

An Experimental Analysis of the Demand for Payday Loans

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Abstract

The payday loan industry is one of the fastest growing segments of the consumer financial services market in the United States. The purpose of our study is to design an environment similar to the one that payday loan customers face. We then conduct a laboratory experiment to examine what effect, if any, the existence of payday loans has on individuals' abilities to manage and to survive financial setbacks. Our primary objective is to examine whether access to payday loans improves or worsens the likelihood of survival in our experiment. We also test the degree to which people's use of payday loans affects their ability to survive financial shocks. We find that payday loans help the subjects to absorb expenditure shocks and, therefore, survive. However, subjects whose demand for payday loans exceeds a certain threshold level are at a greater risk than a corresponding subject in the treatment in which payday loans do not exist.

JEL Classifications: D14 (Personal Finance), C9 (Design of Experiments)

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I. Introduction

Significant evolution in the consumer finance industry over the past several decades encouraged creation of new financial instruments while technological advances eased the ability of financial institutions to evaluate the credit risk of potential borrowers. Furthermore, banking industry consolidation during the same period led to fewer bank branches, likely affecting the quantity of services available to households. At the same time, possibly because of these and other developments, payday lending experienced tremendous growth.

Payday loans are short-term, unsecured loans. To qualify for payday loans, individuals must provide proof of employment, personal identification, and a checking account. While some payday lenders conduct cursory credit checks using services provided by, for example, Teletrack, payday loans are generally provided without any formal credit check.¹ One of the appeals of these loans, as documented in a number of studies (see, for example, Elliehausen and Lawrence (2001)), is the speed with which individuals can obtain these loans. While relatively easy to obtain, payday loans are expensive when compared to the interest rates charged on other consumer loans.

Two aspects of payday loans draw significant attention: (1) interest rates charged for these loans; and (2) the potential effect of these loans on the “cycle of debt” faced by some consumers. Interest rates on the majority of payday loans exceed 300% on an annual percentage rate (APR) basis, causing some to claim that payday lending is predatory. For example, Stegman and Faris (2003, p. 20) note that “if repeated, chronic borrowing is as commonplace as it appears, then the triple-digit APRs charged by most payday lenders may go beyond what is fair and become abusive and predatory.” Because of these high interest rates, some critics suggest that interest rate ceilings should be implemented or propose that the industry be banned altogether.

¹ We provide a slightly more detailed description of the underwriting process of payday loans in the next section.

There is also evidence suggesting that a number of consumers rely frequently on these loans and, therefore, potentially become caught in what critics call a “cycle of debt.” In these situations, borrowers can find themselves paying fees for a loan that eventually exceed the initial loan amount. For example, Quinn (2007) reports “if you borrow once or twice, a payday loan solves a problem fast. But if it leaves you short again next month, you’ll probably borrow the money back and pay another fee. Over two years, a \$300 loan, renewed and renewed, can cost \$2,340 or more and you’re still in debt.”

Despite these and other criticisms, supporters of the industry contend that payday lenders are simply providing credit to individuals who otherwise would not be able to obtain it in the more formal financial sector. Supporters further argue that the credit obtained in this industry allows individuals to weather short-term financial disruptions caused by, for example, unexpected expenditures. Additionally, a comparison of the costs of payday loans with, for example, the costs of bounced checks indicates that payday loans may not be the most expensive choice individuals face. Lehman (2005) compares the APR of the nonsufficient funds fee associated with a bounced check with the APR of a payday loan. We include Lehman’s example in Table 1. While the APR of payday loans and the implicit APR of bounced check fees will depend, for example, on the duration of the loan, this simple example provides some information about the relative cost of payday loans.²

[insert Table 1 here]

The objective of our study is to design an environment similar to the one that payday loan customers face and conduct a laboratory experiment to examine what effect, if any, the existence

² In the May 2005 issue of *Consumer Reports*, a comparison of the implicit APR on bounced checks, overdraft protection, and several other forms of overdraft protection were compared. Depending on the total cost assumed, the APR for overdraft protection ranged from 608% to 791% and the APR for bounced check fees ranged from 487% to 730%.

of payday loans has on individuals' abilities to manage and to survive financial setbacks. In our experiment, we control a number of features that allow us to examine the effect of payday loans in different economic environments. As Morse (2006, p. 1) notes, "with 20% of U.S. households financially constrained, the importance of knowing the welfare implications of payday lending is likely to be both timely and large." In contrast to field studies that cannot directly measure the welfare of individuals, we can measure total earnings which is the measure of total welfare in our experiment. Specifically, our results allow us to comment on how payday loans affect an individual's ability to adjust financially to unexpected expenditures. Our analysis also allows us to comment on the extent to which individuals' consumption decisions result in demand for payday loans that potentially creates and/or compounds financial difficulties.

The paper is organized as follows: the next section, Section II, briefly describes the growth and features of the payday lending industry and presents the criticisms of the industry. Section III summarizes the literature concerning payday lending. Section IV describes the experimental design and procedures. The following two sections present our primary results and provide several examples illustrating how payday loans aided, harmed, or *could have* aided subjects. The final section contains a summary and conclusions.³

II. Industry Background⁴

The payday loan industry is one of the fastest growing segments of the consumer financial services market in the United States. It sprung up in the early 1990's when commercial check cashing stores began offering customers the option of taking out a short-term loan to help

³ We also include three appendices. Appendix A and Appendix B include the tables and figures, respectively. Appendix C provides the instructions for the experiment. A fourth appendix, available upon request, contains a brief overview of experimental economics methodology.

⁴ The information in Section II relies heavily on Caskey's (2001, 2005) excellent descriptions of the payday loan industry and of the controversy that surrounds the industry.

them meet unplanned expenses until their next payday. Caskey (2001, p. 1) reports that at the time there were approximately 200 check-cashing outlets offering payday loans. By the early part of this decade the industry has grown to over 10,000 payday loan offices, with approximately 4,400 of them owned by national chains that have offices located throughout the country. Stegman and Faris (2003) report estimates that the annual dollar amount of payday lending reached approximately 8 to 14 billion dollars by 2000.

Payday loans are short-term loans of \$100 to \$500 that typically must be paid back within two weeks or by the borrower's next payday. The fees for these loans vary from \$10 to \$25 per \$100 borrowed. Although the loan is unsecured, the borrower must be employed, provide personal identification, and have a checking account. The specific underwriting process of payday-loan credit decisions varies by lender from highly formal and procedure-oriented (including the use of credit scoring systems and the Teletrack database of defaulted loans) to very informal. Among the factors taken into account by lenders are the applicant's income sources, returned checks in his or her checking account, any identifiable history of defaulted loans with other payday lenders, and verifiability of address, telephone, and employment. A borrower who is ineligible under the standards of one lender may find another lender willing to extend credit for reasons that may not be readily apparent. A paramount factor in lenders' decision processes, given the unsecured nature of the loans, is the ability to contact the borrower on a consistent basis following any prospective default.

At the time of the loan, the borrower provides the payday lender with a check written in the amount of the loan plus the fee. The date on the check is typically the day the borrower is scheduled to receive her next paycheck. When the loan comes due, the borrower can pay off the loan in cash and retrieve her post-dated check or she can allow the lender to cash the check. If

the loan is paid in full, the transaction is complete.⁵ If the borrower cannot repay the loan, she can renew the loan under the same terms as the previous loan. Loans can be renewed in one of two ways. The borrower can pay off the loan plus the finance charge on the date that it is due and take out a new loan on the same day; these are often referred to as renewals. Alternatively, the borrower can renew the loan by simply paying the finance fee and writing a new post-dated check for the amount of the loan plus a new finance fee; these are generally referred to as rollovers.

Payday loan customers typically are young with a high school education but little or no college education. They have little money in their checking account and few, if any, alternative sources of credit because they are at (or have exceeded) their credit limit, or previously have been turned down for more conventional consumer loans. Payday loan customers' most frequently cited reason for using the loans is to meet unplanned expenses. Caskey (2001) cites several sources that show that somewhere between 35% to 50% of payday loan customers use ten or more loans a year.

Rapid growth of the payday loan industry suggests that this industry evolved to fill a gap in the consumer credit market not being served by traditional lending institutions like commercial banks, savings banks, and credit unions. As we discuss below in Section III, there is some evidence that supports this claim. The payday loan industry explains that it provides credit to customers who, because of credit limit or credit risk issues, lack other satisfactory financing alternatives to meet unplanned short-term expenses. Payday lenders recognize that the fees they charge are high but they claim that the fees are necessary to cover the default risk on these

⁵ If the check bounces, the lender will contact the borrower and require her to renew the loan. The lender will also charge a bounced check fee.

unsecured loans and the administrative costs associated with these unsecured loans.⁶ Lenders also claim that the payday loans are less costly than the alternatives, such as bouncing a check or not paying a bill on time. Bouncing a check usually involves fees of \$10 to \$20 to the merchant and \$25 or more to the bank. Furthermore, if a customer bounces too many checks or repeatedly fails to pay bills on time, she can lose her checking account and be denied future access to the goods and services provided by the merchants who were stuck with the bounced check.

While critics of the payday loan industry recognize that traditional lending institutions fail to provide consumers in the subprime credit market with adequate credit, they question the industry's loan fees and lending practices, and even the need for such loans. Critics claim that lending fees are far in excess of the cost of default risk and the administrative cost of handling these short-term loans. The payday lenders are also accused of engaging in "predatory lending" tactics. Although predatory lending is not precisely defined, some critics refer to alleged tactics, such as false and misleading advertising, that exaggerate the benefits or understate the true cost of the loans.

