconsistent or verified to be false, Prosper will cancel or refuse the applicant's loan listing.
- If discrepancies or inconsistencies are found during the verification process, applicants must submit additional documents such as a recent utility bill.

BANK ACCOUNT

- Applicants must provide their bank account information.
- Applicants must provide a valid UK bank account or building society account.
- Applicants must provide a valid disbursement account.

RESIDENCY

- Applicants must prove residency.
- Applicants must provide proof of residence.
- Applicants must submit their address.

REPEAT CUSTOMERS
- Auxmoney checks if the applicants have any history using its service.
- PPDai collects previous loan data for repeat borrowers.

BEHAVIORAL DATA
- Yirendai collects online shopping and payment information from popular Chinese e-commerce websites.
- Yirendai collects the applicant's online data from Internet service providers and mobile carriers.
- Auxmoney collects behavioral and web data.
- PPDai collects applicants' Internet behavior data, such as the number of visits to its website and various social media websites.
- PPDai records the time spent completing the loan application.
- Behavioral data about applicants are collected.
- In 2009, eBay ratings were used as a form of e-commerce and behavioral data.

DATA CHANNELS
- CRF has 200 data channel partners (e-commerce, travel companies, data credit bureaus, financial groups, etc.) from which it can pull additional information on loan applicants
- Applicants are prescreened using various data channels and given a loan offer before they apply, so the amount of information they must input is very small.
- Afluenta uses data channels to determine whether applicants have a car.
- Yirendai collects online shopping and payment information from popular Chinese e-commerce websites.
- Yirendai collects the applicant's online data from Internet service providers and mobile carriers.
- Yirendai uses Big Data platforms to check for inconsistencies in applications.
- Other data is also collected from third-party agencies. If applicant fails to provide data, or provides the wrong data, then the loan is either rejected or more information is collected.
- PPDai checks applicants' information against fraud databases.
- A borrower's name, Social Security Number, address, and telephone number are verified using credit reporting agencies as well as through checking anti-fraud databases.
- Zopa obtains an applicant's credit history from two credit agencies, to help ensure that there is no missing information.

FAMILY/HOUSEHOLD

- Applicants must report their marital status.
- Applicants must report the number of dependents they claim.

REASON FOR LOAN

- Applicants must provide the purpose of their loan.
- Applicants must provide the purpose of the loan.
- The application process requires different information depending on the type of loan request; for example, a car loan requires information about the car you want to purchase.

APPENDIX L: Approval Algorithm

Lending Club	Prosper	Upstart	Zopa	RateSetter	Auxmoney
Yirendai	PPDai	CRF	Younited	WeLend	Afluenta

FICO SCORES

- Minimum FICO 08 score is 660.
- Minimum FICO 08 score is 640.
- Applicants must have a credit score of at least 640.
- Applicants' TransUnion credit scores must be above a certain threshold.

LEGAL CITIZENS

- Applicants must be a U.S. Citizen or have a long-term visa.
- Applicants must be UK residents with three years of address history.
- Applicants must be UK residents for a minimum of three years.
- Applicants must be Argentinian citizens.
- Applicants must reside in mainland France.
- Applicants must be permanent Hong Kong residents.

DEBT-TO-INCOME RATIO

- Lending Club has a required maximum debt-to-income ratio of 40%.
- The maximum acceptable debt-to-income ratio is 50%.
- Upstart does not have a required maximum debt-to-income ratio.
- Applicants must have an acceptable debt-to-income ratio.
- Applicants will be rejected for having too high of a debt-to-income ratio.

CREDIT ACCOUNTS

- Applicants must have at least two revolving credit accounts.
- Applicants must have at least three open credit accounts.

CREDIT INQUIRIES

- Applicants must have five or fewer credit inquiries in the past six months.
- Applicants must not have more than seven credit report inquiries in the past six months.
- Applicants must have less than six credit inquiries in the last six months.

