

“If you are considering taking out a payday loan, I’d like to tell you a great *alternative*, it’s called *anything else.*”
- Last Week Tonight

1. Introduction

A payday loan, by definition, offers its borrower fast cash in a small amount and requires the money to be paid back by the next payday of the borrower. The interest charged by payday loans is extremely high and can often reach over 500% per annum. Borrowers of payday loans are usually individuals who undergo an unexpected shock in their cash positions, such as urgent medical bills or car repairs. Often times they are severely constrained in credit with quite limited borrowing options. Payday loans hence appear to be the last resort to satisfy the liquidity needs (Bhutta et al. 2015). The short duration of payday loans often makes the high interest rate acceptable to borrowers. Given an APR of 500%, a 14-day loan with \$100 principal would charge \$19 for the interest, and in most cases, the interest takes a camouflage of service fees that seem to justify the lending process. For borrowers, even the rational ones, satisfying cash need is more important than the high cost.

Although the high interest can be justified to some degree, especially when payday lenders have to bear high default risk from their borrowers, payday loans are proved to be very dangerous to financial consumers. Researchers have shown that payday borrowing exacerbates the households’ economic situations and causes them to fall behind in mortgage payments, medicals bills, and utility bills. It also leads to greater risk of personal bankruptcy (Meltzer 2011). Payday borrowers may also find themselves as the defendant in the lawsuits filed by their lenders when the repayments are not delivered in time. More than inducing financial distress, payday lenders often use deceptive and illegal practices. According to the report of Federal Trade Commission (FTC), many lenders set a goal to constantly charge unnecessary fees to borrowers, prolong repayment period without reducing principal, and withdraw from borrowers’ accounts without their knowledge. These practices eventually lead to the closure of borrowers’ bank account (Campbell 2012). Such fraudulent behaviors are pervasive in the industry and cause damages nationwide. For example, a payday lender named *AMG Services* uses fraudulent loans that victimize over 4.5 million

people in 50 states¹. The litigation recovery of its lawsuit reaches \$1.3 Billion, the highest in FTC history, or \$289 per victim.

When the risk of payday borrowing is high in all regards and the expected payoff is low (higher paid interest is less beneficial payoff to borrowers), rational risk-averse individuals should shy away from the activity. However, it is not the case for many payday borrowers. Despite facing personal bankruptcy, deception, and potential legal charges, the number of payday borrowers grows tremendously over the past decades. Nowadays, as many as 12 million Americans use payday services each year, and the number of payday shops increased from about 2,000 in 1996 (Prager 2009) to over 23,000 in 2019, twice the size of McDonald's in America.

This paper investigates whether borrowers are rational in taking payday loans. In particular, I test individual risk preference, one of the human behavioral characteristics, as a determinant of payday borrowing. When an individual was born with a natural instinct to take risks or can easily become addicted to risks, he/she is likely to engage in risky activities with negative payoffs. In the studies of behavior finance, irrational risk-loving preference appears to be economically detrimental. For example, risk-loving CEOs behave more aggressively in making corporate policies, which eventually increase the riskiness of their firms' position and the cost of capital of their firms (Bernile et al. 2016). Risk-loving hedge fund managers tend to invest in lottery-like stocks, underperform their peers, and subsequently fail more often (Brown et al. 2018). To the best of my knowledge, none of the previous studies have addressed the individual's risk-loving preference in the area of consumer finance. It is surprising given the pervasiveness of the payday borrowing and the high risk embedded.

To test the relationship between risk preference and payday borrowing, I use the data from the NFCS state-by-state survey supported by Financial Industry Regulatory Authority (FINRA). The data covers the years of 2009, 2012, 2015 and 2018 with over 108,310 participating individuals. The survey provides information on how much risk an individual is willing to take. Based on this variable, I develop

¹ Press Releases, US Department of Justice, U.S. Attorney's office Southern District of New York, Jan-15, 2020

another variable for the risk-loving preference that incorporates the irrationality of accepting low return with high risk. My empirical result shows a strong and positive relationship between payday borrowing and risk-loving preference. In a preliminary univariate analysis, a payday borrower is 7 times more likely to be a risk-lover compared to a non-borrower. In a multivariate analysis that controls for financial distress, financial literacy, overconfidence and a series of demographic features, the positive relation stays quite strong.

Consistent with previous studies, I find that payday borrowing is more prevalent among people who are young, less-educated, low-income, and male. Also, payday borrowing is 6 times more active among military servicemen compared to civilians. Among all the control factors, overspending problem, lack of financial literacy, and severe financial distress are the primary determinants affecting payday borrowing across specifications. For robustness test, I apply a 1-to-1 matching method for univariate tests and also a propensity-score matching method for multivariate tests. For both methods, the matching criteria include state location and the control variables proved significant in the previous testing. The main result stands robust after the matching.

Agarwal, Skiba, and Tobacman (2009) suggest that a payday loan can be mistakenly taken, when the borrower has not fully exploited their credit limit. Accordingly, had more credits are explored and used, their payday borrowing would be avoided. In contrast, my data shows that the majority of payday borrowers are more active in credit card shopping, and they have experienced at least one of the credit limitations reflected in cash withdrawal from credit card, paying late credit card fees, or spend over credit limit. Therefore, payday borrowing appears to be the last resort after all credit options run out, instead of a wrongful decision when credits are still available.

Moreover, I test other costly alternative financial services (AFS) in the debt consumer's market. These services are pawn loans, rent-to-own, title loans, etc. and like payday loans, they provide customers short-term cash with high cost and high risk. I find that the risk preference also determines the usage of these AFS. In addition, I find that the use of other AFS is positively associated with payday borrowing, while several studies in the past suggest the opposite. They find that when payday borrowing is limited, the

use of other AFS increases (Bhutta, Goldin and Homonoff 2016; Kirsch, Mayer and Silber 2014; Edmiston 2011). However, I do not find such substitution effect within my data. Instead, payday borrowers are more likely to use other AFS. To test the robustness, I run a two-stage model to develop an estimate of AFS usage in isolation of financial distress, literacy, overspending, etc. The idiosyncratic AFS variables still increase with payday borrowing. This result suggests that when a person needs cash desperately, he/she is likely to explore all possible services, rather than choosing one over another.

The contribution of this paper has several folds. First, to the best of my knowledge, the paper is the first to study risk preference as a determinant of alternative financial services with payday loan as the focus. The result supports the notion that noncognitive bias plays an important role in debt consumptions, and the choice of payday loan is a reflection of the risk-loving nature. It also expands the studies of behavioral finance, which previously focused on the investment behavior and corporate governance. Second, it provides quantitative support on the joint effects of risk-preference, financial distress, financial literacy, overconfidence, and demographic features in terms of affecting payday borrowing. I am the first to conduct a rat race in the same testing experiment and outline the magnitude of the effect of each factor. Moreover, I show evidence that payday loans are not a substitute for other AFS. They both are subject to the same income effect that drives up liquidity needs. I am able to identify some of the common determinants, which primarily include risk preference, along with overspending problems, financial distress, financial literacy, etc.

The implication of my research is also profound. While regulators are weighing various factors that sustain the payday market, the risk preference of debt consumers should be recognized. The addiction to risk should be viewed as similar as the addiction to liquor, tobacco, and drugs, which are naturally implanted in human genes and cannot be eradicated by external forces. While risk addiction can be found among lottery buyers and casino gamblers, it can also be found among payday borrowers. To prevent such irrationality damaging financial consumers themselves, regulators can take lessons from the other industries that constantly consume and exploit human addictions. For example, in the tobacco industry, cigarettes must be packaged with warning signs of health risks. Perhaps, it would also be helpful to package payday

loans with outright warnings of the risks of personal bankruptcy, unpleasant debt collectors, and arrest/imprisonment in the event of default. State regulators could also issue, and mandate the distribution of, the statistics of frauds and complaints in the payday industry in the process of loan application. The rest lies in the hands of free choice.

The rest of the paper is organized as the following: Section 2 provides background introduction, literature review, and hypothesis development. Section 3 explains the data, variables, and methodology. Section 4 tests the effect of risk preference on payday borrowing. Section 5 examines the substitution effect of payday borrowing on other costly financial services. Section 6 concludes.

2. Background, Literature Review, and Hypothesis Development

2.1 Development of payday industry

The payday industry grows large since the 1990s', when the banks in the US reduced issuing small cash loans and left the opportunities to the payday industry. On the demand side, as many as 12 million Americans use payday loan service each year and one-third of young Americans consider using it². Nowadays there are over 23,000 payday lending shops in the United States. Economically, the payday market is quite competitive for the lenders to earn handsome profit, despite the high interest/fees they charge and the aggressive selling tactics they deploy. The net profit margin on average is only at 7.63% (Huckstep 2007, Wilcox 2014). The largest payday lender, *Advance America*, barely makes 10% of net profit margin, compared to 20% for Wells Fargo, a commercial bank during the same years. The payday lenders must face high default risk from borrowers who are unable to repay the loans. Their charge-offs or doubtful accounts can reach as high as 17% of revenue for storefront shops and 44% for online platform, according to the financial statements of *Advance America*. Therefore, a higher interest must be charged as a compensation for the potential losses.

² "Here's why 1 in 3 college-age Americans consider payday loans with interest rates of 400%", CNBC Report Aug 1 2018

2.2 Scholarly views on payday loans

Evidence suggests that payday loans help alleviate borrowers' short-term cash problems. Morse (2011) studies the housing foreclosures following natural disaster in California and finds that payday loans can mitigate the foreclosures, as well as monetary crimes such as larcenies. He suggests payday loans do satisfy the cash needs in borrowers' dire moments. Morgan and Strain (2012) conduct an event study on the ban of payday loans in Georgia and North Carolina, they find that after the ban, households are more likely to have bounced checks, complain about other lenders and have issues with debt collectors. Several studies also find that when payday credit is not available, borrowers shift to other high cost services such as pawn shop loans (Bhutta, Goldin and Homonoff 2016; Kirsch, Mayer and Silber 2014; Edmiston 2011). These studies suggest that payday loans do have a unique place in the product market of cash loans. Moreover, payday loans may not necessarily cause credit delinquency, as Bhutta (2014) finds the effects of payday borrowing on credit scores and delinquency close to zero. Desai and Elliehausen (2017) also suggest that payday lending may actually help reduce delinquencies on mainstream credit products.

However, when measuring the long-term effect of payday loans, many studies find that payday credit exacerbates consumers' financial wellbeing. As some state regulator announces, payday loans are "not intended to meet long term financial needs"³. Indeed, Melzer (2011) claim that the debt burden posed by payday credits takes a great toll to low-income households and causes them to fall behind paying important bills such as mortgage, rent and utilities. In the study of Stegman (2007), a payday consumer is four times more likely to have filed bankruptcy than the entire adult population. Studying the UK market, Gathergood et al (2019) find similar results. They show payday loans only help in short-lived liquidity needs but in the long run cause more defaults and bank overdrafts of the borrowers. Stegman and Farris (2003) argue that the success of payday lenders is built on unethical debt traps. By setting perpetual indebtedness, the lenders usually convert occasional borrowers into chronic ones. Skiba and Tobacman (2019) also show that payday loans deteriorate the cash positions of borrowers and increase the likelihood

³ Indiana Small Loan Law, July 2018

of personal bankruptcy, especially for first-time borrowers. Accordingly, if payday loans are banned, the long-term financial wellbeing could be significantly improved (Morgan, Strain and Seblani, 2012).