Perhaps the most damning criticism of the payday loan industry is that the cost and structure of these loans entrap the customer in what is often referred to as a "cycle of debt." Specifically, some argue that even if the payday loan customer takes out the first loan to meet a short-term unplanned expense, it may be difficult for a consumer who is living from paycheck to paycheck to pay off the loan and still have enough remaining funds to meet their expenses. As a result, the borrower will renew the loan and incur an additional fee for the new loan. In some

⁶ Caskey (2005, p. 19) reports that payday lenders claim that losses on their loans run about 10 to 20 percent of their annual loan revenues. To minimize their loan losses, payday lenders may limit the size of the loans, check with the Teletrack credit bureau to determine if the borrower has defaulted on other payday loans, and inform the borrowers of the penalties associated with failing to pay the loan on time.

cases a consumer may renew the loan repeatedly until she reaches a point where the combined fees for these renewals are greater than the original loan.⁷

While the payday loan industry represents a relatively new form of credit in consumer finance, a number of issues relevant to payday lending have been previously examined. For example, in their survey of the law and economics of consumer finance, Hynes and Posner (2002, p. 172) note that information failures “may result in either *abnormally* [emphasis added] high price or abnormally harsh terms.” More specifically, Skiba and Tobacman (2007a, p. 25) note that the “underlying question is why people use payday loans. Rational consumers who borrow on payday loans do so because their marginal utility is high enough to warrant a 450% interest rate. This could be due to extreme discount rates or more plausibly consumption shocks such as an illness or car repair. Alternatively, consumers with self-control problems may borrow even in the absence of a consumption shock warranting 450 APR.” We now turn to a discussion of these and other papers that examine various aspects of payday lending.

III. Literature Review

The research on payday lending, as noted by Skiba and Tobacman (2007b), is “thin but growing rapidly.” Among the earliest research, Caskey (1994) describes the features of fringe banking and discusses who uses these fringe banks to obtain financial services.⁸ More recent studies by Caskey (2001, 2002, and 2005) and Stegman (2007) document the growth of payday lending and discuss recent developments in the industry. Fox (1999/2000), Stegman (2001), Barr (2004), and Bair (2005) provide similar analyses of the payday lending industry by

⁷ The Center for Responsible Lending, as it states on its website, serves as “a resource for predatory lending opponents.” For a more detailed discussion of these and other criticisms of the payday loan industry, go to www.responsiblelending.org.

⁸ Fringe banks include, for example, check-cashing establishments and pawn shops.

describing its features, documenting its growth, offering a number of explanations for the causes of its growth, and, to varying degrees, discussing public policy issues related to the industry. While the studies by Chin (2004), Chessin (2005), Butler and Park (2005), and Mann and Hawkins (2007) include descriptions of payday lending and further document its growth, they focus relatively more on the legal and regulatory aspects of the industry.

A number of other studies provide a largely descriptive analysis of the broader, alternative financial services sector. In addition to payday loans, the alternative financial services sector includes rental-purchase agreements, pawn shops, car-title loans, refund anticipation loans, money orders, and check cashing. See, for example, Swagler, Burton, and Koonce Lewis (1995a, 1995b), Koonce, Swagler and Burton (1996), and Rhine and Toussaint-Comeau (1999).

The above papers represent relatively descriptive analyses of payday lending. There are, however, a number of studies that examine in more detail various aspects of the industry. Several papers focus on the determinants of the location decision of payday lenders. For example, Graves and Peterson (2005, p. 832) report that “even when accounting for commercial development patterns and zoning ordinances with bank locations, payday lender location patterns unambiguously show greater concentrations per capita near military populations.” Burkey and Simkins (2004) investigate the determinants of the location of both payday lenders and banks. Their results indicate that, after controlling for a number of socioeconomic variables, banks are *less* likely and payday lenders *more* likely to locate in areas with relatively higher percentage of the population that is black. At the same time, their results also indicate that changes in the percentage of the population that is Hispanic have no effect on the location decisions of either banks or payday lenders.

In contrast to the results of Graves and Peterson (2005), Burkey and Simkins (2004) find that changes in the percentage of the population in the military have no effect on the location decision of payday lenders. They do find, however, that banks are less likely to locate in those areas with a relatively higher percentage of military personnel. The authors suggest (pp. 202-203) that “banks are ‘crowded out’ from military areas by the military unions.” Graves (2003) also studies the determinants of bank and payday lending location decisions and concludes (p. 303) that “disenfranchised neighborhoods are simultaneously targeted by payday lenders and neglected by traditional banks.” The results of these three papers are consistent with claims that payday lenders may be filling a void created by the departure of more traditional lending institutions. Such a result would also partly explain the significant growth in the demand for payday loans.

Stegman and Faris (2003) use logistic and ordered logistic regression analysis to examine what factors determine whether an individual will take out a payday loan and the frequency with which individuals use payday loans. Not surprisingly, they conclude (p. 18) that individuals “with impaired credit are much more likely than others to use payday lenders and ... to be more frequent borrowers.”⁹ Using a data set comprised of payday lenders in North Carolina, the authors also investigate the determinants of gross revenues and conclude (p. 25) “financial performance is significantly enhanced by the successful conversion of more and more occasional users into chronic borrowers.”

The latter result obtained by Stegman and Faris, however, is refuted by the more recent Federal Deposit Insurance Corporation (FDIC) study by Flannery and Samolyk (2005). In their analysis of the determinants of the financial performance of payday lenders (at the store level),

⁹ They also report that individuals who have had one or more bounced checks in the past five years are more likely to use payday lenders. We will discuss the implications of this result later in our paper.

Flannery and Samolyk conclude (p. 19) “a store’s loan volume is a key determinant of its profits. Given a store’s volume, however, renewals and loans to frequent borrowers do not seem to be more profitable than other loans.” That is, store-level profitability is most affected by the quantity of loans (regardless of whether the customers taking out the loans are new or repeat) and not the quantity of its customers. They also find that customer race and income have little effect on profitability.

Skiba and Tobacman (2007a) examine the effects of payday lending on borrowing activity, personal bankruptcy, and crime. They find that first-time applicants for payday loans who qualify for such loans are more likely to take out future payday loans. At the same time, those first-time applicants who are rejected for a payday loan are more likely to take out a pawnshop loan. The authors note (p. 3) this result “implies that payday loan applicants substitute between forms of credit.” Their results also indicate that individuals are more likely to file for Chapter 13 bankruptcy within two years of their first successful application for a payday loan. At the same time, they find no evidence that payday loans have an effect on crime.

Skiba and Tobacman (2007b), using a data set consisting of nearly 800,000 loans and approximately 101,000 borrowers in Texas, investigate payday loan decisions of individuals, focusing on borrowing, default, and discounting behavior. They conclude (p. 1) that the individual’s decision to postpone default is “consistent with partially naïve quasi-hyperbolic discounting.” They also conclude (p. 1) that “overoptimism about future self control cannot be distinguished from overoptimism about future shocks to spending needs.” If, for example, individuals are found to be overly optimistic about future shocks to their own spending requirements, they may alter their current consumption and payday loan borrowing behavior.

Morse (2006), using zip code level data for California for the 1996-2005 period, examines the effects of payday loans on four measures of welfare. Morse uses both positive (e.g. births) and negative (e.g. foreclosures) measures of welfare to determine the extent to which the existence of payday loans provides resiliency in the face of exogenous, natural disasters. Morse measures welfare over the two-year window before and after the natural disaster. The results indicate that the existence of payday lending has a positive effect on welfare. The results also indicate that the measure of bank density in each area more often causes reductions in welfare. Morse, therefore, concludes (p. 31) that “bank density may not be a substitute for payday lending.”

Morgan (2007) examines whether payday lending is predatory and examines the extent to which competition in the industry causes a reduction in payday loan fees. The author (p. 6) first defines predatory lending “as a welfare reducing provision of credit” and presents a theoretical model of lender and borrower behavior to obtain the conditions under which lending would be predatory. Using data from the Survey of Consumer Finance, Morgan examines the effects of payday lending on access to credit, debt levels, and delinquency rates. Morgan’s results indicate that more vulnerable individuals (i.e., those with relatively less education and more uncertain income) in states with higher payday loan limits are denied credit less frequently. Furthermore, the delinquency rates for these same individuals in states with higher payday loan limits are no higher than the delinquency rates for otherwise identical individuals in states with lower payday loan limits.¹⁰ Morgan thus concludes that payday lending does not fit his definition of predatory lending. Morgan also obtains some evidence that as the number of payday loan stores increases, the fees associated with payday loans fall. This result is consistent with the theoretical prediction that increased competition leads to lower fees.

¹⁰ Delinquency is defined as having been delinquent on any debt payment in the last year.