MAX NUMBER OF LOANS

- The maximum number of loans a borrower can have on the Lending Club platform is two.
- Applicants may not have more than two simultaneous loans on the Prosper platform.
- Applicants who want a second loan on the Upstart platform must have made on-time payments for six previous consecutive months, have no more than one outstanding loan at the time of application, and owe no more than $50,000 USD in outstanding principal.
- Existing borrowers can apply for multiple loans, as long as the total combined outstanding principal does not exceed £25,000 total.
- Applicants can only have one loan at a time, but if they have been paying their installments, applicants can then do a top-up loan to increase the amount.
- Applicants are only allowed to take out one loan on the CRF platform at a time.
- Applicants may apply for multiple loans; however they need to create an application for each one.

CREDIT HISTORY

- Applicants must have at least a 36-month credit history.
- Upstart does not have a required minimum credit history.
- Applicants must have an existing credit history and a good track record of repaying debt.
- Zopa puts more weight on credit history than credit score, and considers an applicant's active credit, settled accounts and payment history.
- Applicants must have a good credit history and prove their good payment behavior.

EMPLOYMENT

- Self-employed applicants are considered high-risk.
- Applicants must have a full time job, or a job offer.
- The set of requirements for self-employed applicants is different from the set for company workers.
- Applicants who are company workers must be employed for at least six months.
- Applicants who are self-employed must be employed for at least 12 months.
- Applicants must have stable employment and have been at their current job for at least two months.

BANKRUPTCY

- Applicants cannot have filed for bankruptcy in the past year.
- Applicants must not have filed for bankruptcy.
- Applicants must not have filed for bankruptcy.

BANK ACCOUNT

- Applicants must have a bank account at a U.S. bank.
- Applicants must have a bank account.
- Applicants must set up Direct Debit Authorization with their bank accounts.

AGE

- Applicants must be at least 18 years old.
- Applicants must be over 20 years old.
- Applicants must be over 21 years old.
- Applicants must be over 18 years old.
- Applicants must be between the ages of 18 and 73.
- Applicants must be between the ages of 18 and 75.
- Applicants must be over 18 years old.

INCOME

- Upstart does not have a required minimum income.
- Applicants must have a minimum £12,000 yearly income.
- Applicants must make a monthly income of $7,000 ARS.
- Applicants must justify stable income.
- Applicants must have a minimum income of $8,000 HKD per month.

BEHAVIORAL PATTERNS

- Yirendai considers the behavior patterns of the applicant as he or she uses its website.
- CRF's approval algorithm include non-traditional information such as online, social media, transactional, search, and browsing data.
- Social media behavior is analyzed - if an applicant is on social media while at work, it reflects negatively on him or her.
- Auxmoney considers whether the applicant took time to read the Frequently Asked Questions (FAQs) page and the loan repayment information.

MACHINE LEARNING

- Machine Learning - Upstart's approval algorithm is updated and adjusted by software each time a payment is made or a delinquency is found.
- Zopa has developed its own Machine Learning algorithm, which is used to evaluate credit risk and fraud, and is updated over time.
- PPDai uses Big Data analytics and machine learning to increase the amount of automation and optimize its operational efficiency.

EDUCATION
- Applicants must have a 4-year college degree.

MISCONDUCT
- Yirendai utilizes open government databases to check whether the applicant has any known, committed crimes.
- Applicants must not be blacklisted for fraud.
- Applicants must not have prior arrest warrants.
- Applicants must not have made any late payments over 30 days within the last two years.
- Applicants must not be registered in the incident files maintained by Bank of France.

LEVEL OF AUTOMATION
- The screening process is automated so applicants immediately know once they have been approved or rejected.
- RateSetter has a second screening process where applications are manually checked through personal communication between an employee and the applicant.
- All approvals are automated.
- PPDai's approval algorithm takes approximately an hour to complete if the manual review process is not triggered.

PLATFORM HISTORICAL PERFORMANCE
- Prosper calculates the estimated loss rate for a customer based on the historical performance of Borrower Loans with similar characteristics.
- Yirendai's approval algorithm is based on historical credit data accumulated over time through its platform.

MISCELLANEOUS INFLUENCES
- Yirendai currently has 250 rules in its approval algorithm.
- Yirendai score is influenced by the purpose of the loan, usage and performance of the loans from other financial institutions, credit card usage and payment pattern, public record, income and debt condition, geographic location, job stability, and online merchant purchasing pattern.
- PPDai rejects borrowers who are in Level VIII.
- RateSetter only approves 1 in 5 applications.
- RateSetter takes information provided from applicants to screen them through one of the two credit score bureaus, Callcredit & Equifax.