Regarding the effect of payday loans on personal bankruptcy, several other scholars hold a different view. Using county-level data, Hynes (2012) show that after payday lending is legalized, bankruptcy filings actually fall in counties with large military communities, given that military servicemen are more likely to be payday borrowers. Martin and Tong (2009) argue that bankruptcy may not truly reflect the economic effect of payday credit, because bankruptcy is usually filed by middle class who holds certain level of assets and can afford a bankruptcy lawyer, while payday borrowers are not the same. These arguments put the negative effect of payday loan even more elusive.

2.3 Riskiness in Payday Loans

The purpose of this paper is not to reconcile the debates on the negativity of payday loans, but rather to address the riskiness in the industry. Regardless of whether the expected outcome of payday borrowing is positive or negative, a payday loan is certainly one of the riskiest financial products for debt consumers.

The extremely high interest and service fees charged by payday lenders classify the loans as usury, which is not allowed in most of the states by law. To avoid regulations, many payday lenders collaborate with native American tribes, who are exempted from the laws, to practice lending. In reality, these payday loan companies are neither controlled nor owned by the tribe members, but rather are “a scheme to exploit sovereign immunity and skirt federal and state lending laws”⁴.

By taking out payday loans, borrowers expose themselves to unethical and harmful practices of the lenders. One type of risks is related to information asymmetry, as a payday contract often includes all kinds of hidden fees.⁵ Among them, steep penalty fees and debt rollover can cause quite damage to borrowers,

⁴ “Why Are Online Payday Lenders Getting Sued?” ClassAction.org Website, October 2017

⁵ The Truth About Payday Loans, Website of Illinois Attorney General, 2020

and oftentimes can lead to the closure of borrowers' bank accounts. However, borrowers usually are not fully aware of these clauses when making applications. Had such information disclosed upfront, consumers would think less narrowly about their financial cost and could hence reduce borrowing by 11% (Bertrand and Morse 2011).

Table 1 presents various complaints about payday practice. Panel A shows the number of complaints for each category according to the Consumer Financial Protection Bureau (CFPB) report. The most concentrated area is that payday lenders charge incorrect and unexpected fees. Another problem is that when borrowers realize the problem, the lender disappears. Moreover, the bureau reports that some customers never received their loans, while some others continued to bear unauthorized charges after their loans were paid off. Panel B reports the results of a survey conducted by Pew Trust on payday borrowers. It shows the ratio of payday borrowers who have experienced lender malpractice. In the survey, a surprisingly significant portion of the consumer body has experienced at least one of the fraudulent practices. The top-ranking malpractice is "lender withdraw causing borrowers' overdrafting problem" with almost half of the respondents having experienced it. The second problem is related to illegal disclosure of borrowers' personal information and 39% of the borrowers had this problem. It is also one of the biggest problems in the CFPB complaint filing in Panel A. All other problems include withdrawal not toward principal (31%), unauthorized withdrawals (32%), loss of bank account due to payday loans (22%)⁶, receiving a loan without application (20%), unknown debt (32%), and threats to borrowers (30%).

<Insert Table 1 here>

Another risk for payday borrowers happens when they fall behind in loan repayments. For example, to collect the payments, lenders can threat to contact borrowers' employer, family or friends; they can also threat to arrest borrowers through legal means. In many cases, the threats turn into real actions that cause

⁶ Campbell et al. (2012) also find that access to payday credit is highly correlated with closing of bank account of borrowers

damages in borrowers' reputation, job opportunities, and even imprisonment. In the state of Utah, almost 70% of small-claims court hearings involved high-cost lenders. About 3 in every 10 cases result in borrowers being issued a warrant, and "people are definitely going to jail", according to the director of Consumer Federation of America⁷.

In addition to the risks of personal bankruptcy and legal suits, payday borrowers often find their health negatively affected by payday loans. For example, health. Cuffe and Gibbs (2017) find that payday access is positively related to liquor purchases. Sweet, Kuzawa and McDade (2018) also suggest that payday lending is connected to health risk such as anxiety, inflammation and several bad physical conditions. Eisenberg-Guyot et al (2018) find that the health condition of payday borrower is 38% poorer than non-borrowers. Furthermore, in a study of military personnel, Carrell and Zinman (2014) find that payday borrowing also leads to significant decline in job performance, especially for the financially unsophisticated ones.

2.4 Human Risk Preference

Human risk preference can be tested in a simple economic experiment. In Slovic and Lichtenstein (1968), a human subject faces two choices: (a) to receive \$50 for certain or (b) to receive \$100 or \$0 with equal chance. While the expected payoffs are the same, option (b) implies more variation of outcome. An individual who chooses (b) is risk-loving, whereas an individual who chooses (a) is risk-averse.

The rational investors in the financial market generally have a risk averse attitude. When the risk in an investment is higher, the investors would require higher return as a compensation for the risk. As a result, a riskier asset often yields higher return. For example, a corporate bond always yields higher than treasury bond with the same terms. While risk is viewed as a negativity by rational financiers, still many individuals have a favorable bias toward risk and are willing to bear the adverse consequence of it. In a study of neural science, Kuhnen and Knutson (2005) show that the uncertainty of financial outcome triggers

⁷ "How falling behind on a payday loan can lead to an arrest warrant", CNBC Report Feb-22 2020

human's anticipatory neural mechanism, and for some individuals it activates the generation of nucleus accumbens, which leads them to choose a worse payoff combined with high risk. This finding suggests that there are always risk-loving individuals and that their risk attitude leads to wrongful financial decisions. The risk lovers can mostly be found among the gamblers in casinos, who expect long-time losses but are still attracted to the riskiness. To them, risk appears to be an entertainment that compels them to consume money (Blalock et al. 2007).

In the studies of behavioral finance, the risk-loving preference is also proved to be detrimental. Hvide and Panos (2014) find that more risk-tolerant entrepreneurs perform poorer than the risk-averse counterparts. They use the stock market participation and personal debt as proxies for risk preference, under the premise that such activities induce risky financial situations and hence reflect a more risk-loving preference. Cain and McKeon (2016) study the relationship between CEO personal risk preference and firm policies. Using pilot-license as the proxy for risk-loving, they find that the pilot CEOs are more likely to implement risky corporate policies and that the equity returns of their firms are more volatile. Similarly, Bernile et al (2017) find that CEOs, who are desensitized with the negativity of risk, would lead their companies in more aggressive ways and eventually put their firms into riskier situation with higher cost of capital. Brown et al (2018) also show that Hedge fund managers who are naturally risk-loving tend to invest in lottery-like stocks, underperform their peers, and fail more often. Based on these studies, I argue that the risk-loving preference would be similarly detrimental to consumer's financing choice such as payday loans. Therefore, I develop my first testing hypothesis:

H1a. Payday borrowing is positively (negatively) related with the risk-loving (risk-averse) preference

H1o. Payday borrowing is unrelated with risk preferences

2.5 Other determinants of payday borrowing

To test the effect of risk preference on payday borrowing, it is important to control another psychological bias factor - overconfidence. Brad and Barber (2001) find that in securities trading,

overconfident individuals, predominately males, trade too excessively and hence suffer more transaction costs and lower returns. Likewise, a debt consumer could be overconfident about their repaying ability and hence overload himself with debt burden. Using the NFCS data, Robb et al. (2015) show that overconfident individuals are more likely to use high-cost alternative financing services, such as payday loans. Bertrand and Morse (2011) find that if the overconfidence is debiased, the amount of payday borrowing would be subsequently reduced.

Another determinant of payday borrowing is financial literacy. When debt consumers are not equipped with sufficient financial knowledge, they tend to make bad decisions such as payday loans. Lusardi and Scheresberg (2013) and Kim and Lee (2018) show that financial literacy and education are important factors that prevent taking payday loans.

Moreover, many studies on payday credit focus on the military communities, as serving personnel are often found to be popular targets for payday lenders, because most of the men and women in service are (a) young with fewer financial resources, which creates demand for credit, and (b) more disciplined to pay back (Graves and Peterson 2005), suggesting lower default cost for lenders. Therefore, I also control the military status of the survey respondents in my study.

2.6 Other Alternative financial services (AFS)

In addition to payday loans, debt consumers seeking short-term cash can use other alternative financial services (AFS). For example, credit card company offers cash withdrawal services to their users; banks allow customers to overdraw cash from their accounts; pension funds allow customers to withdraw from their retirement plan. Some other services are just like payday loans, with a storefront or an online platform and a similar style of operation. These services include rent-to-own shops, title loans and pawn shops. Overall, these AFS can be even more costly than payday loans in short-run. For example, a \$100 withdrawal from one's 401k account incurs an effective tax of over \$40, whereas a \$100 payday loan with 390% APR charges only \$14 for two weeks. Since these financial services could likewise endanger the

long-term financial health of the consumers. Therefore, I expect the risk preference of the consumers plays an important role in the usage of these services.

H2a: Usage of AFS is positively (negatively) related to risk-loving (risk-averse) preference

H2o: Usage of AFS is unrelated with risk preference

Using an event study method, scholars show that payday loans function as a substitute of other AFS. For example, Zinman (2010) studies the ban of payday borrowing in the state of Oregon and finds that after the ban, former payday borrowers seek inferior substitutes: bank overdrafts and late bill payment. Accordingly, banks charge more for overdrafting fees and profit more when payday loan service is not available (Morgan et al, 2012; Melzer and Morgan, 2015). Bhutta et al (2016) find that when payday loans are reduced by regulations, debt consumers shift to other costly financial services such as pawnshops, rent-to-own loans for the needed credit. Carter (2015) also suggests there may be complementary relationship between payday loans and pawnshop usage.

While payday loans and other AFS satisfy the same cash needs, there is a question still unanswered: at the individual level, does a debt consumer use payday loans as a replacement of other services? Or are both the payday loans and the other services under the same income effect related to their cash needs? To answer this question, I develop two opposing hypotheses.

Substitution effect hypothesis: H3A. Payday borrowing is negatively associated with usage of other AFS for individual consumers

Income effect hypothesis: H3B. Payday borrowing is positively associated with the usage of other AFS for individual consumers

3. Data and variables

3.1 Data Source

My testing data is from the 2009, 2012, 2015 and 2018 waves of state-by-state survey from National Financial Capability Study (NFSC) sponsored by Financial Industry Regulatory Authority (FINRA)

Investor Education Foundation. The surveys of different waves take a standard format with a few adjustments. The total number of participants in the surveys is 108,310, with roughly 500 from each state for each wave, including the District of Columbia. Slight differences exist in variable definition between the waves. For example, the 2009 wave does not contain information on military service status of its respondents. Also, this wave reports payday lending with a *Yes or No* binary output, whereas other waves report numerical frequency of payday loans.