Morgan and Strain (2007) examine how the ban on payday loans in Georgia and North Carolina affected households. Georgia banned payday loans in May 2004 while North Carolina banned them in December 2005. These two events provide the authors with an opportunity to empirically investigate several effects of the removal of payday loans on household behavior. Morgan and Strain find that relative to households in other states, households in Georgia bounced more checks, complained more frequently to the Federal Trade Commission about lenders and debt collectors, and were more likely to file for bankruptcy under Chapter 7 after the ban of payday loans. Their results also indicate that bankruptcy rates under Chapter 13 *fell* in Georgia after May 2004. However, the authors note (p. 20) that “Chapter 13 is for filers with substantial assets to protect, and that does not seem to fit the profile of payday borrowers. We would expect bankrupt borrowers to wind up in the ‘no asset’ Chapter 7 bankruptcy.” The results for North Carolina, which the authors regard as preliminary, given the shorter period in which payday loans have been banned, are similar to those for Georgia. In general, Morgan and Strain’s results suggest that the ban on payday loans in these two states caused households to encounter more financial problems and, therefore, made them “worse off.”

Karlan and Zinman (2007) conduct a field experiment with the assistance of a South African finance company to examine the effects of the provision of credit to individuals who otherwise would not receive a four-month installment loan. Their results indicate that the randomly selected individuals who received the loans (with a 200% APR) experienced an increase in several measures of well-being. For example, individuals who received these loans were more likely to retain a job and had a more positive outlook. Karlan and Zinman conclude (p. 31) that they “do not find any evidence that the net effects of expanded access to expensive consumer credit are negative.”

IV. Experimental Design and Procedures

In this paper, we use a laboratory experiment to examine the extent to which the existence and use of payday loans affects individuals' welfare in an economic environment in which individuals with limited income and financial resources encounter uncertain expenditures.¹¹ We consider two economic treatments: the *Loan (L)* treatment, in which payday loans are a financing option; and (2) the *No Loan (NL)* treatment, in which payday loans do not exist. This second treatment is motivated by our interest in examining whether the existence of payday loans alters subject welfare. Given that we did not know ex ante the extent to which subjects would put themselves into financially tight circumstances, we conducted our first sessions with a liberal maximum number of overdraft checks, eight. This maximum kicked in after the first experimental month in a session of 30 months, so as to not penalize the subjects too harshly for poor decisions in their first month. After observing 45 subjects in this treatment, we then introduced a more stringent financial constraint, which limited each subject to a maximum of two overdraft checks after the first month.

An additional treatment variable is whether or not each participant incurs a consumption point penalty from writing a check when there are insufficient funds in the participant's account. In the *Overdraft Protection* treatment, the participant is charged a fee and, implicitly, the bank covers the check so that the participant does not incur any negative consequences from the payee for writing a check with insufficient funds in her account. In this paper, we refer to these types of checks as overdrafts. 111 participants faced this treatment condition, 54 without access to loans and 57 with access to loans. We subsequently conducted a harsher treatment, the *No*

¹¹ See Smith (1994) for an excellent discussion of experimental economics and Wilson (2007) for a discussion of the use of experimental economics in examining antitrust issues.

Overdraft Protection treatment, which penalizes participants who “bounce checks” on bills. The penalty, however, is delayed until the next month as it takes time for the check to fail to clear.¹² In the treatment without overdraft protection, we refer to checks written without sufficient funds and, therefore, checks that incur *both* a fee and a subsequent penalty as bounced checks. 162 participants faced this treatment, half without access to payday loans and half with access to payday loans. The 2x3 design is summarized in Table 2.

[insert Table 2 here]

Each subject earns cash based on a series of financial and consumption decisions over thirty 28-day months, or 840 periods. Each day lasts four seconds. Participants are seated at visually-isolated carrels, with each subject using a computer to access information, such as the instructions (see Appendix C) and their financial situation (e.g., historical payments, current balance, bills due), and to enter their decisions (e.g., which bills to pay). Subjects earn money by consuming goods for which they have bills to pay in experimental dollars. Each bill appears 28 days before it is due. When a bill appears, a subject receives “consumption points”, or “utility” in the vernacular of economics, for a good or service. Each consumption point equals one US cent in earnings for the subject. Failure to pay bills on time leads to penalties in the form of deductions from a subject’s accumulated consumption points.

Each subject is endowed with a starting balance of 50 experimental dollars (E\$) and collects biweekly paychecks of 475 experimental dollars. The final balance of experimental dollars is converted into US dollars at the rate of E\$400 = US\$1. For ease of discussion, \$ will denote experimental dollars, except for any reference to actual payouts of cash to the subjects at the end of each session.

¹² The penalties associated with bouncing a check represent any costs imposed on individuals by merchants. In addition to charging individuals for bounced checks, merchants may post the individuals’ name’ and/or refuse to conduct business with those individuals in the future.

We chose bill and income parameters to place subjects in tight financial situations so that failure to survive financially results in the termination of the ability to earn money during the session. Each month a subject must accrue a minimum of 100 consumption points. If a subject fails to meet the monthly minimum of 100, the subject may no longer participate in the session.¹³ A bar graph at the bottom portion of the screen continuously updates the number of consumption points that a subject has accumulated in a month (see Figure 1 in Appendix B for a screenshot for a subject in the *Loan* treatment). Once a subject is eliminated, he or she can no longer make decisions or earn money in the remaining periods. However, in an effort to not disrupt those subjects who continue to participate, these subjects remain at their computer terminals until all subjects in the laboratory complete the session. Eliminated subjects may surf the Internet or participate in a quiet activity, such as reading, without leaving their carrel.

The series of monthly bills faced by each subject is given in Table 3. Over time, subjects become familiar with these basic monthly bills, as they appear each month 28 days before their due date. Table 4 presents the additional bills that the subjects encounter. These bill shocks yield no consumption points but carry penalties if they are not paid. The additional bills are more irregular and infrequent, and are not known to the subjects until the bills appear on each subject's computer screen 28 days before they are due. An individual decides which bills to pay and when to pay them.

[insert Tables 3 and 4 here]

¹³ We chose this monthly minimum to induce a reason for the subjects to pay bills. We also chose it to create an incentive for subjects to continue to participate in the experiment to increase their earnings. This minimum threshold, therefore, conveniently serves as means for us to measure how loans affect the ability of subjects to extend their participation and, as we discuss later, to survive financially.

The total amount of bills to be paid over the course of the experiment is \$26,244 and the total amount of income (plus the starting balance) is \$28,075.¹⁴ Thus bills comprise 93.5% of a subject's income, leaving just 6.5% for discretionary spending. As presented in Table 5, subjects also can choose to purchase optional consumption items at a take-it-or-leave-it price when they become available. Subjects are not informed of the frequency or type of consumption items offered in advance. Purchase of consumption items provide consumption points, which accrue to each subject's earnings. Payment for consumption items is due at the time of purchase. Notice that optional consumption items generate consumption points at twice the rate that bills do. This is meant to capture the more hedonistic pleasure of leisure activities relative to the mundane consumption of utilities, for example. We assume that a vendor has no recourse if a participant bounces a check on an optional consumption item. However, the treatment conditions limit the total number of bounced checks (or overdrafts) to two or eight, so that bouncing checks (or writing overdrafts) eventually catches up with a participant.

[insert Table 5 here]

Bounced checks or overdrafts are permitted in all of the experimental sessions, though as described at the onset of this section, the maximum number permitted varies with the treatment. Each bounced check or overdraft leads to a fee of \$35, regardless of the amount of the check. When a participant bounces a check on a bill in the *No Overdraft Protection* treatment, he avoids the consumption point penalty in the current month, but this is only temporary as the penalty then hits the participant on day 23 of the following month. The bill also remains unpaid. The *Overdraft Protection* treatment differs in that the participant avoids the consumption point

¹⁴ Since the experiment ends after 30 experimental months, this calculation omits the last paycheck on day 28 of month 30 which could not be used to pay bills, nor the last month's set of bills to appear which would come due the following month.

penalty in the next month. The bill, however, remains unpaid and the participant is still assessed the \$35 fee for the overdraft.¹⁵

All unpaid bills for the month appear as a lump sum item, “Previous Unpaid Bills”, on the first day of the following month and are due 28 days later. If a participant fails to pay the previously unpaid bills, he or she incurs the associated consumption point penalty (in the case of utilities, 11 points) and the amount is rolled over to the next month until it is paid.

The computer serves as the payday loan lender in this experiment. The payday loans offered in this experiment are always \$200 at a fee of \$35, which is typical of the rate found in naturally occurring markets. No subject may take out a loan more than twice (\$470) per biweekly pay period (recall the \$475 paycheck). Note that the fee for bouncing a check or writing an overdraft is the same as the fee for taking out a \$200 loan. All loans automatically are repaid on the next payday. All sessions begin without loans available and then on day 27 in month 2, the subjects in the *Loan* treatment receive the additional instructions on the availability of loans and how they work. Loans always are referred to in the experiment as “loans” and not “payday loans.”

A total of 318 subjects participated in the experiment conducted at the International Center for Economic Science (ICES) laboratory at George Mason University in the spring and fall of 2006 and the spring of 2007. Subjects were undergraduate students recruited from the university at large, many from a table in front of a cafeteria. Participants received \$7.00 for showing up on time and additional earnings from the experiment itself. Each subject was seated at a computer terminal and privately read the self-paced instructions on the screen. The experiment began after every subject in each session completed reading the instructions. Each

¹⁵ In the *Overdraft Protection* treatment, the “unpaid” bill represents the sum the individual must implicitly pay the bank which “covered” the check.

session typically lasted approximately 75 minutes and no subject participated in more than one session (though several attempted to do so). Earnings were paid privately at the conclusion of the experiment.