- Zopa focuses on the performance of a particular type of loan within the country when making an approval decision for that type of loan.
- Prosper considers the following data in its' approval algorithm: credit score, number of credit inquiries, debt-to-income ratio, number of open credit accounts, bankruptcies.

PROPRIETARY SCORING INFORMATION

- CRF generates three scores for applicants: the application score (1-7) measures the likelihood of default, the fraud score measures the probability that an applicant committed fraud on the application, and the response score is the likelihood that the applicant will respond to a particular loan product offer.
- One scoring model is based on "traditional" information, and generates a score between 1 and 25, which measures the borrower's "Base Risk Grade".
- An applicant's Prosper Score and FICO 08 credit score combine to determine his or her Prosper Rating, which determines whether he or she is approved.
- Prosper Score indicates an applicant's estimated likelihood of going 60 days past due within the first 12 months of the loan's origination, which is determined using a model that was created to reflect Prosper applicants specifically and includes data and includes data such as 'credit inquiries in the past 6 months' and 'debt-to-income ratio.'
- Prosper Rating is the estimated loss rate for the applicant and is determined using a table; base loss rates are based on historical data of other Prosper borrowers with similar characteristics.
- Applicants will be rejected for entering information that suggests unstable finances during the loan period.

APPENDIX M: Pricing Model

Lending Club   Prosper   Upstart   Zopa   RateSetter   Auxmoney

Yirendai   PPDai   CRF   Younited   WeLend   Afluenta

LOAN GRADING

- The borrowers' interest rates are determined by credit grades (A1-G5), which are assigned to all loans.
- Prosper rates borrowers on a letter grading system: AA, A, B, C, D, E, HR.
- Yirendai assigns each borrower a Yirendai score, generated by the company's credit scoring model after processing all the information.
- Zopa has a letter grade system (A*, A, B….E) to express the credit risk involved with each loan.
- Auxmoney has a letter grading system (AA, A, B….E, X), where the closer to AA an applicant is, the safer a risk he or she is.
- PPDai has a segmented pricing model (Level I - Level VII) for its standard loans, with Level I containing the safest credit risk loans; a borrower's loan's Level is determined using PPDai's proprietary credit scoring model.
- Afluenta scores borrowers based on the risk they pose using a grading system (AA, A - F).
- Borrowers are assigned a score of A, B, or C which represents how risky of an investment they are.

GRADE INFLUENCE ON INTEREST RATE

- Higher-grade borrowers receive lower interest rates.
- A borrower's grade influences the size of the origination fee and the interest rate he or she must pay.
- The maximum loan amount a borrower can take out with Prosper depends on the grade he or she receives.
- The borrower's Yirendai score is used to determine his or her interest rate.
- The lower a borrower's Auxmoney score is, the higher his or her interest rate.
- Borrowers with higher grades receive lower origination and interest fees.
- Lower-grade loans give higher returns but also have a higher risk of default.
- APR rates range from 2.8% to 34.9%.

ORIGINATION FEE

- Upstart deducts an origination fee (1%-6% depending on borrower's credit score) from the loan balance before it is deposited.
- There is a one time fee for borrowers which is dependent on the repayment term and credit rating.
- PPDai charges borrowers a transaction fee (loan facilitation service fee) as a percentage of the total loan principal.
- Level I borrowers have the lowest transaction fee rate (3% to 3.5%), and Level VII have the highest (5% to 11%).
- Investors are charged a service fee upon a successful loan transfer.
- WeLend charges borrowers an "Effective Rate" which is calculated using a standardized annualized interest method.
- A borrower's grade influences the size of the origination fee and the interest rate he or she must pay.

FIXED INTEREST RATE

- All personal loans are fixed rate loans.
- Interest rates are fixed once assigned.
- Upstart has fixed interest rates.
- All loans have fixed interest rates.
- Loans have fixed interest rates.

INVESTOR PROTECTION

- RateSetter charges borrowers a Risk Assurance Charge to fund the Provision Fund. It is a fee that is determined through the borrower's credit score.
- Lenders cannot directly invest in borrowers; instead, they add money to one of the five fund pools, each of which invests in a specific range of loan grades and terms.