3.2 Sample distribution

Table 2 reports the distribution of my samples. Panel A presents the ratio of payday borrowers by state. The state of Nevada has the highest rate of payday borrowing at 19.6%, while New Hampshire is the lowest at 5.2%. On average, 12.2% of the sample population has experienced payday borrowing. Based on the data, Figure 1 maps the ratio of payday borrowing for each state across USA.

<Insert Figure 1 Here>

The panel also reports different state laws regulating the payday industry, based on the information from Consumer Federation of America (CFA)⁸. In 32 states, such as Texas or Florida, high-cost payday lending is allowed. These states either authorize payday lending without interest caps, or their state usury law has loopholes and fails to prohibit payday lending. In several other states, the interest of payday lending is capped with certain limit. For example, the state Montana limits the annual lending rate up to 36%. Although some states such as New York prohibited payday loans, still the borrowing is very prevalent. The reason is that many payday lenders are using internet platforms, instead of a physical store front, to attract borrowers nationwide. These online lenders are either established in a state with loose regulation, or are operated under a Native American tribe, who has the sovereign immunity from federal laws.

⁸ Source: Payday Loan Consumer Information by Consumer Federation of America.

Panel B of Table 2 reports the samples segregated by different demographic features. Judged by marital status, the ratio of payday borrowers is high among individuals who are separated or single, and low among the married and widowed. There are also more males than females that borrow payday loans but the difference in ratio is not large. Consistent with the literature, payday borrowing is more concentrated among people with lower age, lower income, and lower education. For example, the ratio of payday borrowing is highest for people between 25 to 34, making \$15,000-\$35,000 annual income, and people who have not completed high school. While many studies focus on the payday borrowing activity of US military personnel, my data shows that 61.4% of current US military members have borrowed payday loans, compared to 12.6% of previous members and 11.9% of other civilians. Figure 2 graphically presents the results of this panel.

<Insert Figure 2 Here>

Panel C presents the ratio of payday borrowers under different types of financial distress. A distress situation can be late mortgage payment, paying credit card late fee, a large drop in income, or unpaid medical bills. A distress situation can also lead individuals to seek other costly financing options such as cash withdrawal from credit card, etc. The panel shows that when an individual is under distress, he/she is more likely to borrow payday loans. In group 2 of the panel for example, 50.8% of the people who have withdrawn from their retirement funds have borrowed payday loans, compared to 7.3% for people that did not withdraw. In group 5, for people who fell behind in mortgage payment, 34.2% are payday borrowers, compared to 3.8% of the regular mortgage payers.

The study of Agarwal et al. (2009) shows that payday borrowers are not active seeking more credit lines while they are still qualified. This statement is somewhat contradicted in my result in group 10, where I use credit card shopping as a proxy for distress. The ratio of payday borrower is 13.1% for credit shoppers, compared to 8.2% for non-shoppers. Among the payday borrowers, nearly half (or $\frac{3776}{3776+4062}$) are shopping for more credit cards, while only 37% of the total population do the shopping. It shows that payday

borrowers are indeed more active in extending their credit lines. In an unreported analysis, over 78% of the payday borrowers have experienced at least one of the following credit problems: cash withdrawal from credit card, pay late fees, or spend over credit limits. To the majority of the sample respondents, a payday loan appears to be the last resort when all credit options are run out, rather than a wrongful decision when credits are still available.

Figure 3 shows the ratio of payday borrowers across different types of distress. For the groups under different types of financial distress, payday ratio is much higher compared to the groups under no distress.

<Insert Figure 3 Here>

Panel D shows the level of financial literacy across groups. The NFCS survey asks quiz-like questions on different financial subjects in mortgage, bond, risk, inflation, and time value of money. For example, for the bond question, the survey asks whether bond price and interest rate are inversely related. Among the people answered it correctly, 9% are payday borrowers, compared to 16% among the people who answered incorrectly. While a correct answer is an indicator of financial literacy, lack of literacy is usually associated with higher percentage of payday borrowing.

3.3 Variables

Because the survey asks only multiple-choice questions, the variables developed in this study are either dummy variables or discrete variables. Table 4 shows the statistics of these variables. For the variable of payday borrowing, there is a dummy variable that separate borrowers from non-borrowers; there is also a discrete variable that indicates the number of payday loans borrowed. According to the survey, if more than 4 loans are borrowed, the variable takes the value of 4.

To test the effect of risk on payday borrowing, I develop two variables: One is *Risk-taking willingness* directly from the survey data; the other is risk-loving preference that incorporates irrationality. The survey asks how willingly the respondents are to take risks, with the answer ranging from 1 to 10. The

average of this variable is 4.81, indicating the population has a mild attitude toward risks. A risk-taking individual would still be considered rational if high risk is associated with high return. On the other hand, a risk-loving individual is irrational, and bears the harmful consequence for taking the risk. To develop the risk-loving variable, I incorporate one financial literacy variable related to the riskiness. In particular, the survey asks the respondents whether mutual fund is riskier than stocks. While the reality proves that stocks are riskier, still 15% of respondents answer it wrong. Among these illiterate individuals, the ones who preference higher risk would invest in mutual funds instead of stocks, and therefore, and therefore would receive a lower return. The high-risk perception, combined with a low counterfactual return, defines the risk-loving preference in my study. It is a dummy variable that takes the value of 1, if *Risk-taking wiliness* is greater than 7 and *Understanding risk of stocks and mutual funds* is 0.

Financial distress score: Financial hardship is the primary reason for an individual's cash needs. To construct the distress score, I incorporate four hardship indicators from the survey: a large income-drop in the recent past, falling behind in mortgage payment, having unpaid medical bills, and paying late fees for credit card. The statistics of the four variables are also in Table 3. The mean for *Large income drop* is 0.28, indicating 28% of Americans have experienced this difficulty, given that the survey started right after the financial crisis of 2008. The means of other variables range from 17% to 23%. For each individual, *Financial distress score* is the number of hardships that actually happened, scaled by the number of hardship questions answered in the survey. Table 3 Panel A shows that the discrete variable takes an average of 0.17, indicating that most of the Americans have experienced one out of the four hardships.

Financial literacy score: In total, the survey asks 6 questions related to financial knowledge. For each individual, the literacy score is the number of correct answers scaled by the number of questions answered. Table 3 Panel A shows the average of this score is 0.68, indicating the survey population roughly answer 2 questions correctly out of every 3 questions.

Overconfidence: In Robb et al (2015), overconfident individuals are the ones with high self-evaluation of financial skills, but are actually low on financial literacy. Following their method, I define my

Overconfidence dummy variable as 1, if the value of *Self-belief on one's finance skill* is greater than 6 (its average is 5.74), and the value of *Financial literacy score* is less than 0.5; and 0 otherwise.

Overspending is the self-perception of one's spending behavior from the survey. It takes the value of 1 if the respondent thinks he has overspending problem, and 0 otherwise.

The table also shows variables related to the usage of other AFS. For example, 11% of the respondents have withdrawn cash from their credit card services; 21% of the population have overdrawn cash from bank account; 37% have actively shopping for more credit cards.

Panel B of Table 3 presents the correlation matrix of the major variables. As expected, *Payday borrowing* is positively correlated with *Financial distress core*, *Risk-taking willingness*, *Overspending*, and *Overconfidence*, and is negatively correlated with *Age*, *Education*, *Income*, and *Financial literacy score*. *Risk-taking willingness* is positively related to education and income levels, but negatively related with *Gender* and *Age*. It shows that young and male individuals are more willing to take risk, and so are the people with higher income and higher education.

3.3 Methodology

To test the effect of risk preference on payday borrowing, I run probit regression with the dependent variable as the dummy variable of payday borrowing. The independent variables include risk preference, financial distress, financial literacy, overconfidence, overspending, along with a number of demographic characteristics such as age, income, education, gender and military status. The regression model is listed in Equation (1) as below:

$$\text{Probit}(\text{Payday borrowing}) = \alpha + \beta_1 \text{risk preference} + \beta_2 \text{financial distress} + \beta_3 \text{financial literacy} + \beta_4 \text{overconfidence} + \beta_5 \text{overspending} + \gamma_i \text{Control}_i \quad \text{Equation (1)}$$

I also run Tobit model with the frequency of payday loans as the dependent variable. Other specifications are the same with Equation (1)

Tobit(Frequency of payday loans)

$$= \alpha + \beta_1 \text{risk preference} + \beta_2 \text{financial distress} + \beta_3 \text{financial literacy} \\ + \beta_4 \text{overconfidence} + \beta_5 \text{overspending} + \gamma_i \text{Control}_i$$

$$(0 \leq \text{Frequency of payday loans} \leq 4) \quad \text{Equation (2)}$$

To test my second hypothesis that risk preference affects usage of other AFS, I change the dependent variable of the Equation (1) to a dummy variable of another financial service.

$$\text{Probit}(AFS) = \alpha + \beta_1 \text{risk preference} + \beta_2 \text{financial distress} + \beta_3 \text{financial literacy} + \\ \beta_4 \text{overconfidence} + \beta_5 \text{overspending} + \gamma_i \text{Control}_i + \varepsilon \quad \text{Equation (3)}$$

Based on the prediction in Equation (3), I calculate the idiosyncratic value of the dependent variable as the actual value minus the predicted value, listed in Equation (4).

$$\varepsilon = \text{idiosyncratic}(AFS) = AFS - \text{predicted}(AFS) \quad \text{Equation (4)}$$

To test the substitution effect of payday borrowing on other AFS, I regress payday borrowing on the idiosyncratic value of other AFS along with other control variables, as shown in Equation (5):

$$\text{Probit}(\text{Payday borrowing}) = \alpha + \beta_1 \text{idiosyncratic}(AFS) + \beta_2 \text{risk preference} + \\ \beta_3 \text{financial distress} + \beta_4 \text{financial literacy} + \beta_5 \text{overconfidence} + \beta_6 \text{overspending} + \\ \gamma_i \text{Control}_i \quad \text{Equation (5)}$$

4. Empirical Results

4.1. Univariate analysis by group

Table 5 provides the univariate analysis results for the pooled samples. I compare both mean and median of the groups separated either by payday borrowing or by risk preference, and then test their differences using pooled t-test and Wilcoxon rank-sum test. The result in Panel A shows that payday borrowers are significantly more willing to take risks, and their risk-loving preference is also stronger. The mean of *Risk-loving preference* is 0.166 for borrowers and 0.024 for non-borrowers. It indicates that borrowers are 7 times more likely to have the risk-loving preference. Although both groups have a 0 median for the risk preference due to much smaller sample of risk-lovers, the difference in median (borrowers minus non-borrowers) is quite positive and significant, as shown by the Wilcoxon test results for sign ranking. Compared to non-borrowers, payday borrowers are also more overconfident, more likely to overspend money, twice more likely to be under financial distress, and less literate in financial knowledge. Consistent with the literature, payday borrowers tend to be younger, less educated, with less income, and more likely to be male. Notably, a payday borrower is 10 times more likely to be found in military than in civilian population.