V. Primary Results

Our primary objective is to examine whether access to payday loans influences individual welfare and, more specifically, the likelihood of survival in our experiment. We also test the degree to which the use of payday loans affects a subject's ability to survive. Before we examine our primary findings, we present and discuss summary statistics for a number of the variables obtained in our experiment. Table 6 contains these summary statistics.

[insert Table 6 here]

As discussed above, in the event that a subject attempts to pay a bill without sufficient funds in her account, she will have either overdraft protection (where she will pay the \$35 fee but incur no other penalties) or will pay the \$35 fee *and* incur a consumption penalty in the next month. This latter situation faces individuals who do not have overdraft protection. We presented subjects with two different constraints with regards to overdraft protection and bounced checks. In one case, subjects could write up to eight checks with overdraft protection (or bounce up to eight checks). We then imposed a more binding constraint on the subjects when we allowed up to two overdrafts (or up to two bounced checks). Of course, our primary interest is in the effect of the introduction of payday loans in each of these treatments.

Panel (a) of Table 6 includes information about the number and percentage of subjects who survived through the end of the experiment. A clear pattern of results emerges. Specifically, in those treatments in which payday loans exist, a higher percentage of subjects survived for the entire 30 months. For example, 61.4% of the subjects who could write up to two

overdrafts survived in the presence of payday loans while 51.9% of those subjects for whom payday loans did not exist survived. This pattern of results exists for the three remaining pairs of treatments. This result *suggests* that the existence of payday loans enables at least some individuals to survive for a longer period of time.¹⁶ Panel (b) reports the mean and median number of months of survival across the treatments. There is also some evidence suggesting that the existence of payday loans increases the number of months of survival. For example, the median number of months of survival in the *L8 Overdraft Protection* treatment is 14.5 while the median number of months of survival in the *NL8 Overdraft Protection* treatment is 11.0. A similar pattern of results occurs across the other treatments.

Panels (c), (d), and (e) report information about the subjects' earnings, the demand for the optional consumption items (measured as a percentage of income), and the total penalties incurred across all treatments. There are three results worth noting. First, no clear pattern of results appears to emerge when one compares mean and median earnings across the *Loan* and *No Loan* treatments. Second, the demand for optional consumption items as a percentage of income is generally lower when payday loans exist. For example, a comparison of the *L2* and *NL2 Overdraft Protection* treatments indicates that subjects who had access to payday loans spent 5.5% of their income on optional consumption items while subjects who did not have access to payday loans spent 7.1% of their income on these optional consumption items.¹⁷ Third, we also observe that the percentage of subjects who do not incur any penalty points (caused, for example, by the failure to pay a bill on time) is much lower in the *No Overdraft Protection* treatments when compared to the otherwise identical *Overdraft Protection* treatments.

¹⁶ While not the focus of our paper, we should note that the percentage of those who survive for the entire 30 months is higher for those subjects who had access to overdraft protection. For those subjects who could only bounce checks, the percentage of those who survived was lower. This result occurs whether or not payday loans exist.

¹⁷ We should note that that median value is higher in the *L8* versus *NL8* treatment without overdraft protection.

Panel (f) of Table 6 provides information about the total demand for payday loans, the demand for payday loans on a per-payday borrower basis, and the extent to which individuals renew payday loans. In addition to payday loan renewals where the subjects can choose to renew the loan automatically, we also present information about the number of consecutive biweekly pay periods that an individual had an outstanding loan. We subtract one from the total number of consecutive biweekly pay periods that an individual had an outstanding loan to determine the number of consecutive pay periods that an individual took out a loan after taking out the previous loan. This latter statistic provides additional information about the extent to which individuals rely on payday loans as a frequent source of credit. For example, in the *L8 Overdraft Protection* treatment, fourteen of the twenty-two subjects took out at least one payday loan. Of those fourteen subjects, four had at least one renewal while eleven had at least one consecutive loan. Of the 122 consecutive loans for the treatment, one subject accounted for 34 of the consecutive loans.

Panel (g) shows the number and percentage of subjects who took out at least one payday loan across all treatments. We also report information about the extent to which subjects used payday loans. For example, in the *L2 Overdraft Protection* treatment, four subjects took out more than 21 loans during the experiment while 25 subjects did not use payday loans. The information in the lower half of Panel (g) indicates that the majority of subjects in our experiment either did not take out a payday loan or, if they did, took out 5 or fewer loans.

Panel (h) documents the use of overdrafts and bounced checks across all treatments. Not surprisingly, demand for overdrafts and bounced checks are higher, the higher is the maximum number allowed. There is some evidence, though mixed, that the number of overdrafts and bounced checks is higher when payday loans do not exist. With the exception of the *L8* and *NL8*

No Overdraft Protection treatments, the number of overdrafts per subject and number of bounced checks per subject are lower when payday loans exist. Furthermore, 63.6% of subjects wrote at least one overdraft check in the *L8* treatment while 87% of subjects wrote at least one overdraft check when payday loans did not exist in the *NL8* treatment. Similarly, 47.5% of subjects bounced checks in the *L2* treatment while 75% of subjects bounced checks when payday loans did not exist in the *NL2* treatment. These statistics suggest that subjects may rely more heavily on (or, equivalently, switch to) overdrafts and bounced checks when payday loans do not exist. Such a change in subject behavior would be consistent with the results obtained by Morgan and Strain (2007) who found that households in Georgia and North Carolina bounced more checks after payday loans were banned.¹⁸

The final panel in Table 6 provides information about the end-of-month checking account balance for the subjects across all treatments. There are two results that we briefly discuss. First, the mean and median end-of-month balance in the *Loan* treatments are generally higher than in the *No Loan* treatments (for both the *Overdraft Protection* and *No Overdraft Protection* cases). Second, both the mean and median end-of-month balances generally are higher in the *Overdraft Protection* treatments when compared to the *No Overdraft Protection* treatments (when payday loans do or do not exist).

To examine what effect the existence and use of payday loans have on the likelihood of survival, we employ the popular proportional hazards model developed by Cox (1972).¹⁹ In the presence of right censoring, this method of analyzing the effect of covariates on the hazard rate assumes that $\lambda(t_i) = e^{\beta x_i} \lambda_0(t_i)$, where λ is the hazard function for individual i at time t , x is the

¹⁸ We do note that the percentage of subjects who wrote overdraft checks is slightly higher in the *L2* versus *NL2* treatments and that the percentage of subjects who bounced checks is relatively higher in the *L8* versus *NL8* treatments.

¹⁹ Kiefer (1988) presents a thorough introduction to the analysis of duration data and subsequent use of hazard models in economics. For a less formal discussion of duration models, see Kennedy (2003).

covariate vector associated with the parameter vector β , and λ_0 is the baseline hazard. For a treatment dummy variable, the Cox model affords a simple interpretation of the “relative risk” for our *No Loan* treatment. Subjects in the *No Loan* treatment are $e^{\beta_{NL}}$ times less likely to survive than those in the *Loan* treatment. In other words, we have a measure of the difference in survivability between those who do and those who do not have access to payday loans. For continuous covariates, the exponentiated estimated coefficients are interpreted as the effect of a unit change in the covariate on the relative hazard. For example, $e^{\hat{\beta}_1}$ implies that a one-unit increase in the first covariate changes the hazard by $(e^{\hat{\beta}_1} - 1) \times 100$ percent. An attractive feature of the semi-parametric Cox regression is that it makes no assumption about the parametric distribution of the length of survival.

Specifically, we include a number of covariates in our Cox regression. The first covariate, *CIPercent*, measures the expenditures on optional consumption items as a percentage of total income.²⁰ *NumberLoans* equals the number of loans that subject i took out in the *Loan* treatment.²¹ *EarlyPenalties* measures the number of consumption point penalties that the subject incurred in the first two months. We also include several dummy variables as covariates. *No Loan* equals 1 if the subject is in the *No Loan* treatment, and equals zero if the subject is in the *Loan* treatment. *2BC* equals 1 if the subject is in either of the maximum of two bounced checks

²⁰ Because the set of opportunities for optional consumption items is fixed over a six month cycle and is the same cycle for every subject, the danger is minimal that the length of financial survival affects the covariate *CIPercent*, which is measured as a percentage over all months of survival.

²¹ If the duration of financial survival definitionally (or involuntarily) determined the *NumberofLoans* that a subject would take out, then we would have the problem of an endogenous covariate and hence a biased interpretation of the hazard ratio for this covariate. For example, a Cox model to assess whether casualties affect the duration of war has the endogeneity problem that war duration also causes deaths. Each subject in our experiment, however, has a choice of whether or not to put themselves into a position to require a payday loan at any time during the experiment: early, middle, or late. In other words, *NumberofLoans* is independent of time. Lengthier survival does not mean that a subject is going to put, or not put, himself into a financially precarious position that requires him to take out a loan. A scatterplot of *NumberofLoans* against months of survival reveals no uniform relationship across our subjects, and a simple OLS regression of *NumberofLoans* on months of survival (for all the subjects in the *Loan* treatment) confirms this with an R^2 of 0.01 and a $F_{1,158} = 1.95$ (p -value of 0.1649).

or maximum of two overdraft checks treatments. *2BC*, therefore, equals zero if the subject is in a treatment that allows her to bounce up to eight checks or write up to eight overdraft checks. *NoOverdraft* equals 1 if the subject is in the *No Overdraft Protection* treatment, and equals zero if the subject is in the *Overdraft Protection* treatment. And finally, *Female* equals 1 if the subject's gender matches the variable's name.