BORROWER PROTECTION

- Borrowers have the option to buy insurance on their loan to protect themselves if they become unable to repay due to "accidents of life".

BORROWER BENEFITS

- "Low and Grow" strategy - customers with little credit history are offered small loan products first (consumption loans) and then will get access to longer-term, larger loans.
- Borrowers can connect with WeLend for up to a 20% reduction on their interest rate: 5% deduction for providing their Facebook, 10% for LinkedIn, and 5% for their education details.

- Borrowers can set their own repayment schedule ranging from 14 days to 60 months.

DETERMINING INTEREST RATE

- RateSetter allows investors to set their own interest rate contracts. They can either choose the Market Rate or Investor Rate.

- Pre-2014, Upstart asked for a percentage of borrower's future income rather than having a predefined amount to be paid.

- Loans through the Upstart platform accrue daily rather than monthly.

- Younger borrowers tend to have higher rates because they usually have shorter credit histories.

LOAN SIZE

- The maximum loan amount a borrower can take out with Prosper depends on the grade they receive.

- Loans get funded by individual investors over a period of 10 days. If the loan does not get fully charged, then total amount funded at that point is offered to the borrower.

APPENDIX N: Post-loan Management

Lending Club	Prosper	Upstart	Zopa	RateSetter	Auxmoney
Yirendai	PPDai	CRF	Younited	WeLend	Afluenta

PREPAYMENT FEES
- Customers who make timely repayments are rewarded with a lower cost of borrowing.
- RateSetter does not charge early repayment fees.
- Auxmoney charges a prepayment penalty of 0.5% to 1% of the outstanding loan amount.
- Borrowers are not penalized for making early monthly payments.
- Upstart does not charge penalties for prepayment.
- WeLend needs to be notified 30 days in advance if borrowers wish to repay earlier.

CHARGE-OFF DATE
- When a loan is 150 days past due, it is considered "charged-off".
- Loans are considered charged-off when they are 121 days or more past due.
- After four months of missed payments, Zopa considers the loan a capital loss.
- Loans become cancelled if there is no response four weeks after the last reminder.

DEBT COLLECTION
- When a loan is charged-off, the remaining principal balance of the Note is deducted from the investor's account, and the loan is sold to a third-party.
- If a charged-off loan is recovered, the investor will receive a pro rata share of the amount, minus the fee paid to the collection agency.
- If no litigation is involved when collecting on non-performing loans, Lending Club charges investors 18% of the amount collected.
- If litigation is involved in debt collection, Lending Club charges investors 30% of hourly attorney fees.
- After four months of no payment, the loan is sold to a collection agency and the proceeds are split among the loan's investors.
- The debt collection process begins 15 days after a loan becomes delinquent, and is handled by CreditEase, the parent company.
- If a loan is charged-off, the lost capital is taken out of the investors' wallets; if Zopa manages to recover the missing money, the amount it recovers is returned to the investors.

- Terminated loans have to be paid within two weeks or the loan is sent to claim management who can take further steps to get the funds back such as legal action.
- If a borrower goes missing or is still not able to make payments then the case is passed along to a third-party collection agency.
- Borrowers are charged a collection fee for successful collection of defaulted loans.

CONTACTING BORROWERS

- Late or delinquent borrowers are contacted via emails, phone calls, and letters.
- When a payment is late, Yirendai will send text messages between 1-14 days from when the payments are past due, followed by visits to the borrower's home.
- Yirendai sends reminder text messages to borrowers on the day payments are due.
- Borrowers are reminded three times, each two weeks apart about a missing loan payment.
- Borrowers are contacted very quickly in the case of late payment.
- WeLend sends e-mail reminders to borrowers regarding late payments.

REPORTING DELINQUENT BORROWERS

- Lending Club reports delinquent borrowers to credit bureaus every month.
- Prosper notifies major credit agencies when a borrower makes a late payment or misses a payment.
- If borrowers are 30 days late on any payment, Upstart will report any delinquencies or defaults to credit bureaus.
- Zopa's loan book is very detailed and open to the public; when an individual borrower is late with a payment, the loan is posted to the public.
- Late or missing payments are reported to the FICP and added to the borrower's personal loan incident file.