In Panel B, the full sample is divided by risk preference. The mean of *Payday borrowing* is 0.477 for risk-lovers and 0.102 for risk-averse individuals. It indicates that risk-lovers are 4 times more likely to take payday loans compared to risk-averse group, which is consistent with my hypothesis. Moreover, like payday borrowers, risk-lovers are more likely to be male and more overconfident, overspend more, and 20 times more likely to be in military service. However, a risk-lover tends to be more educated, with higher income. This result is opposite to that for payday borrowers.

4.2. Regression analysis of payday borrowing

Table 6 shows the regression results of payday borrowing on risk preference. In Panel A, the dependent variable is the dummy variable, whereas in Panel B it is the number of payday loans. Since my data limits the number of loans up to 4, I run a Tobit model that limits the variation the dependent variable with a range from 0 to 4. Across different specifications in both Panels, the coefficients of all independent variables appear to be significant both economically and statistically.

In Panel A, the coefficient of *Risk-taking willingness* is 0.042 in Column (1). When the willingness increases by 1 or 10%, the probability of taking payday loans increases by 4.2%. Compared to the most conservative risk-takers (variable value=1), the most aggressive risk-takers (variable value=10) is 38% or $4.2\% \times (10-1)$ more likely to take payday loans. In Column (2), the coefficient of *Risk-loving preference* is 0.58. It shows that a risk-loving individual is 58% more likely to take payday loans than a risk-averse individual. From Column (3), if the *Financial Distress Score* increases by 0.1 or 10%, the probability of payday borrowing increases by 11.42%. Given that this variable can only take a value from 0 to 1, such magnitude of coefficient is quite large. The same significance can be found in *Financial literacy score*, except that the sign of coefficient is negative as expected. *Overconfidence* is positively related to payday borrowing, but not when *Financial literacy score* is controlled.

Among the demographic features, military status is the most impactful factor. According to Column (3), a current military member is 85% more likely to borrow payday loans, compared to other civilians. This effect is much more pronounced, compared to the effects of education level, age level, income level, and gender. It is also worth mentioning that the effect of *Overspending* is quite consistent across specifications. An individual with overspending problem is roughly 25% more likely to borrow payday loans. Panel B presents the same qualitative results. Overall, the results suggest that risk-taking willingness and risk-loving preference of individuals plays an important role in their payday borrowing, when all other necessary factors are considered.

4.3. Comparison of matched samples

Since both risk preference and payday borrowing can be determined by some same characteristics, the previous test is subject to an endogeneity problem. To tackle the issue and to make a cleaner comparison, I match each payday borrower with a non-borrower by financial distress, financial literacy and a number of demographic features, and then compare the risk preference across the two groups. To best preserve observations through the matching process, I loosen the matching criteria for education, age, and income. For example, NFCS data reports 8 levels of income. Instead of matching by the NFCS levels, I divide the

observations into 3 larger groups with cutoff points at \$25,000 and \$75,000 for low, middle, and high-income groups, and then match the samples within the same group. The same method is applied for matching education and age. To match *Financial literacy score*, I divide the scores into 4 groups with cutoff points at 0.25, 0.5, and 0.75 and then match the samples within the same score group instead of matching by exact score. The same method is applied for matching *Financial distress score*.

Panel A of Table 7 shows the difference between payday borrowers and paired non-borrowers. Each pair is matched by gender, education group, age group, income group, and military status. Each pair is also in the same literacy score group and distress score group. Out of 13,185 payday borrowers, 8,350 are matched with non-borrowers. Some payday borrowers are matched with more than 1 non-borrowers. To ensure a 1-to-1 match, I select the non-borrower with the nearest distress score. The matching process effectively reduces the differences in all factors for the two groups. For example, the difference in distress score is 0.012, or 3% of the average score of non-borrowers, whereas in previous Table 5 Panel A the difference was 0.293, or 136% of non-borrowers' average.

After matching, payday borrowers still appear to be more willing to take risks and are twice more likely to be risk-lovers. However, the difference in overconfidence diminishes and turns opposite after matching, suggesting that payday borrowers are less overconfident compared to matched non-borrowers in the similar conditions. This result shows the effect of overconfidence on payday borrowing is limited, after financial distress, literacy, and demographic features are considered.

Panel B reports the difference between risk-lovers and risk-averse individuals matched by the same criteria. In addition, the two groups are matched with *Overconfidence*, based on that overconfident borrowers are more likely to have irrational bias of risk preference and that it is necessary to de-bias this factor. For each risk lover with more than one matches, I select the match with the nearest literacy score. The procedure covers 1,624 risk lovers out of the 3,755. The result shows that 29.2% of the risk-lovers are payday borrowers, compared to 19.3% of the risk-averse individuals. Consistent with my hypothesis, a risk lover is more likely to borrow payday loans. Moreover, in both panels of Table 7, *Overspending* is quite

different across groups. No matter for payday borrowers or for risk-lovers, they all have the overspending problem.

4.4. Propensity score matching analysis

The matching method above does not completely eliminate the statistical difference between the groups. Therefore, better approach is needed to solve the endogeneity problem. To this end, I apply propensity score matching analysis. The process is conducted in several steps and the result of each step is shown in the panels of Table 8. In particular, Panel A shows the Logistics regression results when risk preference is set as the dependent variable and run against all the control variables. Based on the regression result, a propensity score is signed for each observation. I then match the risk-loving observations with the risk-averse ones based on the scores. Panel B shows that the matching process produces 3,678 matched controls to the risk-lovers on a 1-to-1 matching basis. The difference in payday borrowing between treat group and control group is still pronounced after the matching, although its economic and statistical significance is reduced. Panel C shows the difference between treated (risk-loving) and control (risk-averse) in the dimensions of financial literacy, financial distress, overconfidence, overspending and many other demographic features. The difference in these variables are eliminated from the statistical standpoint, a much improvement compared to the result in Table 7. At last, Panel D shows the result of Probit regression result of payday borrowing on the treated dummy along with other controls. My result still stands robust.

5. Other Alternative Financial Services

5.1 The effect of risk preference

This section tests the effect of individual risk preference on the consumption of alternative financial services (AFS) other than payday loans. Some of the AFS are run by well-established institutions under strict regulations. These AFS could be cash withdrawal from credit card, withdrawal from retirement fund, and bank account overdraw, offered by either commercial banks, credit card companies, or pension funds. The other type of AFS is like payday loans. They include pawn shops, rent-to-own stores, advance tax

refund shops, title loan stores, all of which often involve fraudulent practices, hidden cost, and legal risk. Both types of the AFS charge high fees for providing liquidity to customers and therefore, potentially put the consumers' financial well-being at risk.

Table 9 shows the regression results with the usage of AFS as dependent variable and risk preference as the test variable. The results are similar to that of payday loans. A risk-loving individual is much more likely to choose these services and all other control variables have the same expected sign and are both economically and statistically significant.

5.2 Substitution effect of payday loans

To test whether payday loan is a substitute for the other AFS, I regress *Payday borrowing* on each of AFS with all the control variables. Since both payday borrowing and the other services can be predicted by the common control variables such as financial distress, an endogeneity problem needs to be solved in the regression. To measure the AFS, I develop the idiosyncratic version of the AFS variables, as the difference between the actual value and the predicted value. The predication model is based on Equation (3). Table 10 shows that the relationships between all other AFS and payday loans are positive and quite strong. When the usage of other AFS increases, payday borrowing also increases. The result rejects the substitution hypothesis that payday credit takes away the product market of other AFS. The result instead suggests an income effect that affects both payday borrowing and alternative financing. When an individual's financial situation deteriorates, payday loans appear similar to costly debt choices as a remedy for cash need.

6. Conclusion

While numerous studies debate on the usefulness of payday credit, either to justify or denounce its high interest cost, fewer have addressed the riskiness in the industry faced by financial consumers and how the risk preference of the consumers affects their decision to take payday credit. This paper shed a light on the literature in this route. Based on various sources of consumer complaints and federal reports, I show

that a payday borrower would face various kinds of risks that include but not limited to: hidden clauses, lenders' malpractice, personal bankruptcy, legal charges and imprisonment, etc. Despite all the risks, payday borrowing still grows rampantly across the country with no substantial drop in the borrowing cost. The phenomenon contradicts the conventional understanding that individuals require higher compensation for more risks. I argue that payday borrowers are not as rational as the general investors in the financial market. In particular, payday borrowers tend to be more willing to take the high risk while the expected payoff is quite negative.

The risk-loving preference is an irrational psychological bias that affects human decisions. In the literature of finance, risk-loving individuals, when act as CEOs of companies or hedge fund managers, often make risky decisions that financially harm their performances. My study shows the same effectiveness of risk-loving preference on consumer behaviors of taking payday credit. In particular, a risk-loving individual is more likely to take payday loans, and the higher their willingness to take risk, the more payday loans they would borrow. To the best of my knowledge, none of the studies on risk-preference sets a foot in the area of alternative financial services such as payday loans.

While payday borrowing usually happens within the population under financial distress and less literate in finance, it is necessary to isolate the effect from these factors for the test. To achieve this, not only do I set these factors as control variables in regression analysis, but also apply a 1-to-1 matching method and propensity score matching method. My results stay robust still. Moreover, consistent with the literature, I find that age, income, education, gender, and military status are all important determinants of payday borrowing. Moreover, for the variable of overconfidence, I find it having a significant effect for my pooled samples, but I do not find the same effect for matched samples.

Several studies show that payday credit is a substitute for other costly financial services, such as title loan, cash withdrawal from credit card, and bank account overdraw, etc. However, I find no such evidence in my dataset. Payday borrowing is found to increase with the usage of the other services across individuals. My analysis also controls for the state effect and the year effect, so it counts for any event shock related to payday practice such as a regulatory ban. Therefore, the other services are not great

alternatives for payday loans, but instead, they coexist under the effect by the same factors. These factors include overspending problems, financial distress, lack of financial literacy. Still, my predicting model of this test left much unexplained variation, indicating that there must be other factors that determine the use of costly financial services. These unknown factors can be explored in future research.