Our hypotheses are as follows. Increases in the *CIPercent* variable are expected to decrease the likelihood of survival, as purchasing optional consumption items results in fewer funds available to pay for bill shocks as they arise ($\beta_1 > 0$). We also expect that being in the *No Loan* treatment decreases the likelihood of survival because those subjects do not have access to the loans to absorb the bill shocks ($\beta_2 > 0$). An increase in the *NumberLoans* variable is hypothesized to decrease the likelihood of survival, as more loans indicate that subjects may be caught in what critics refer to as a "cycle of debt." Similarly, an increase in the use of loans results in more expenditures on loan fees and, therefore, results in fewer funds available to pay for unexpected bills. Both of these interpretations suggest that increases in the number of loans will reduce the likelihood of survival ($\beta_3 > 0$).

We also expect that those subjects who can bounce no more than two checks or write no more than two overdrafts are less likely to survive. *2BC*, therefore, decreases the likelihood of survival because the subjects have fewer opportunities to use bounced checks or overdrafts as a means to absorb bill shocks ($\beta_4 > 0$). We also expect that *NoOverdraft* will decrease the likelihood of survival because, all else fixed, subjects incur additional penalties when bouncing checks (in comparison to overdrafts). We hypothesize that the additional penalties in the *No Overdraft Protection* treatment will make it more difficult to survive ($\beta_5 > 0$). An increase in the *EarlyPenalties* variable is expected to decrease the likelihood of survival as it difficult to

continue in the experiment if one incurs penalties early in the experiment.²² And finally, we have no reason to predict a gender effect in this experiment.

Before proceeding further we note that in analyzing the data we found a software bug that differentiated the environmental conditions of a small subset of the subjects (11%) from the others in the *Overdraft Protection* treatment only. Specifically, if a subject attempted to repay his or her "Previous Unpaid Bills" exactly on the first of the month, the software recorded the payment in the accounting ledger of the subject, but this line item for "Previous Unpaid Bills" would appear again in the next month to be repaid a second time. Thus, to survive these subjects would have to pay their unpaid bills twice, making their survival that much more difficult.²³ This software problem affected four subjects in the *NL8* treatment, seven in the *L8* treatment, twelve in the *NL2* treatment, and thirteen in the *L2* treatment. Fortunately, we can include these subjects in the Cox regression as "alive" or surviving for the month *before* the software bug affected them. That is, in the month prior to the problem they are in exactly the same circumstances as all the other subjects in the experiment with the observation that they are still surviving in the experiment.²⁴

The estimates from the Cox regression are reported in Table 7. As hypothesized, we find that an increase in the *CIPercent* variable increases the probability of failure (not achieving a minimum of 100 consumption points). Specifically, a one percentage point increase in the share of income used to purchase optional consumption items will increase the probability of failure by 11% (p -value < 0.0001). Figure 2 plots the expenditures on optional consumption items as a

²² Because *EarlyPenalties* measures the number of penalties only in the first two months and, by design, all subjects survive at least until the end of the second month, months of survival cannot affect *EarlyPenalties*. Hence, *EarlyPenalties* is not an endogenous covariate.

²³ Amazingly some subjects did.

²⁴ Medical studies that utilize this model often have many subjects coded similarly. We cannot simply exclude these subjects without introducing a bias into results as there may be a latent variable that selects these individuals to pay their bills on the first day of the month.

percentage of income against the number of months of survival and reveals a rather clear linear relationship between the two variables for subjects when the *CIPercent* is greater than 6.5% in the *2BC* treatment.²⁵ The exceptions are the subjects that make early mistakes by failing to pay a bill associated with a large penalty.²⁶

[insert Table 7 here]

The estimated hazard ratio for the *NL* treatment is 1.31 and is statistically different from one (p -value = 0.0550). The interpretation of this estimate is that the *No Loan* treatment increases the relative hazard of survival in our experiment by 31 percent. After controlling for the expenditures on the optional consumption items, the subjects without access to loans are at a nontrivially higher risk. Hence we find that the existence of payday loans, all else fixed, increases the probability of survival by 31%. Payday loans, therefore, are a means for the subjects to absorb shocks when, for example, they do not sufficiently save for the unexpected “rainy days”.

Taking out the loans, however, does not come without its risk. The estimated coefficient for the *NumberLoans* variable indicates that each additional loan increases the relative hazard by 3 percent and is highly statistically significant (p -value = 0.0090).²⁷ Thus, we find that a sparing use of loans enhances the survivability of the subject relative to the *NL* treatment. Using the average *CIPercent* of 6.28%, the model predicts that in both the *NoOverdraft* and *Overdraft* treatments a male subject taking out ten or fewer loans in the *Loan* and the *2BC* treatments has a lower hazard rate than a corresponding subject in the *No Loan* and *2BC* treatments. However,

²⁵ Recall that monthly bills and other shocks represent 93.5% of the subjects’ income. The subjects, therefore, can use 6.5% of their income for optional/discretionary spending (or saving).

²⁶ For example, often if a subject fails to pay the rent bill early in the experiment, there is little that a subject can do in the early months to overcome its associated penalty.

²⁷ The additional covariates of the square of *NumberLoans* and an interaction variable of *NumberLoans* \times *CIPercent* are both highly insignificant.

taking out more than ten loans puts the subjects at a greater risk than a corresponding subject in the *No Loan* treatment.

The interpretation of the *NL* and *NumberLoans* variables, given the frequency distribution of the demand for payday loans in our experiment as shown in panel (g) of Table 6, provides us with an opportunity to offer some comments about what effect both the existence and use of payday loans has on the subjects' abilities to survive in our experiment. In our experiment, 160 subjects had access to payday loans. Of those 160 subjects, 35 of them took out more than ten payday loans. Based on the results of the above hazard model, the predicted probability of survival for these 35 subjects (i.e., 21.9% of the subjects with access to payday loans) was lower than that for otherwise identical subjects in the *No Loan* treatment. At the same time, the predicted probability of survival for the remaining 125 subjects for whom payday loans exist was higher than that for otherwise identical subjects in the *No Loan* treatment. In other words, while some subjects' survival was adversely affected by their use of payday loans, the majority of subjects in our experiment (i.e., 78.1% of the subjects with access to payday loans) benefited from both the existence of and their subsequent use of payday loans.

The restriction of the number of bounced checks (and overdrafts) to two has a significant impact on the ability of our subjects to survive. Relative to the *8BC* treatment, the *2BC* treatment increases the probability of failure by 26 percent (p -value = 0.0600). Even after taking into account the costs associated with bounced checks and overdrafts, this result implies that subjects' abilities to survive are greater when the subjects are allowed to bounce more checks or to write more overdraft checks.

As hypothesized, the estimated coefficient for the *NoOverdraft* variable is positive and statistically significant (p -value = 0.0090). This result indicates that those subjects in the

NoOverdraft treatment are 49% less likely to survive. The estimated coefficient for the *EarlyPenalties* variable is also positive and statistically significant (p -value < 0.0001). As expected, increases in the number of penalty points in the first two experimental months cause an increase in the probability of failure. Specifically, each additional penalty point causes the probability of failure to increase by 9%.²⁸ And finally, we find that gender has no effect (p -value = 0.5600).

We conclude this section with observations on the spontaneous order plotted in Figure 2. Notice how uniformly people survive until the end of the experiment (once they make it past the first 5 months), if they restrain their purchases of optional consumption items to less than 6.5% of income. For subjects who more liberally spend their income on the optional consumption items, there is a near linear inverse relationship between the months survived and the percentage of income used to purchase optional consumption items. Considering that people whose *CIPercent* $< 6.5\%$ take out very few loans, the above analysis indicates that loans are an effective tool to allow people with *CIPercent* $> 6.5\%$ to survive longer, as long as they do not overuse them.

VI. Examples

In this section, we discuss three subjects from the *Overdraft Protection* treatment as examples of how loans aided, harmed, or could have aided subjects.

²⁸ One possible explanation for this result is that the *EarlyPenalties* variable may capture the effects of the financial skills that each subject brings with her/him to the experiment. We would expect that subjects who know how to pay bills, manage their financial situation, ... etc. are less likely to incur penalties early on in the experiment. Hence, the *EarlyPenalties* variable may also serve as proxy for personal finance skills. Regardless of the interpretation, increases in this variable have a negative effect on the probability of financial survival.

Example 1: *Subject in the Loan and 2BC treatments who used loans effectively to survive (Session 11, Participant 1).*

This subject began the session paying all of his or her bills and over the first three months the subject consumed a total of three optional consumption items. In month 4 the subject missed three bills: cell phone, internet, and insurance. He or she skirted the consumption point minimum with a total of 103 points for the month and followed the same strategy again in month 5 by not paying their cell phone and insurance bills. The subject ended the month with a balance of 103 points. This plan of not paying some bills but not consuming many items is a trend that this participant keeps through the next few months.

After months 6 and 7, the subject started paying for all of their bills and also consuming more optional items. In months 9 and 10 they accumulated 121 and 136 consumption points, respectively. The subject wrote his or her first overdraft check in month 11 by consuming a small consumption item (hobby). In months 12 and 13 the participant started consuming many more optional items, accruing 130 and 156 points, respectively.