LATE PAYMENT FEES

- Lending Club may waive late fees if the company believes that this will increase the chance of the borrower returning the loan back to "current status."
- Lending Club offers a 15-day grace period to its borrowers for late payments, after which borrowers will be charged for a late fee, which is the greater of either 15% of the unpaid payment or $15.
- Borrowers are charged a late fee if payments are more than 15 days late.
- Late fees are charged on late payments equal to the greater of 5% of monthly past due amount or $15.
- The penalty for late payment is equal to 8% of unpaid monthly payments.
- WeLend charges a $350 HKD late service fee on each late repayment.
- If a borrower misses a payment, he or she is charged extra interest which goes to the investor as compensation.

- If a borrower misses a payment, Afluenta analyzes data from credit bureaus to determine whether something has happened to affect the borrower's ability to repay and decides whether to cancel the late fees.

REPAYMENT ADJUSTMENTS

- If the borrower is having difficulty repaying, Lending Club allows him or her to take part in a "hardship plan," where the borrower only pays the interest over a 3-month period.
- Borrowers have the option to extend their existing loan payment schedule for another one to four weeks up to a maximum of three times without going through another credit evaluation. Before each extension, borrowers are required to pay an upfront extension fee equal to 3% of the principal amount subject.

RISK RESERVE FUND

- Yirendai has a risk reserve fund, which it adds to at the time of loan origination; after 15 days, the company withdraws the monthly amount due to the investors from that account. After 90 days, Yirendai pays the total outstanding loan principal to the investor.
- Zopa offers a risk reserve fund, called the SafeGuard fund, which investors can opt into by paying a fee; if a loan defaults, investors who have SafeGuard can receive money from the fund for the outstanding loan principal and interest.
- The Provision Fund reimburses all investors if a borrower becomes delinquent.
- Delinquent loans can either be fulfilled by the Provision Fund and/or the Security fee.
- Investors may opt to pay a 3% fee to join the SafeGuard program, which is a pooled fund that will cover any missing payments owed to that investor.
- PPDai charges certain borrowers, based on their estimated loan delinquency rate, a percentage of their original loan principal as a contribution to the Quality Assurance fund, which will reimburse investors if they become delinquent. This fee is paid in monthly installments.
- Investors who invest in loans that are not protected by the Quality Assurance fund can choose to contribute a part of their investment capital to be protected from underperformance (returns lower than expected) and market changes by an Investor Reserve fund.
- Younited does not offer a pool for reimbursing investors - if a borrower does not repay properly, investors are not fully reimbursed.

REPAYMENT FEATURES

- If a payment does not go through due to insufficient funds, Prosper charges the borrower a $15 fee.
- WeLend allows borrowers to pay their monthly loan payments through multiple methods such as visiting a 7-11 with cash.

SECURING LOANS

- RateSetter requires a Security fee from some borrowers such as vehicles or houses as collateral for situations where the borrower cannot pay back the loan amount.

APPENDIX O: Survey Protocol

O.1   Survey Protocol:

The survey contents was adjusted based on discussion with our sponsor, Qiantu Financial Group. The survey was then translated to Chinese with the assistance of our Hangzhou Dianzi University (HDU) partnering students and was added to an online service, QQ Surveys. A URL link to the survey was sent to Qiantu for its approval. We then asked Qiantu to send the link to its users.

O.2   Survey Form:

The results of this survey will be completely anonymous, and will only be used to help Qiantu Financial Group improve its products and credit risk management. Your responses will not affect your current loans and approval decisions from Qiantu Financial Group.

Please note: If you wish to be entered into a raffle for ¥300 RMB for completing the entire survey, please provide your WeChat ID _____.