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Table 1. Reports on Risky and Fraudulent Payday Practices**Panel A. Risky and Harmful Payday Practices Reported by Consumers (Source: Pew Trust Survey⁹)**

Risky and harmful practice reported	% of respondents
Withdraw from account only to satisfy the financing fees, not toward principal	31%
Threats to arrest borrowers, contact employer, family or friend of borrowers	30%
Fraud and dissemination of personal information of borrowers	39%
Lender withdraw causing overdraft problems	46%
Unauthorized withdraw by lenders	32%
Received a loan or product you did not apply for or authorize	20%
Contacted about a debt you do not actually owe	32%
Caused Lost of bank account, either shut by bank or borrower	22%

Panel B. Nationwide Complaints about Payday Loans across Years Separated by Reporting Issue (Source: Consumer Financial Protection Bureau)

Payday Loan Issues	2013	2014	2015	2016	2017	2018	2019	2020
Received a loan never applied	33	280	276	237	148	94	100	43
Cannot contact lender	13	276	326	297	178	76	80	73
Cannot stop charges to bank account	18	143	149	154	83	85	96	33
Charge unexpected fees or wrong amount	120	898	722	770	542	513	386	187
Problematic report	0	0	0	0	47	74	65	42
Payment not credited to account	10	109	112	107	88	48	55	24
Struggling with payment	0	0	0	0	251	370	307	113
Problem with the payoff process at loan maturity	0	0	0	0	73	102	88	31
Never receive the money after loan approval	0	0	0	0	29	38	43	25
Other	0	0	0	0	6	5	1	6
Total	194	1706	1585	1565	1445	1405	1221	577

⁹ Fraud and Abuse Online: Harmful Practices in Internet Payday Lending, Report from the PEW Charitable Trusts, Oct 2014

Table 2. Sample Distribution**Panel A. Payday borrowers across state under different laws**

State	Number of Payday Borrowers	Total Survey Respondents	Percentage of Payday Borrowers	Law on Payday Lending by State
Nevada	411	2,096	19.6%	High-cost allowed
Oklahoma	379	2,080	18.2%	High-cost allowed
Texas	452	2,554	17.7%	High-cost allowed
Mississippi	360	2,061	17.5%	High-cost allowed
Alabama	358	2,061	17.4%	High-cost allowed
Louisiana	349	2,099	16.6%	High-cost allowed
Tennessee	339	2,064	16.4%	High-cost allowed
California	402	2,567	15.7%	High-cost allowed
Missouri	317	2,065	15.4%	High-cost allowed
Washington	427	2,827	15.1%	High-cost allowed
Florida	310	2,075	14.9%	High-cost allowed
South Carolina	310	2,101	14.8%	High-cost allowed
Kentucky	302	2,061	14.7%	High-cost allowed
Ohio	299	2,056	14.5%	High-cost allowed
Colorado	292	2,076	14.1%	High-cost allowed
Wyoming	267	1,932	13.8%	High-cost allowed
Virginia	283	2,075	13.6%	High-cost allowed
Kansas	282	2,083	13.5%	High-cost allowed
District of Columbia	260	1,928	13.5%	Payday law repealed
New York	335	2,572	13.0%	Prohibited
Idaho	265	2,076	12.8%	High-cost allowed
Illinois	325	2,584	12.6%	High-cost allowed
Indiana	258	2,073	12.4%	High-cost allowed
Georgia	256	2,078	12.3%	Prohibited
New Mexico	255	2,087	12.2%	High-cost allowed
Utah	253	2,117	12.0%	High-cost allowed
Michigan	248	2,079	11.9%	High-cost authorized
Oregon	334	2,822	11.8%	Lower cost permitted
South Dakota	224	1,954	11.5%	Max 36% APR
Wisconsin	235	2,060	11.4%	High-cost authorized
Maryland	234	2,065	11.3%	Never authorized
Arizona	234	2,079	11.3%	Authorized no more
Iowa	221	2,062	10.7%	High-cost allowed
Arkansas	218	2,095	10.4%	Max 17% APR
North Carolina	216	2,080	10.4%	Authorizing law expired
North Dakota	195	1,933	10.1%	High-cost allowed
Alaska	194	1,926	10.1%	High-cost allowed
Delaware	205	2,076	9.9%	High-cost allowed
Nebraska	203	2,056	9.9%	High-cost allowed

Montana	194	1,967	9.9%	Max 36% APR
Pennsylvania	179	2,085	8.6%	Never authorized
Rhode Island	174	2,095	8.3%	High-cost allowed
Connecticut	172	2,071	8.3%	Never authorized
Massachusetts	172	2,073	8.3%	Never authorized
New Jersey	172	2,100	8.2%	Prohibited
Minnesota	166	2,067	8.0%	High-cost allowed
West Virginia	151	2,077	7.3%	Never authorized
Hawaii	137	1,903	7.2%	High-cost allowed
Maine	140	2,081	6.7%	Lower cost permitted
Vermont	113	1,968	5.7%	Never authorized
New Hampshire	108	2,088	5.2%	Max 36% APR
Overall	13,185	108,310	12.2%	

Panel B. Payday borrowers by demography

By Marital Status	Borrower	Total	Borrower %
Married	6,142	59,640	10.30%
Single	4,624	30,122	15.35%
Separated	363	1,663	21.83%
Divorced	1,652	12,331	13.40%
Widowed/widower	404	4,554	8.87%

By Gender	Borrower	Total	Borrower %
Female	7,064	59,511	11.9%
Male	6,121	48,799	12.5%

By Age	Borrower	Total	Borrower %
18-24	1,881	11,711	16.1%
25-34	3,880	18,917	20.5%
35-44	3,044	18,797	16.2%
45-54	2,390	20,819	11.5%
55-64	1,356	19,100	7.1%
65+	634	18,966	3.3%

By Income	Borrower	Total	Borrower %
<\$15,000	1,867	13,175	14.2%
\$15,000 ~ \$25,000	2,056	12,197	16.9%
\$25,000 ~ \$35,000	2,043	12,263	16.7%
\$35,000 ~ \$50,000	2,289	16,221	14.1%
\$50,000 ~ \$75,000	2,326	21,170	11.0%
\$75,000 ~ \$100,000	1,451	13,986	10.4%
\$100,000 ~ \$150,000	847	12,493	6.8%
>\$150,000	306	6,805	4.5%

By Education	Borrower	Total	Borrower %
Did not complete high school	387	2,093	18.5%
High school graduate - GED or alternative credential	2,114	16,069	13.2%
High school graduate - regular diploma	1,791	13,512	13.3%
Some college, no degree	2,716	21,809	12.5%
Associate's degree	967	9,805	9.9%
Bachelor's degree	1,209	12,223	9.9%
Post graduate degree	614	7,290	8.4%
Overall	9,798	82,801	11.8%

By Military Service	Borrower	Total	% of Borrowers
Current member	990	1,613	61.4%
Previous member	1,226	9,696	12.6%
Never served	8,068	67,792	11.9%

Panel C. Payday borrowers by financial distress factors and financing activities

1. Withdraw cash from credit card				2. Withdraw from retirement			
	Borrowers	All	Borrower %		Borrowers	All	Borrower %
Distress	3,073	9,109	33.7%	Distress	1,834	3,608	50.8%
No distress	4,862	72,662	6.7%	No distress	2,710	37,028	7.3%
3. Bank account overdraw				4. Unpaid medical bill			
	Borrowers	All	Borrower %		Borrowers	All	Borrower %
Distress	5,911	20,614	28.7%	Distress	5,383	18,072	29.8%
No distress	4,584	76,874	6.0%	No distress	4,389	60,028	7.3%
5. Late in mortgage payment				6. Large income drop			
	Borrowers	All	Borrower %		Borrowers	All	Borrower %
Distress	1,794	5,246	34.2%	Distress	5,916	29,249	20.2%
No distress	969	25,324	3.8%	No distress	6,533	76,477	8.5%
7. Pay credit card late fee				8. Borrow against retirement			
	Borrowers	All	Borrower %		Borrowers	All	Borrower %
Distress	3,752	14,345	26.2%	Distress	1,840	4,229	43.5%
No distress	4,083	67,189	6.1%	No distress	2,017	35,110	5.7%
9. Spend over limit credit				10. Shopping for more credit cards			
	Borrowers	All	Borrower %		Borrowers	All	Borrower %
Distress	3,200	7,954	40.2%	Distress	3,776	28,749	13.1%
No distress	4,654	73,631	6.3%	No distress	4,062	49,249	8.2%

Panel D. Payday borrowers by financial literacy measures

Understanding time value of money			
	Borrowers	All	% of Borrowers
No	2,841	12,480	23%
Yes	8,094	83,479	10%

Understanding inflation			
	Borrowers	All	% of Borrowers
No	4,385	18,358	24%
Yes	5,455	68,121	8%

Understanding loan payment			
	Borrowers	All	% of Borrowers
No	5,005	44,811	11%
Yes	2,517	20,171	12%

Understanding riskiness of stock vs mutual fund			
	Borrowers	All	% of Borrowers
No	2,464	7,042	35%
Yes	3,312	38,864	9%

Understanding mortgage payment			
	Borrowers	All	% of Borrowers
No	2,642	22,014	12%
Yes	6,932	63,227	11%

Understanding bond pricing			
	Borrowers	All	% of Borrowers
No	5,654	35,766	16%
Yes	2,923	31,372	9%

Table 3. Definition of Variables

Variable	Definition
Payday borrowing	A dummy variable that equals 1 if a survey respondent has taken out payday loans over the past 5 years, and 0 otherwise
Frequency of payday loans	The number of payday loans taken over the past 5 years. If more than 4 loans were taken, the value is set at 4
Risk-taking willingness	The answer to the question "How willing are you to take risk". Its value ranges from 1 to 10, with "not at all" as 1 and "very willing" as 10
Risk-loving preference	A dummy variable if risk-taking willingness is greater than 7 and a respondent believes that mutual funds are riskier than stocks
Self-belief of one's finance skill	One's self-perception on how good he is at financial matters. A strong belief indicates a higher value of this variable and the highest value is 7
Financial distress score	The number of distress situations applied to a respondent's life, scaled by the number of distress-related questions he answered. The distress situations cover late mortgage payment, unpaid medical bills, late credit card fees, and large drop in household income
Financial literacy score	The ratio of correct answers to the questions related with financial knowledge. There are 6 questions in the NFCS survey covering time value of money, bond price, security riskiness, etc.
Overconfidence	A dummy variable that equals 1 if self-belief of one's finance skill is above 5 and financial literacy score is below 0.5; 0 otherwise
Overspending	A dummy variable that equals 1 if one's spending is more than his income and 0 otherwise
Gender	A dummy variable that equals 1 for male and 0 for female
Military service	A dummy variable that equals 1 if the respondent is a current military service member and 0 otherwise
Age level	A discrete variable that reports a respondent's age level. It takes the value from 1 to 6, with 6 being the eldest
Income level	A discrete variable that reports a respondent's income level. It takes the value from 1 to 8, with 8 being the highest
Education level	A discrete variable that reports a respondent's education level. It takes the value from 1 to 7, with 7 being the highest

Table 4. Statistics and Correlation of Variables**Panel A. Variable statistics**

Discrete Variables					
Variable name	Observations	Mean	Std Dev	Minimum	Maximum
Payday loan frequency	78,937	0.29	0.90	0	4
Risk-taking willingness	104,912	4.81	2.66	1	10
Financial distress score	108,310	0.17	0.20	0	1
Financial literacy score	103,757	0.68	0.27	0	1
Self-belief of one's finance skill	106,922	5.74	1.54	1	7
Income level	108,310	4.35	2.07	1	8
Age level	108,310	3.68	1.62	1	6
Education level	108,310	3.99	1.60	1	7