The subject missed paying their cell phone bill and wrote an overdraft check for groceries in month 16 and also consumed two optional items, movie and hobby. In months 19 and 20 the subject again consumed several optional items concluding the months with 136 points each month. In month 21, the subject played it safe by paying all of his or her bills and consuming very little. The vet visit came due in this month and reduced the subject's balance significantly. The consumption of optional items in several of the months along with bill shocks finally caught up with the person in month 22. The subject decided to take out their first loan of the session on day 10 of this month. The loan was used to pay several bills and the person consumed no optional items. This was an effective strategy that kept the person going through these shocks.

The subject took out another loan on day 4 of month 23, again only to pay bills. In months 24 and 25 the subject continued to take out loans to pay bills and nothing else and missed a cell phone bill. After this, the subject did not take out any more loans for the rest of the session and survived until month 30.

Example 2: *Subject in the Loan and 2BC treatments who ended the session early due to abuse of loans (Session 2, Participant 1).*

This subject started the session poorly writing two overdraft checks in the first month. In the second month he or she had to pay previously unpaid bills on day 3 but again was unable to cover them. On day 5 of month 3, the subject took out their first loan and later paid off the rest of the bills. Then in order to pay for three optional consumption items the subject took out a second loan on day 20. In month 5 the subject took out a fourth loan on day 3 and a fifth loan on day 12. Month 6 started with the subject paying bills and taking out a loan on day 3 to cover bills and consume an optional movie. On day 23 the subject took out a seventh loan and immediately used it to consume a vacation (E\$200, 50 consumption point). The next month the subject paid several bills and took out an eighth loan on day 9.

Month 8 was brutal for the participant. In all, the subject took out four loans in this month. Even with this the subject was unable to pay for the rent bill (penalty of 38 consumption points). The participant consumed many optional items in order to keep the consumption point balance above the minimum of 100. However, even with this burst of consumption, paying back all four loans in one month and not paying their rent doomed the subject who failed to reach the minimum requirement of 100 consumption points ending the month with a balance of 98. In sum the subject used loans for optional consumption items, which put him or her in a precarious financial position.

Example 3: Subject in the No Loan and 2BC who ended the session early due to lack of access to loans. (Session 10, Participant 2).

This subject moderately consumed optional items for most of the session. In month 9, the subject purchased a vacation but spent more conservatively in months 10 and 11, accumulating 105 points. For the next several months the subject continued to conservatively purchase optional items and pay *all* bills. In month 21 the subject purchased a vacation which depleted his or her account balance substantially. This caught up with the subject on day 7 of month 24 when he or she missed paying the first bill of the session (utilities), but he or she compensated for it by consuming an optional item. Similarly, in month 25 the person missed a grocery bill and bought an optional item to secure a consumption point balance of 105. In month 26 the subject did not pay the utility bill again, but did pay the previously unpaid bills in both month 25 and 26. Month 27 was the final month for the subject. He or she was unable to pay for both the utility and grocery bills and as a result failed to reach the 100 consumption point threshold. This subject appears to be as fiscally responsible as the subject in Example 1, but without access to loans, he or she was not able to reach month 30.

VII. Summary and Conclusions

The payday loan industry has received intense scrutiny by policy makers and consumer advocacy groups. This is not a surprising development given the industry's growth, the high interest rates charged on payday loans, and the much-publicized news accounts of those individuals whose repeated renewals of just one payday loan resulted in finance charges that far exceed the initial loan. Given both these high interest rates and allegations of excessive borrowing by some payday loan customers, a number of critics conclude that the payday loan

industry represents abusive if not predatory lending. Not surprisingly, some of these same critics have suggested interest rate caps as a remedy while others have argued that the industry should be banned altogether.

A number of academic studies examine several aspects of payday lending. Graves (2003), Burkey and Simkins (2004), and Graves and Peterson (2005) focus on the location decision of payday loan firms while Stegman and Faris (2003) and Flannery and Samolyk (2005) investigate the determinants of the financial performance of payday loan firms. While these areas of analysis are important, possibly the most relevant question to ask about payday lending is whether this particular form of credit is welfare enhancing. Morse (2006), Skiba and Tobacman (2007a), Morgan (2007), and Morgan and Strain (2007) each attempt to address this latter issue. Skiba and Tobacman obtain evidence that qualified first-time payday loan applicants are more likely to take out future payday loans and find that these same individuals are more likely to file for bankruptcy within two years of the initial loan application. At the same time, Morse (2006), Morgan (2007), and Morgan and Strain (2007) obtain evidence which suggests that payday loans raise welfare and that payday loans represent a welfare-enhancing provision of credit, respectively.

In this paper, we design an environment similar to the one that payday loan customers face. We then conduct a laboratory experiment to examine what effect, if any, the existence of payday loans has on individuals' abilities to manage and to survive financial setbacks (as represented by unexpected expenditures). In contrast to field studies that cannot directly measure the welfare of individuals, we measure total earnings and, in particular, the subjects' abilities to survive which are the measures of total welfare in our experiment.

Our primary finding addresses the question as to whether access to payday loans improves or worsens the likelihood of survival in our experiment. We also test the degree to which people's use of payday loans affects their ability to survive. We find that payday loans are a means for the subjects to absorb expenditure shocks and, therefore, survive. For these individuals, the existence of payday loans raises welfare. Taking out payday loans, however, does not come without its own risks. Subjects whose demand for payday loans exceeds a certain threshold level are at a greater risk than a corresponding subject in the treatment in which payday loans do not exist. While some subjects' survival was adversely affected by their use of payday loans, we found that the majority of subjects in our experiment benefited from the existence of and their subsequent use of payday loans.

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Appendix A

Tables

Table 1

Comparison of Costs of Bounced-Check Fees with Payday Loans

Type	Size of Payday Loan	Size of Bounced Check	Fee	Duration	Hypothetical APR
Payday Loan	\$300		\$45	14 days	391%
Bounced Check		\$155	\$28.75	14 days	478%

Source: Lehman (2005).

Table 2

Experimental Design
(Number of Subjects)

Overdraft Protection Treatment

	<i>No Loan</i>	<i>Loan</i>	Total
<i>8 Overdrafts</i>	<i>NL8</i> (23)	<i>L8</i> (22)	45
<i>2 Overdrafts</i>	<i>NL2</i> (54)	<i>L2</i> (57)	111
Total	77	79	156

No Overdraft Protection Treatment

	<i>No Loan</i>	<i>Loan</i>	Total
<i>8 Bounced Checks</i>	<i>NL8</i> (41)	<i>L8</i> (41)	82
<i>2 Bounced Checks</i>	<i>NL2</i> (40)	<i>L2</i> (40)	80
Total	81	81	162

Table 3**Monthly Bills**

Day	Description	Amount	Days till due	Consumption Points	Penalty
2	Rent	304	28	38	38
3	Cell Phone	48	28	6	5
6	Utilities	88	28	11	11
11	Groceries	120	28	15	15
16	Cable/Internet	96	28	12	6
17	Insurance	112	28	14	7
21	Credit Card	80	28	10	10

Table 4**Other Bills (or Shocks)**

Month/Day	Description	Amount	Days till due	Consumption Points	Penalty
4/7 and 21/7	Vet Visit	180	28	0	45
10/7 and 26/7	Dentist Appointment	190	28	0	48
15/7	Car Repair	200	28	0	50
18/7	Taxes	212	28	0	53
23/7	Appliance Repair	148	28	0	37
24/7	Car Repair	152	28	0	38
26/7	Driving Violation	200	28	0	50

Table 5**Consumption Item Purchase Opportunities**

Month/Day Introduced	Frequency Item is Offered	Description	Price	Consumption Points
1/7	Monthly	Movie	24	6
1/17	Monthly	Club	32	8
2/22	Monthly	Hobby	28	7
3/19	Monthly	Concert	36	9
5/9	Bi-Monthly	Sporting Event	80	20
6/2	Tri-Monthly	Vacation	200	50

Table 6
Summary Statistics

Panel (a): Frequency of Survival

Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Number of subjects	57	54	22	23
% of subjects who survived	61.4%	51.9%	54.5%	47.9%

No Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Number of subjects	40	40	41	41
% of subjects who survived	20.0%	12.5%	22.0%	17.1%

Notes:

1. Number of subjects represents the total number of subjects in that treatment.
2. % of subjects who financially survived represents the percentage of subjects who survived through the end of the experiment (i.e., survived 30 experimental months).

Panel (b): Length of Survival (months)

Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	18.9	18.4	16.5	16.3
Median	20.0	19.0	14.5	11.0

No Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	13.9	10.4	14.2	13.9
Median	9.0	5.5	12.0	12.0

Panel (c): Earnings in US\$*

Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	23.59	23.40	20.99	20.58
Median	26.09	24.32	17.94	16.27
Minimum	3.05	2.29	2.69	3.24
Maximum	37.57	37.48	37.30	37.47

No Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	7.38	13.48	17.78	17.71
Median	11.13	6.86	16.61	17.16
Minimum	3.01	2.87	2.86	2.75
Maximum	37.57	37.57	36.74	36.93

* Does not include \$7.00 show-up payment.