Please indicate your gender:
- ❏ Male
- ❏ Female

What is your age?
- ❏ 18-24
- ❏ 25-29
- ❏ 30-34
- ❏ 35-39
- ❏ 40+

When applying for a loan using Flash Fund:

Would you be willing to provide information regarding your monthly expenses?
- ❏ Yes
- ❏ No

Would you be willing to provide information about your education?
- ❏ Yes
- ❏ No

Would you be willing to disclose your marital status or relationship status?
- ❏ Yes
- ❏ No

Would you be willing to report the number of dependents you have?
- ❏ Yes
- ❏ No

Would you want the option to take out more than one loan at a time?
- ❏ Yes
- ❏ No

Would you want the option to pay back the loan in cash?
- ❏ Yes
- ❏ No

Please rank your preferred methods of communication for payment reminders and late payments:
- ❏ WeChat
- ❏ QQ
- ❏ Email
- ❏ Phone Call
- ❏ Text Message

O.3   Translated Survey Form:

您好，首先非常感谢您愿意抽出时间来填写我们的调查问卷，这份问卷旨在依据各位对问题的回答了解当前信贷产品的一些市场现状。本问卷中的问题不分对错，所以可依据您最真实的状况和意见来填写。问卷采取无记名方式，回答结果保密，仅用于研究分析，为钱兔金服的产品和风控模型提供参考，不会做其它用途，请放心作答。再次感谢您的支持与理解！