Dummy Variables			
Variable name	Observations	Mean	Std Dev
Payday borrowing	108,310	0.12	0.33
Risk-loving preference	92,348	0.04	0.20
Overconfidence	108,310	0.23	0.42
Overspending	104,394	0.19	0.39
Gender	108,310	0.45	0.50

<u>Financial literacy variables</u>			
Understanding interest	95,959	0.87	0.34
Understanding inflation	86,479	0.79	0.41
Understanding bond pricing	67,138	0.47	0.50
understanding loan payments	64,982	0.31	0.46
Understanding mortgage payments	85,241	0.74	0.44
Understanding risk of stock vs mutual fund	45,906	0.85	0.36

<u>Financial distress variables</u>			
Unpaid medical bill	78,100	0.23	0.42
Late in mortgage payment	30,570	0.17	0.38
Large income drop	105,726	0.28	0.45
Late in credit card bill	81,534	0.18	0.38

<u>Engagement of Other Costly Financial Services</u>			
Withdraw cash from credit card	81,771	0.11	0.31
Withdraw cash from retirement	40,636	0.09	0.28
Bank account overdraw	97,488	0.21	0.41
Borrow against retirement	39,339	0.11	0.31
Spend over credit limit	81,585	0.10	0.30
Shopping for credit card	77,998	0.37	0.48

Panel B. Variable correlations

	Payday borrowing	Financial distress score	Financial literacy score	Income	Age	Education	Gender	Over-confidence	Over-spending	Willingness to take risk
Payday borrowing	1									
Financial distress score	0.312	1								
Financial literacy score	-0.151	0.025	1							
Income	-0.106	-0.112	0.158	1						
Age	-0.173	-0.182	0.188	0.164	1					
Education	-0.063	0.061	0.257	0.374	0.070	1				
Gender	0.011	-0.014	0.053	0.108	0.027	0.069	1			
Overconfidence	0.094	-0.033	-0.655	-0.079	-0.121	-0.157	-0.048	1		
Overspending	0.148	0.201	-0.073	-0.135	-0.105	-0.046	-0.031	0.019	1	
Willingness to take risk	0.088	0.110	-0.007	0.264	-0.160	0.198	0.226	0.021	-0.019	1

Observations=98,622

This table reports the summary statistics of the variables used in this study in Panel A and correlation of the variables in Panel B. In Panel A, the four financial distress variables are dummy variables that equal 1 if the distress occurs and 0 otherwise. The six financial literacy variables equal to 1 if an individual shows understanding of a certain financial subject and 0 otherwise. For other financial services variables, the value equals 1 if such service is used and 0 otherwise. The definitions of all other variables are described in Table 3.

Table 5. Univariate Analysis with Pooled Samples

Panel A. Full sample divided by payday borrowing

	Pooled t-test for mean difference				Wilcoxon rank-sum test for median difference			
	Payday borrowers	Non- borrowers	Diff		Payday borrowers	Non- borrowers	Diff	
Risk-taking willingness	5.437	4.719	0.718	***	5	5	+	***
Risk-loving preference	0.166	0.024	0.142	***	0	0	+	***
Overspending	0.345	0.171	0.174	***	0	0	+	***
Overconfidence	0.322	0.218	0.104	***	0	0	+	***
Financial literacy score	0.572	0.693	-0.121	***	0.6	0.667	-0.067	***
Financial distress score	0.508	0.215	0.293	***	0.5	0	0.5	***
Age level	2.952	3.780	-0.829	***	3	4	-1	***
Education level	3.722	4.027	-0.304	***	4	4	-	***
Income level	3.790	4.425	-0.634	***	4	5	-1	***
Military service	0.096	0.009	0.087	***	0	0	+	***
Gender	0.464	0.449	0.016	***	0	0	+	***
Number of observations	13,185	95,125			13,185	95,125		

Panel B. Full Sample divided by risk preference

	Pooled t-test for mean difference				Wilcoxon rank-sum test for median difference			
	Risk-loving	Risk-averse	Diff		Risk-loving	Risk-averse	Diff	
Payday borrowing	0.477	0.102	0.375	***	0	0	+	***
Overspending	0.300	0.186	0.114	***	0	0	+	***
Overconfidence	0.656	0.199	0.457	***	1	0	+	***
Financial literacy score	0.402	0.707	-0.305	***	0.4	0.75	-0.35	***
Financial distress score	0.437	0.237	0.200	***	0.33	0	0.33	***
Age level	2.650	3.804	-1.154	***	2	4	-2	***
Education level	4.257	4.029	0.228	***	4	4	+	***
Income level	4.544	4.333	0.211	***	5	4	1	***
Military status	0.202	0.010	0.192	***	0	0	+	***
Gender	0.605	0.432	0.173	***	1	0	1	***
Number of observations	3,775	88,573			3,775	88,573		

This table reports variable differences across groups. In Panel A, all samples are divided into two groups by payday borrowing. The difference is the value of payday borrower group minus the value of the non-borrower group. In Panel B, all samples are divided by risk preference. The difference is the value of risk-loving group minus that of risk-averse group. The definitions of all other variables are described in Table 3. Pooled t-test is used to test the statistical significance of the mean differences and Wilcoxon rank-sum signed test is used to test for the median differences. When median difference is 0, a sign is shown as the result of the sign test. *, **, *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

Table 6. The Effect of Risk Preference on Payday Borrowing

Panel A. Probit model regression results		Dependent Variable: Payday Borrowing					
	(1)	(2)	(3)	(4)	(5)	(6)	
Constant	-0.558*** (-11.13)	-0.630*** (-10.49)	-0.989*** (-20.65)	-0.724*** (-12.47)	-0.519*** (-9.63)	-0.990*** (-17.27)	
Risk-taking willingness	0.042*** (17.88)		0.044*** (19.58)	0.046*** (16.49)			
Risk-loving preference		0.580*** (21.45)			0.752*** (30.01)	0.681*** (25.29)	
Financial Distress Score	1.136*** (64.79)	1.236*** (55.42)	1.142*** (67.01)	1.252*** (58.96)	1.117*** (59.19)	1.241*** (57.04)	
Financial Literacy Score	-0.705*** (-29.69)	-0.608*** (-19.66)		-0.736*** (-26.98)	-0.556*** (-18.31)		
Military service		0.808*** (20.74)		0.845*** (23.86)		0.825*** (20.98)	
Overconfidence			0.226*** (16.07)		-0.028 (-1.53)	0.187*** (9.17)	
Overspending	0.265*** (19.65)	0.249*** (14.77)	0.277*** (21.03)	0.261*** (16.24)	0.253*** (17.41)	0.249*** (15.08)	
Income level	-0.030*** (-9.58)	-0.025*** (-6.52)	-0.033*** (-10.88)	-0.030*** (-8.07)	-0.026*** (-7.94)	-0.029*** (-7.79)	
Age level	-0.102*** (-27.19)	-0.103*** (-22.27)	-0.116*** (-31.80)	-0.096*** (-21.51)	-0.105*** (-26.55)	-0.113*** (-25.13)	
Education level	-0.026*** (-6.29)	-0.019*** (-4.04)	-0.037*** (-9.44)	-0.021*** (-4.65)	-0.025*** (-5.60)	-0.030*** (-6.61)	
Gender	0.097*** (8.13)	0.119*** (8.02)	0.089*** (7.67)	0.099*** (6.99)	0.112*** (8.76)	0.102*** (7.04)	
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes	
State Effect	Yes	Yes	Yes	Yes	Yes	Yes	
N	98,426	66,886	101,593	71,972	86,916	68,682	
Pseudo R ²	0.185	0.236	0.170	0.224	0.200	0.223	

Panel B. Tobit model regression results

	Dependent Variable: Frequency of Payday loans			
Constant	-3.696*** (-11.99)	-4.181*** (-13.85)	-6.526*** (-22.03)	-5.616*** (-18.56)
Risk-taking willingness		0.197*** (14.03)	0.204*** (14.74)	
Risk-loving preference	2.321*** (16.90)			2.664*** (19.20)
Overconfidence			1.435*** (16.89)	1.025*** (10.70)
Military service	2.689*** (14.08)	3.021*** (17.02)	3.150*** (17.89)	2.719*** (14.17)
Financial Distress Score	6.292*** (48.39)	6.355*** (51.50)	6.471*** (53.09)	6.399*** (49.50)
Financial Literacy Score	-2.662*** (-16.74)	-3.178*** (-22.47)		
Overspending	1.318*** (15.59)	1.373*** (17.07)	1.399*** (17.63)	1.334*** (15.89)
Income level	-0.140*** (-6.87)	-0.159*** (-8.07)	-0.176*** (-9.09)	-0.156*** (-7.77)
Age level	-0.465*** (-18.53)	-0.428*** (-17.67)	-0.464*** (-19.52)	-0.491*** (-19.82)
Education level	-0.109*** (-4.40)	-0.109*** (-4.63)	-0.143*** (-6.19)	-0.144*** (-5.91)
Gender	0.490*** (6.48)	0.398*** (5.47)	0.390*** (5.45)	0.460*** (6.14)
State Effect	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes
N	66464	71471	73682	68165
Pseudo R ²	0.151	0.144	0.138	0.146

This table reports the results of regression of payday borrowing activity on risk preference. Panel A shows the Probit model regression results with payday borrowing as dependent variable. Panel B shows the Tobit model regression results with the frequency of payday loans as the dependent

variables. Please see Table 3 for detailed definition of all variables. All regressions include state and year fixed effects. Z-statistics are reported in parentheses below parameter estimates that are computed using robust standard errors. *, **, *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

Table 7. Univariate Analysis for Matched Samples

Panel A. Sample divided by payday borrowing, 1-to-nearest neighbor in financial distress

	Pairwise t-test for Mean Difference				Wilcoxon Signed-rank test for Median Difference				Number of pairs
	Payday borrowers	Non-borrowers	Diff		Payday borrowers	Non-borrowers	Diff		
Risk-taking Willingness	4.930	4.466	0.463	***	5	4	1	***	7519
Risk-loving preference	0.081	0.043	0.038	***	0	0	+	***	5815
Overspending	0.320	0.232	0.088	***	0	0	+	***	7443
Overconfidence	0.259	0.276	-0.017	***	0	0	-	***	8350
Financial literacy Score	0.616	0.623	-0.007	***	0.6	0.6	-	***	7461
Financial distress score	0.408	0.396	0.012	***	0.33	0.33	+	***	7986
Age level	3.061	3.085	-0.024	***	3	3	-	***	8350
Education level	3.511	3.503	0.008		4	4	+		8350
Income level	3.459	3.418	0.041	***	3	3	0	***	8350
Military status	0.005	0.005	0.000	N/A	0	0	0	N/A	6324
Gender	0.398	0.398	0.000	N/A	0	0	0	N/A	8350