**Panel (d): Demand for (optional) Consumption Items
as a Percentage of Income**

<i>Overdraft Protection</i>				
	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	5.5%	7.1%	6.8%	7.2%
Median	5.0%	7.2%	6.6%	7.2%
<i>No Overdraft Protection</i>				
	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	4.5%	6.3%	6.5%	6.9%
Median	4.1%	5.5%	6.2%	5.6%

Panel (e): Total Number of Penalties

<i>Overdraft Protection</i>				
	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	24.0	29.6	30.3	46.7
Median	7	24	18	18
Number of subjects with 0 penalties	26	18	6	6
% of subjects with 0 penalties	45.6%	33.3%	27.3%	26.1%
<i>No Overdraft Protection</i>				
	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	39.0	67.8	52.7	76.3
Median	38	39.5	41	49
Number of subjects with 0 penalties	6	2	2	3
% of subjects with 0 penalties	15.0%	5.0%	4.9%	7.3%

**Panel (f): Demand for Payday Loans and Payday Renewals with
Overdraft Protection (OD) and without Overdraft Protection**

	<u>L2</u>	<u>L2</u>	<u>L8</u>	<u>L8</u>
	<u>with OD</u>	<u>without OD</u>	<u>with OD</u>	<u>without OD</u>
Total number of loans	272	206	172	285
Total number of borrowers	32	23	14	30
Average loans per borrower	8.5	9.0	12.3	9.5
Maximum loans per borrower	27	29	37	41
Total number of renewals	39	31	8	20
Number of borrowers with one or more renewals	5	5	4	3
Average renewals per borrower	1.22	1.35	0.57	0.67
Maximum renewals per borrower	16	20	4	17
Total number of consecutive loans	186	122	122	195
Number of borrowers with one or more consecutive loans	16	14	11	21
Average consecutive loans per borrower	5.81	5.30	8.71	6.50
Maximum consecutive loans per borrower	26	26	34	36

Note: Consecutive loans represents the number of consecutive biweekly pay periods that an individual had an outstanding loan minus one.

**Panel (g): Frequency Distribution of Payday Loan Demand
with Overdraft Protection (OD) and without Overdraft Protection**

	<u>L2</u> <u>with OD</u>	<u>L2</u> <u>without OD</u>	<u>L8</u> <u>with OD</u>	<u>L8</u> <u>without OD</u>
No. of subjects with 0 Loans	25	17	8	11
No. of subjects with 1 to 5 Loans	16	12	4	17
No. of subjects with 6 to 10 Loans	4	3	4	4
No. of subjects with 11 to 15 Loans	4	1	1	1
No. of subjects with 16 to 20 Loans	4	3	2	2
No. of subjects with 21 or more Loans	4	4	3	6
Number of subjects with 1 or more Loans	32	23	14	30

	<u>L2</u> <u>with OD</u>	<u>L2</u> <u>without OD</u>	<u>L8</u> <u>with OD</u>	<u>L8</u> <u>without OD</u>
% of subjects with 0 Loans	43.9%	42.5%	36.4%	26.8%
% of subjects with 1 to 5 Loans	28.1%	30%	18.2%	41.5%
% of subjects with 6 to 10 Loans	7.0%	7.5%	18.2%	9.8%
% of subjects with 11 to 15 Loans	7.0%	2.5%	4.5%	2.4%
% of subjects with 16 to 20 Loans	7.0%	7.5%	9.1%	4.9%
% of subjects with 21 or more Loans	7.0%	10.0%	13.6%	14.6%
% of subjects with 1 or more Loans	56.1%	57.5%	63.6%	73.2%

Panel (h): Demand for Overdrafts (OD) and Bounced Checks (BC)

Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Total number of OD	59	60	56	87
OD per subject	1.04	1.11	2.55	3.78
% of subjects who used OD	66.7%	64.8%	63.6%	87.0%

No Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Total number of BC	33	44	86	79
BC per subject	0.83	1.1	2.10	1.93
% of subjects who used BC	47.5%	75.0%	73.2%	68.3%

Panel (i): End-of-Month Checking Account Balance

Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	\$659.21	\$572.49	\$590.50	\$579.78
Median	\$542.05	\$522.64	\$531.86	\$524.50

No Overdraft Protection

	<u>L2</u>	<u>NL2</u>	<u>L8</u>	<u>NL8</u>
Mean	\$628.23	\$558.10	\$568.87	\$566.62
Median	\$536.25	\$517.75	\$521.00	\$530.00

Table 7**Estimates of the Cox Proportional Hazard Model**

	Estimate	Std. Error	$e^{Estimate}$	z-statistic	H_a	p-value
<i>CIPercent</i>	0.1017	0.0231	1.11	4.41	$\beta_1 > 0$	<0.0001
<i>No Loan</i>	0.2666	0.1684	1.31	1.58	$\beta_2 > 0$	0.0550
<i>NumberLoans</i>	0.0249	0.0171	1.03	2.37	$\beta_3 > 0$	0.0090
<i>2BC</i>	0.2315	0.1498	1.26	1.55	$\beta_4 > 0$	0.0600
<i>NoOverdraft</i>	0.3974	0.1676	1.49	2.37	$\beta_5 > 0$	0.0090
<i>EarlyPenalties</i>	0.0844	0.0060	1.09	14.05	$\beta_6 > 0$	<0.0001
<i>Female</i>	0.0849	0.1471	1.09	0.58	$\beta_7 \neq 0$	0.5600
				LR(7) = 230		<0.0001
318 Obs.						

Note:

1. Estimate represents the estimated coefficient for each covariate (i.e., $\hat{\beta}_j$ for $j = 1, 2, \dots, 7$); therefore, $e^{Estimate} = e^{\hat{\beta}_j}$.

Appendix B

Figures

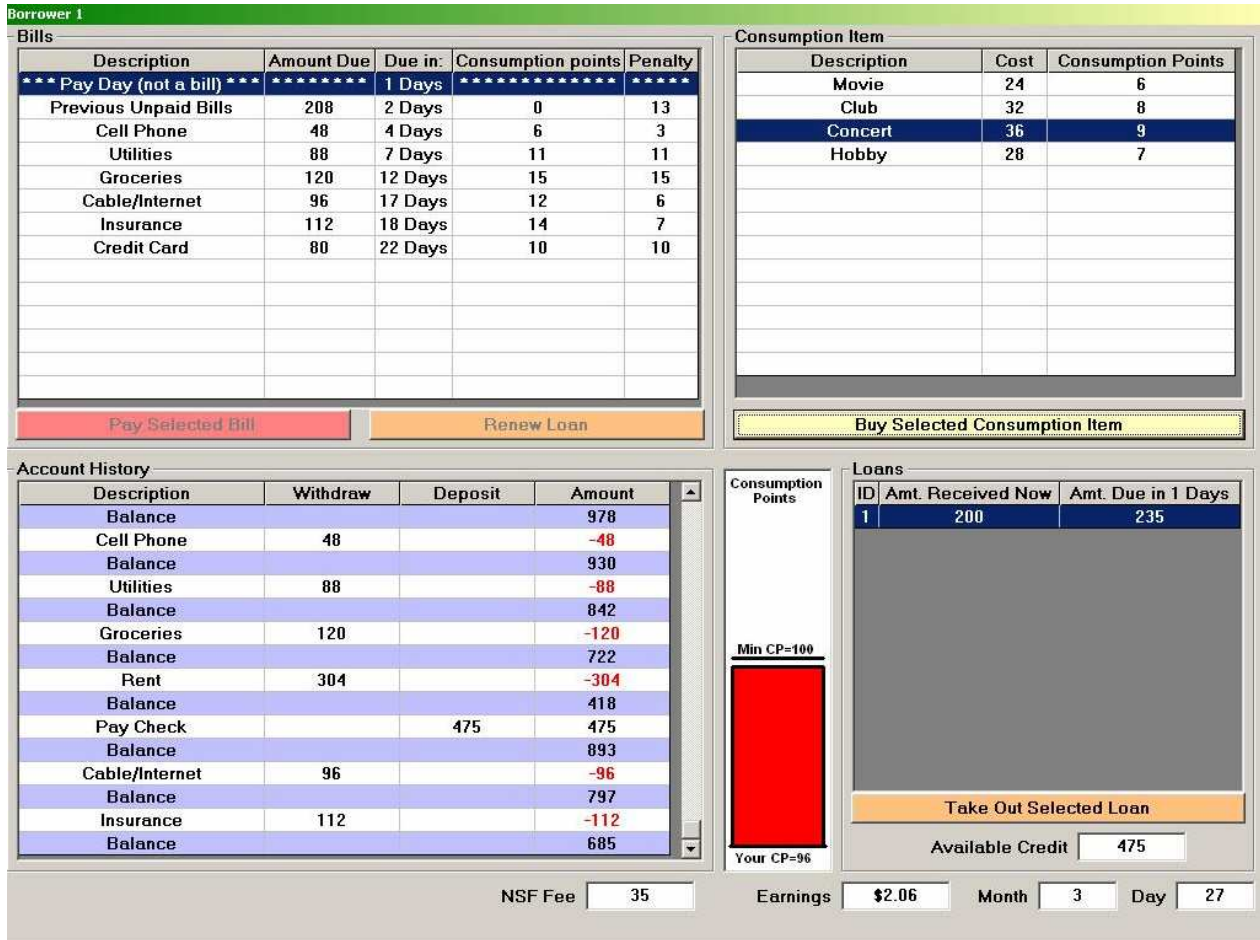
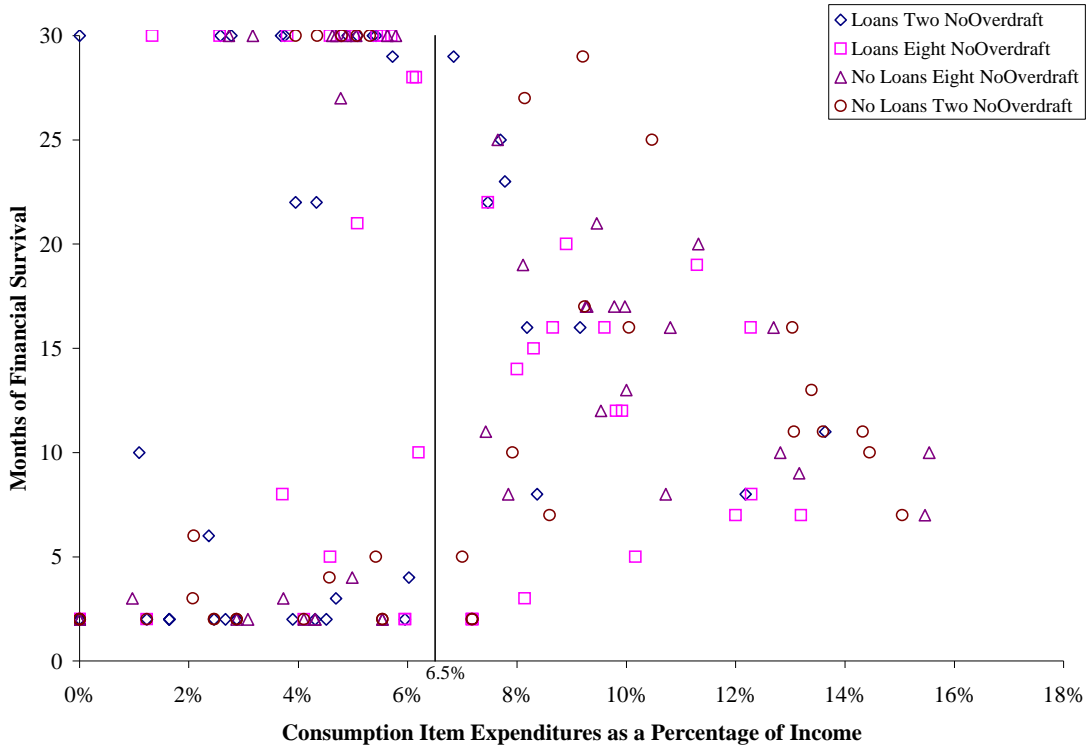