请注意：在完成这个调查问卷后，您可以免费参与最高价值300元的抽奖活动。如果您愿意参加，请您提供您的微信联系方式：_____

请问您的性别是：
- ❏ 男
- ❏ 女

请问您的年龄是：
- ❏ 18-24
- ❏ 25-29
- ❏ 30-34
- ❏ 35-39
- ❏ 40+

在申请闪电贷款的过程里：

您是否愿意提供有关您每月开支的信息：
- ❏ 是
- ❏ 否

您是否愿意提供有关您学业方面的信息：
- ❏ 是
- ❏ 否

您是否愿意透露您的婚姻状况：
- ❏ 是
- ❏ 否

您是否愿意告知您有多少位家属：
- ❏ 是
- ❏ 否

您是否希望能够申请到不止一笔的闪电贷款：
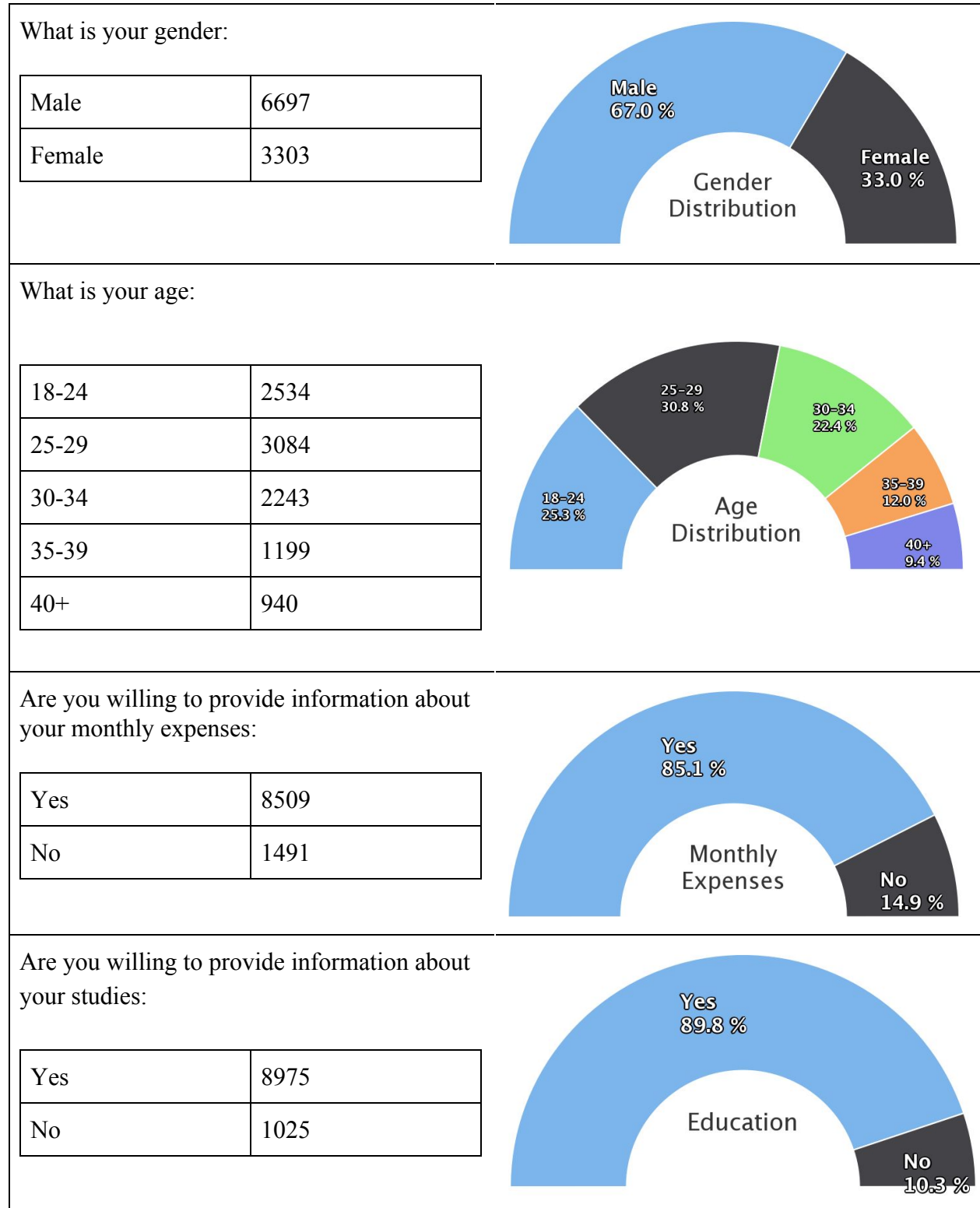- ❏ 是
- ❏ 否

您是否希望能用现金付还贷款：
- ❏ 是
- ❏ 否

请根据您的偏好排列一下付款提醒和延迟付款通知方式：
(如想重新排列，请滑动图标)

- ❏ 微信
- ❏ QQ
- ❏ 邮件
- ❏ 打电话
- ❏ 发短信

APPENDIX P: Survey Results

In order to determine whether Qiantu could consider some of the strategies we found in our research, we surveyed members of the company's Flash Fund user base. We recorded 10,000 survey responses from 20,687 total page views, resulting in a 48.34% submission rate. Although our survey utilized convenience sampling, the sheer number of responses speaks well for the significance of our survey results. Of the people who submitted a survey response, 66.97% were male and 33.03% were female. About 30.84% of respondents were between the ages of 25 and 29, and 25.34% were between the ages of 18 and 24. Compared to the user demographics that we received from Qiantu, the sample population was generally older and had a larger population of females (S. Xu, personal communication, October 25, 2017). Despite the demographic shift, none of our considerations involve age or gender, therefore, we believe that this shift would not influence our analysis of the survey results or the lending strategies discussed in our report. We were concerned that respondents would be motivated by the incentive to respond as quickly as possible and would not provide valid data. However, the average completion time of the survey was 1 minute and 32 seconds, and only 1,517 out of the 10,000 respondents provided a WeChat, indicating that only 15.17% wanted to be entered in the raffle. From this, we believe that respondents took the time to provide their honest opinions.

What is your gender:

Male	6697
Female	3303

What is your age:

18-24	2534
25-29	3084
30-34	2243
35-39	1199
40+	940

Are you willing to provide information about your monthly expenses:

Yes	8509
No	1491

Are you willing to provide information about your studies:

Yes	8975
No	1025

Would you like to disclose your marital status:

Yes	9743
No	257

Marital Status

Yes 97.4 %

No 2.6 %

Would you like to tell how many dependents you have:

Yes	8348
No	1652

Number of Dependents

Yes 83.5 %

No 16.5 %

Would you like to be able to apply to more than one Flash Fund loan:

Yes	9621
No	379

Multiple Loans

Yes 96.2 %

No 3.8 %

Do you want to pay back the loan in cash:

Yes	7117
No	2883

Cash Repayment

Yes 71.2 %

No 28.8 %

Please arrange payment reminders and delayed payment notifications according to your preference:						
Option	1st Choice	2nd Choice	3rd Choice	4th Choice	5th Choice	Overall Rank
WeChat	5860	2847	927	213	153	1
QQ	676	4074	2936	1846	468	2
Text	2780	1657	846	1252	3465	3
E-mail	171	611	3929	3059	2230	4
Call	513	811	1362	3630	3684	5