Panel B. Sample divided by risk preference, 1-to-nearest neighbor in financial literacy

	Pairwise t-test for Mean Difference				Wilcoxon Signed-rank test for Median Difference				
	Risk-loving	Risk-averse	Diff		Risk-loving	Risk-averse	Diff	No. pairs	
% of Payday borrowers	0.292	0.193	0.099	***	0	0	+	***	1624
Overspending	0.234	0.211	0.023	*	0	0	+	*	1579
Overconfidence	0.530	0.530	0.000	N/A	1	1	0	N/A	1624
Financial literacy score	0.482	0.513	-0.032	***	0.5	0.5	-	***	1624
Financial distress score	0.249	0.251	-0.002		0	0	-		1616
Age level	2.942	3	-0.058	***	3	3	-	***	1624
Education level	4.032	3.986	0.046	***	4	4	+	***	1624
Income level	4.158	4.080	0.078	***	4	4	+	***	1624
Military status	0.038	0.038	0.000	N/A	0	0	0	N/A	1587
Gender	0.506	0.506	0.000	N/A	1	1	0	N/A	1624

This table reports variable differences across matched groups. The definitions of all other variables are described in Table 3. In Panel A, each sample in the payday borrower group is matched with a sample in the non-borrower group in the same distress level, literacy level, age group, income group, education group, gender, state location and military status. If a payday borrower matched with more than 1 non-borrowers, I select the match with the nearest financial distress score. In Panel B, each sample in the risk-loving group is matched with a sample in the risk-averse group. The samples are matched with the same criteria in Panel A plus the overconfidence factor. For a risk-lover matched with more than 1 risk-averse samples, I select the match with the nearest financial literacy score. The difference is calculated as the value of borrower minus non-borrower, risk-loving minus risk-averse. Pairwise t-test is used to test the statistical significance of the mean differences and Wilcoxon signed-rank test is used to test for the median differences. When a median difference is calculated as 0, a sign is shown as the result of the sign test. *, **, *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

Table 8. Propensity Score Analysis to Correct Selection Bias in the Relation between Risk Preference and Payday Borrowing

Panel A. Logistic regression of Risk-loving preference on control variables

Dependent variable: Risk-loving preference dummy

	Coefficient	Z-score	P-value
Constant	-2.834	-29.2	0.00***
Overspending	0.264	6.3	0.00***
Overconfidence	0.886	20.0	0.00***
Financial distress score	0.974	19.4	0.00***
Financial literacy score	-3.307	-37.3	0.00***
Age group	-0.755	-28.7	0.00***
Education group	0.438	15.7	0.00***
Gender	0.949	25.2	0.00***
Income group	0.290	14.6	0.00***
N	86,916		
Pseudo R2	25.1%		
Prob > chi2	0.00***		

Panel B. Payday borrowing of treated and control groups before and after propensity score matching

Variable: Payday Borrowing Dummy

	Mean of Treated	Number of Treated	Mean of Controls	Number of controls	Difference	T-stat
Matched	0.480	3678	0.213	3,678	0.267	17.46***
Unmatched	0.480	3678	0.099	83,238	0.381	72.94***

Panel C. Variable statistics of treated and control groups after propensity score matching

Variable	Treated	Control	Difference	t-test	P-value
Overspending	0.300	0.304	-0.004	-0.36	0.72
Overconfidence	0.663	0.651	0.012	1.11	0.27
Financial distress score	0.439	0.427	0.012	1.36	0.17
Financial literacy score	0.403	0.395	0.008	1.69	0.09*
Age group	1.563	1.565	-0.002	-0.15	0.88
Education group	2.214	2.209	0.006	0.31	0.76
Gender	0.607	0.608	-0.001	-0.1	0.92
Income group	2.550	2.545	0.005	0.23	0.82

Panel D. Regression of Payday borrowing on risk preference after propensity score matching

Dependent variable: Payday borrowing dummy

	Coefficient	Z-score	P-value
Risk-loving preference	0.403	8.97	0.00***
Overspending	0.290	7.51	0.00***

Overconfidence	0.101	2.35	0.019**
Financial distress score	1.372	26.66	0.00***
Financial literacy score	-0.473	-4.74	0.00***
Age group	-0.295	-10.13	0.00***
Education group	0.077	2.97	0.00***
Gender	0.307	8.05	0.00***
Income group	0.088	4.50	0.00***
Constant	-0.914	-4.54	0.00***
Year Effect	Yes		
State Effect	Yes		
N	7,356		
Pseudo R ²	31.2%		
Prob > chi2	0.00***		

The table presents results from propensity score analysis where payday borrowing with risk-loving preference (treated group) is compared to payday borrowing with risk-averse preference (control group). Panel A reports marginal effects from a probit model estimated using all samples with and without risk-loving preference. The logit model is used to compute propensity scores (probability of risk-loving preference) to match treatment and control individuals. The dependent variable is risk-loving preference dummy. All variables are defined in Table 3. In parentheses below are the coefficient estimates are z-statistics computed using robust standard errors. Based on the estimated propensity scores for the samples, I match treated samples and control samples through a 1-to-1 approach. Panel B shows the number of observations before and after the matching, as well as the difference between the two groups. Panel C reports a balance check for the model in Panel A where I compare the means of the covariates for the treatment group (risk-lovers) to those of the one-to- matched control group of risk averse individuals. This goodness of fit test assesses whether the means of the covariates in the propensity score model is statistically indistinguishable in treatment and control groups. Panel D reports the probit regression of payday borrowing on risk preference for treatment and control groups pooled together. I report a z-statistic for the difference in payday borrowing. I use ***, **, and * to denote significance at the 1% and 5% levels, respectively.

Table 9. Probit Regression Analysis of Other Alternative Financial Services on Risk-loving Preference

	Cash withdraw from credit card	Withdraw from retirement	Rent-to-own loan	Title loan	Bank account overdraw	Advance tax refund	Pawn
Constant	-0.906*** (-12.94)	-1.864*** (-13.87)	-0.405*** (-6.21)	-0.917*** (-14.36)	-0.872*** (-15.67)	-0.635*** (-7.06)	0.0416 (0.70)
Risk-loving preference	0.543*** (17.73)	0.696*** (16.36)	0.615*** (22.22)	0.602*** (22.47)	0.267*** (9.19)	0.650*** (17.67)	0.528*** (19.47)
Military service	0.360*** (8.33)	0.828*** (16.30)	0.939*** (23.96)	0.936*** (24.77)	0.697*** (17.00)	1.004*** (20.49)	0.744*** (18.47)
Financial Distress Score	1.149*** (40.78)	1.640*** (38.10)	1.069*** (45.04)	0.927*** (39.33)	1.547*** (69.92)	0.969*** (30.45)	1.155*** (54.58)
Financial Literacy Score	-0.497*** (-13.22)	-0.674*** (-10.28)	-0.705*** (-21.26)	-0.608*** (-18.43)	-0.287*** (-9.59)	-0.808*** (-18.11)	-0.544*** (-18.64)
Overspending	0.306*** (15.66)	0.305*** (9.47)	0.118*** (6.35)	0.195*** (10.86)	0.434*** (27.73)	0.158*** (6.35)	0.184*** (11.28)
Income level	-0.039*** (-8.58)	-0.024*** (-2.78)	-0.022*** (-5.34)	0.029*** (7.04)	-0.009*** (-2.67)	0.013** (2.28)	-0.089*** (-24.01)
Age level	-0.0404*** (-7.44)	-0.0138 (-1.21)	-0.144*** (-28.27)	-0.105*** (-20.85)	-0.0726*** (-17.23)	-0.202*** (-28.32)	-0.163*** (-37.55)
Education level	-0.008 (-1.63)	0.023** (2.41)	-0.044*** (-8.51)	-0.011** (-2.30)	0.010** (2.32)	-0.042*** (-5.69)	-0.052*** (-11.55)
Gender	0.172*** (10.29)	0.197*** (6.99)	0.102*** (6.31)	0.160*** (10.17)	-0.053*** (-3.96)	0.232*** (10.43)	0.165*** (11.76)
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	53,148	26,139	66,516	66,509	61,656	43,674	66,451
Pseudo R ²	0.182	0.379	0.253	0.200	0.201	0.295	0.247

This table reports the effect of risk preference on the usage of 7 types of costly financial services. Each column shows the probit regression results with the usage of a financial service as dependent variable. Please see Table 3 for detailed definition of all independent variables. All regressions include state and year fixed effects. Z-statistics are reported in parentheses below parameter estimates that are computed using robust standard errors. *, **, *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

Table 10. Regression of Payday Borrowing on other Financing Activities

	Dependent Variable: Payday Borrowing						
Constant	-0.539*** (-7.20)	-1.190*** (-10.86)	-1.169*** (-18.82)	-0.755*** (-11.84)	-0.656*** (-9.41)	-0.687*** (-9.09)	-0.787*** (-12.37)
Risk-loving preference			0.711*** (24.96)		0.655*** (21.71)	0.594*** (16.41)	0.627*** (22.06)
Risk-taking willingness	0.062*** (16.23)	0.083*** (14.54)		0.040*** (12.41)			
idio (credit cash withdrawal)	0.604*** (25.24)						
idio(retirement withdrawal)		0.536*** (13.37)					
idio (rent-to-own)			1.312*** (62.95)				
idio (title loan)				1.218*** (58.96)			
idio (bank account overdraw)					0.629*** (34.59)		
idio (advance tax refund)						1.237*** (42.86)	
idio (pawn shop)							1.105*** (61.83)
All other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	52,867	26,048	66,516	66,041	61,656	43,674	66,451
Pseudo R ²	0.315	0.376	0.320	0.308	0.281	0.298	0.320

This table reports the correlation between payday borrowing and other costly financial services and risk preference. Each column shows the probit regression results with payday borrowing as dependent variable. The variables of other financial services are actual values minus the predicted values through the regression used in Table 9. Control variables are not reported to save space. All regressions include state and year fixed effects. Z-statistics are reported in parentheses below parameter estimates that are computed using robust standard errors. *, **, *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