Figure 1. Screenshot for Subject in the *Loan* Treatment

*N.B. The only difference for subjects in the *No Loan* treatment is that they did not have the loan frame in the bottom right corner. The consumption point counter in the bottom middle portion of the screen turned from red to green when the subject met the minimum threshold of 100 consumption points to continue on to the next month.

Panel (a): No Overdraft Protection Treatment



Panel (b): Overdraft Protection Treatment

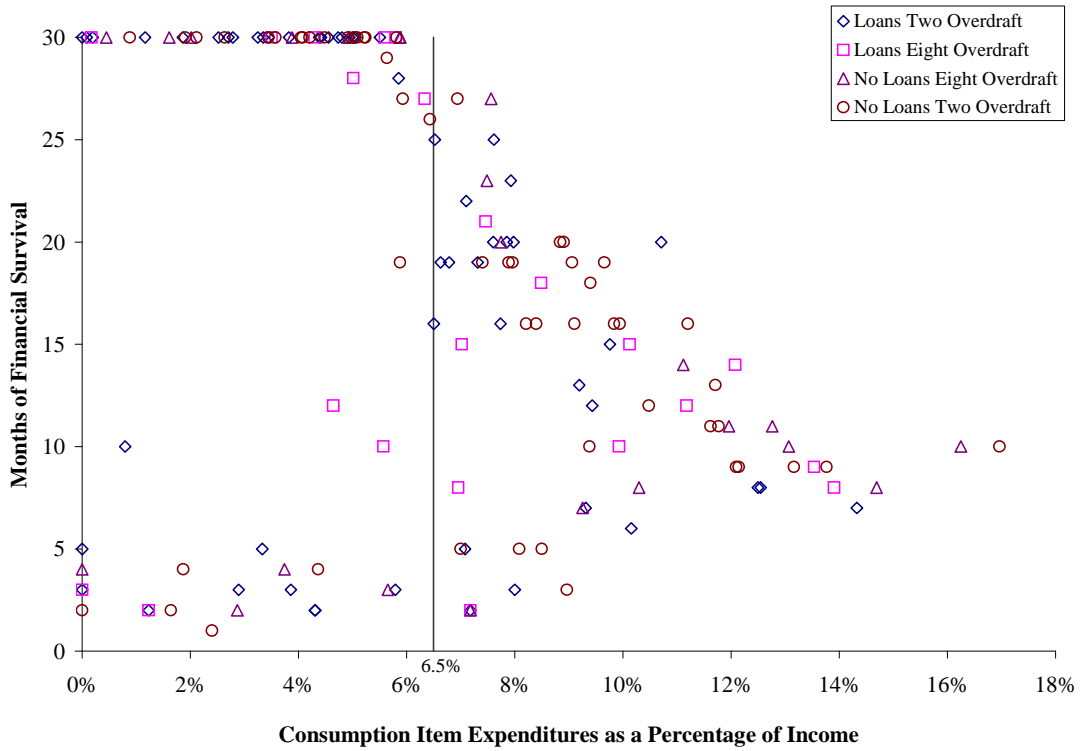


Figure 2. CIPercent Plotted Against Months of Financial Survival

Appendix C

Experiment Instructions

<page 1>

Welcome

This is an experiment in the economics of decision-making. The instructions are simple. If you read them carefully and make good decisions, you may earn a considerable amount of money that will be paid to you in cash at the end of the experiment.

From this point on, all references are in terms of computer dollars. In this experiment you will have a series of bills you must pay over the course of some days and months. Some bills will come on a monthly basis and some will be one time only.

Bills are located in the upper left portion of the screen and will appear throughout the experiment. Each bill will be due in some number of days after it appears. This means it must be paid on or before the due date. To pay a bill, highlight it by clicking on it and press the **Pay Selected Bill** button.

Each bill will have an amount due. Your account balance is located in the “Account History” frame in the bottom left portion of your screen. This section of your screen records a history of your transactions and your current balance.

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Consumption Points

When a bill appears you will earn **consumption points**. You can think of **consumption points** as the benefit you receive from consuming the item on the bill. The **consumption points** you earn from any given bill is located under the “Consumption points” column in the bills frame.

Every consumption point you have at the end of each month will earn you one cent that will be paid to you at the end of the experiment. Your monthly **consumption point** total will be reset to zero at the beginning of the month.

If you do not pay a bill, you may incur a **consumption point penalty**. The penalty for not paying a bill is located under the “Penalty” column in the Bills section. The penalty will be subtracted from your monthly **consumption point** total. That bill will then appear next month as “Previous Unpaid Bills” in bill section. You will continue to incur the **consumption point penalty** each month until you pay it off.

<page 3>

Consumption Points Continued

Each month **consumption items** will also be available for purchase. These items are located in the top right portion of your screen.

Consumption items are optional purchases; there is no penalty if you do not purchase them. If you do purchase a **consumption item**, then the cost will be subtracted from your balance and the **consumption points** will be added to your monthly total.

At the end of each month, which is every 28 days, your **consumption points** will be added to your earnings. They will then be cleared out.

Each month you must consume a minimum of **100 consumption points**. *It is important to note that if you do not reach this minimum by the end of each month, your participation in the experiment will end.*

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Bills continued

If you pay a bill that is greater than your account balance, meaning you don't have enough money to pay for it, you will incur a non sufficient fund (NSF) fee. If this occurs, only the NSF fee of 35 dollars will be subtracted from your balance, and you will avoid the consumption penalty. However, the amount of the bill and its associated penalty will appear next month as part of the "Previous Unpaid Bills".

You can only incur 2 NSF fees.

On the 14th and 28th of every month you will receive a paycheck in the amount of 475. This will be added to your account balance.

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At the end of the experiment your balance will be converted to cash at a rate of 4 computer dollars to one US cent. This cash will be added to your "Earnings" from the consumption points, which is displayed at the bottom of your screen.

Important Items for Review

- (1) Every consumption point you have at the end of a month will earn you one US cent.
- (2) If you do not accumulate the minimum number of consumption points by the end of a month, your participation in this experiment will end.

If you feel you are prepared to proceed with the actual experiment, click on the Start button. The experiment will begin once everyone has clicked on the Start button. If you have a question that you feel was not adequately answered by the instructions, please raise your hand and ask the monitor before proceeding.

<Loan treatment instructions on day 27, month 2>

Loans

At any time you can take out a loan from one of the x different lenders, located in the bottom right portion of your screen.²⁹ All of the loans will give you the same amount, 200 computer dollars. But the different lenders may offer different rates for their loans, located in the "Amt. Due in X Days" column.

Suppose the rate in this column is 225, then if you took out that loan you would receive 200 immediately which would be available to spend. Then you would owe 225 on the next payday (the 14th or the 28th).

The loan will be automatically repaid at the price the amount the lender offered at the time of purchase. On the day the loan is due you can choose to renew it by clicking the "Renew Loan" button. This will renew the loan at the current lender's rate. The original loan will also be automatically paid back.

²⁹ The software has been programmed to implement subjects as lenders. We chose to first implement a robot lender for this initial project. Each lender has a maximum capacity of twelve loans, so depending upon how many subjects were in a session, we included enough computer lenders to accommodate two loans per subject per pay period.