Figure 1. Concentration of Payday Borrowers by State

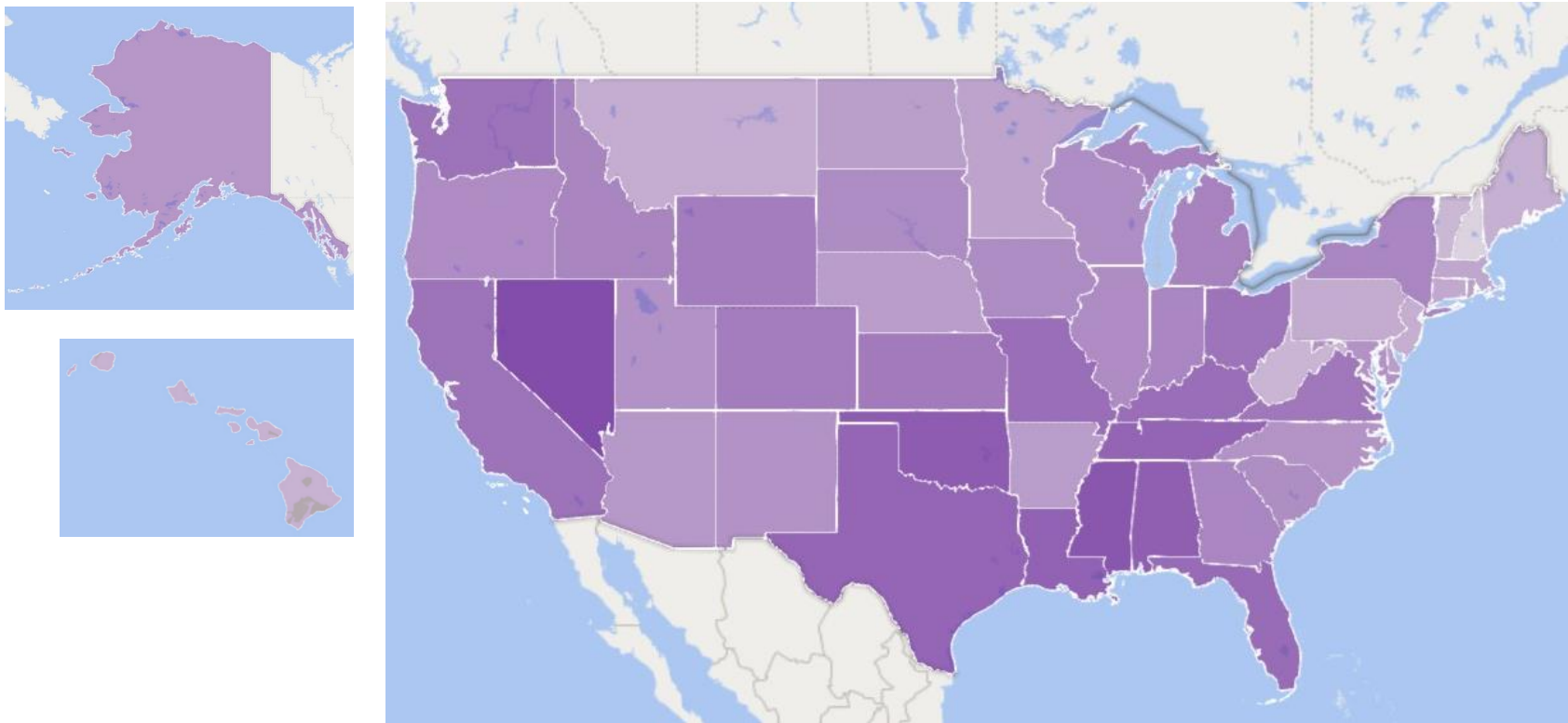
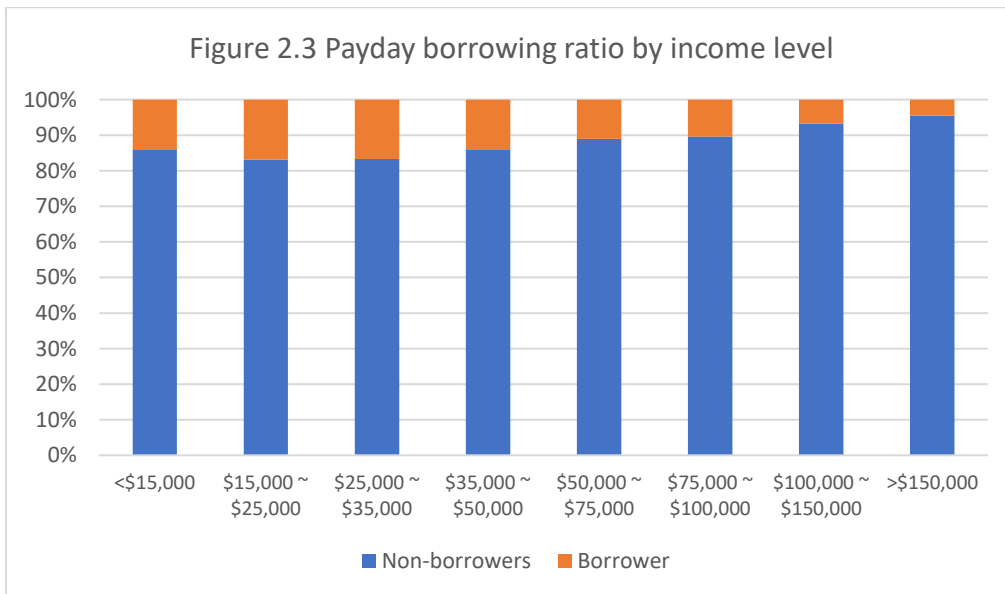
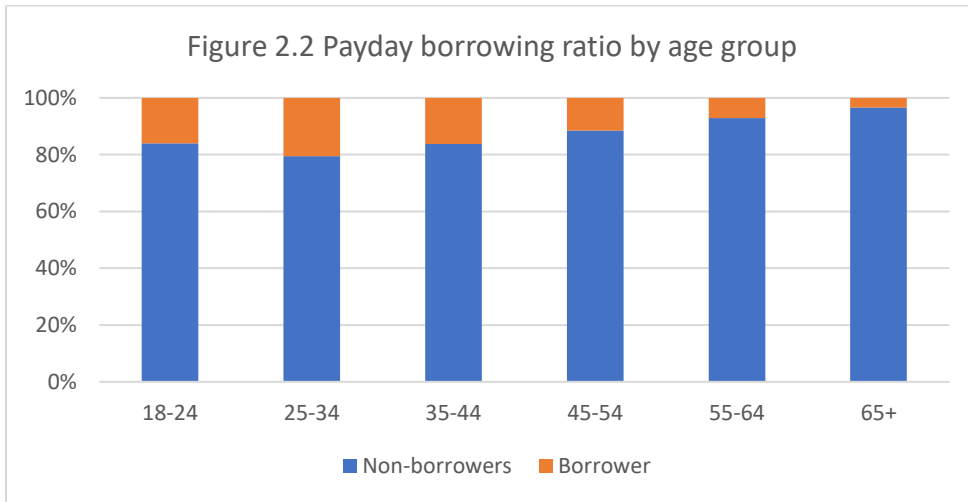
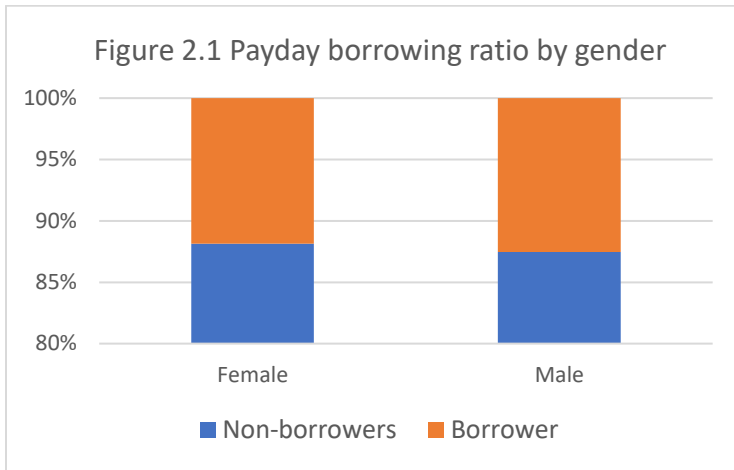


Figure 2 Payday Borrower Distribution by Demographic Features



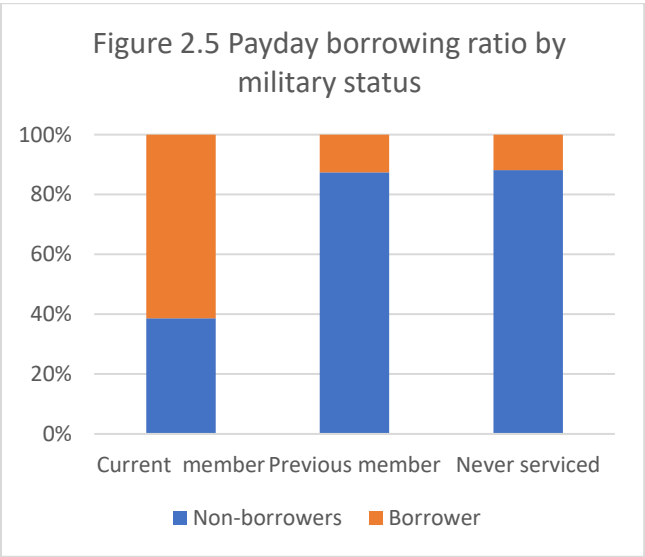
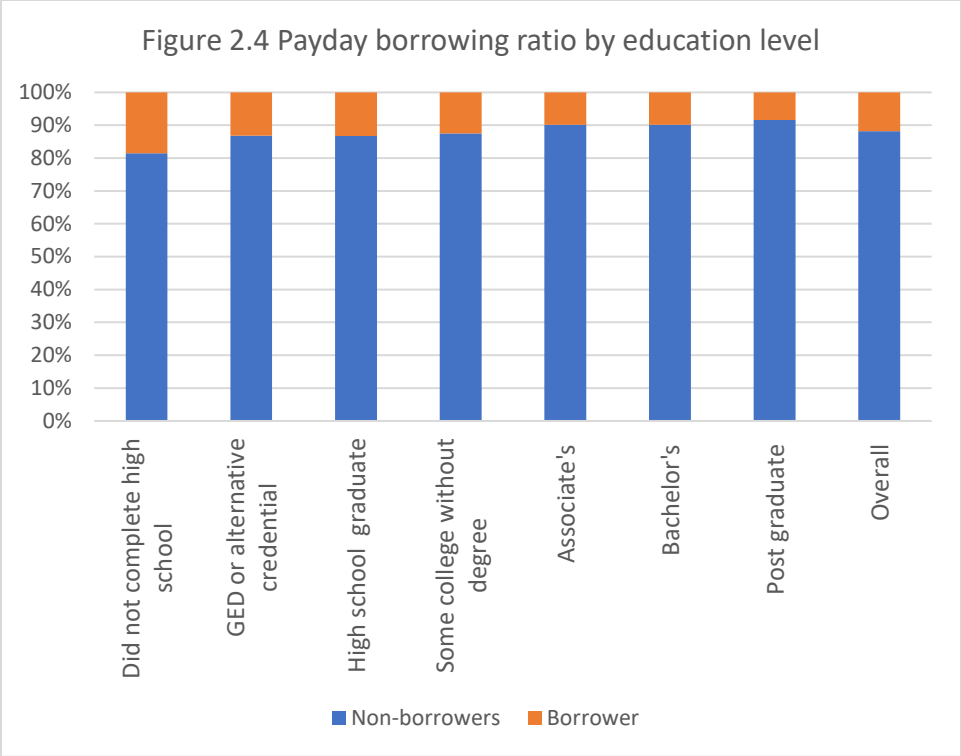


Figure 3. Percentage of payday borrowers in different distress situations

