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PAWNSHOPS, BEHAVIORAL ECONOMICS, AND SELF-REGULATION

SUSAN PAYNE CARTER* AND PAIGE MARTA SKIBA**

I. Introduction

Pawnbroking is the oldest source of credit.¹ There is growing public interest in day-to-day pawnbroking operations, as evidenced by the popularity of reality shows such as “Pawn Stars” and “Hardcore Pawn.”² Television viewers’ curiosity about an old credit institution may be due to the fact that 7% of all U.S. households have used pawn credit.³ Although pawnshops predate biblical times, researchers know surprisingly little about this ancient form of banking and its customers.⁴ We fill this gap by documenting detailed information on pawnshop loan repayment and default, and by discussing how pawnshop borrowers’ behavior is consistent with various behavioral economics phenomena.

Pawnshop loans are small, short-term, collateralized loans typically used by low-income consumers. The borrower leaves a possession, or “pledge,” as collateral in exchange for a loan, typically of \$75–\$100.⁵ Interest rates vary by state and range from 2

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¹ JOHN P. CASKEY, FRINGE BANKING: CHECK CASHING OUTLETS, PAWNSHOPS, AND THE POOR 13 (1994).

² *Pawn Stars*, THE HISTORY CHANNEL, <http://www.history.com/shows/pawn-stars> (last visited Nov. 19, 2012); *Hardcore Pawn*, TRUTV, <http://www.trutv.com/shows/hardcore-pawn/index.html> (last visited Nov. 19, 2012).

³ Marieke Bos, Susan Payne Carter & Paige Marta Skiba, *The Pawn Industry and its Customers: The United States and Europe* 1 (Vanderbilt Univ. Law and Econ. Research Paper Series, Paper No. 12–26, 2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2149575.

⁴ *Id.*

⁵ Customers can also sell items outright to the pawnshop, a practice we do not study here.

to 25%.⁶ If the borrower does not return to repay the principal plus interest after the maturation date (typically loans last 30–90 days), the pledge is forfeited and resold by the pawnbroker. Just about anyone can borrow on a pawn loan. No bank account, job, or credit check is required—just the collateral and a valid photo ID.

We are able to study pawnshop-borrowing behavior in depth using a unique transaction dataset from a lender in Texas with 103 stores in 37 different cities across the state. Our dataset comes from “pawnslips,” which are filled out by the pawnbroker at the time of the transaction and include information on the collateral or “pledge,” start date and due date, repayment outcomes, and borrower demographic characteristics. We study the nature of the collateralized pledge separately, distinguishing items that might have intrinsic value to the owner that goes beyond the dollar value of the item, i.e., sentimental value. We find that borrowers are more likely to return to repay their pawnshop loan when they have pawned a sentimental item, such as a piece of jewelry. We discuss potential behavioral economic explanations and rational economic reasons for this behavior below.

These issues have gone unexplored in the sparse literature on pawnshop lending. The growing body of work on other forms of what is often referred to as “fringe banking” makes the persistent lack of literature on pawnshops especially surprising.⁷ Numerous papers study consumer borrowing behavior and test the consequences of various other types of subprime credit, including payday loans, subprime mortgages, subprime auto loans, and auto-title loans.⁸ Perhaps researchers have overlooked pawnshop lending

⁶ Our Table 1 shows these interest rates. For a state-level analysis of pawnbroking as well as payday loans, see generally Susan Payne Carter, *Payday Loan and Pawnshop Usage: The Impact of Allowing Payday Loan Rollovers* (Jan. 15, 2012) (unpublished Ph.D. dissertation, Vanderbilt Univ.), available at https://my.vanderbilt.edu/susancarter/files/2011/07/Carter_Susan_JMP_website2.pdf.

⁷ For a nice exception that studies pawnbroking (rather than customer behavior per se) see CASKEY, *supra* note 1. For works that study pawnshop customers directly, see Bos, Carter & Skiba, *supra* note 3; Sumit Agarwal, Paige Marta Skiba & Jeremy Tobacman, *Payday Loans and Credit Cards: New Liquidity and Credit Scoring Puzzles?*, 99 AM. ECON. REV. 412 (2009).

⁸ On payday loans see generally Agarwal, Skiba & Tobacman, *supra* note 7, at 412; Neil Bhutta, Paige Marta Skiba & Jeremy Tobacman, *Payday Loan Choices and Consequences* 1–23 (Vanderbilt Univ. Law and Econ. Research Paper Series, Paper No. 12–30, 2012), available at

because the loans made are small (the average loan size in our data is \$79). Despite their small principal, however, pawnshop loans are an important tool that many consumers use to manage their monthly finances during financial shortfalls.

Our results documenting differential repayment rates on pawn contracts are consistent with both (1) a model of decision-making where consumers are aware of their own self-control problems and (2) a rational model of economic decision-making where “affect” or sentimentality toward an object plays a role in utility maximization. As explained *infra*, loss aversion, the extra loss in utility due to the feeling of loss relative to a reference point,⁹ may also play a role.

Because of self-awareness about self-control problems, borrowers may seek commitment mechanisms to give themselves a greater incentive to act optimally. In the context of pawnshops, these

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2160947; Carter, *supra* note 6; Susan Payne Carter, Paige Marta Skiba & Jeremy Tobacman, *Pecuniary Mistakes? Payday Borrowing by Credit Union Members*, in FINANCIAL LITERACY: IMPLICATIONS FOR RETIREMENT SECURITY AND THE FINANCIAL MARKETPLACE 145, 147 (Olivia S. Mitchell ed., 2011); Will Dobbie & Paige Marta Skiba, *Information Asymmetries in Consumer Credit Markets: Evidence from Payday Lending* 1–41 (Vanderbilt Univ. Law and Econ. Research Paper Series, Paper No. 11-05, Sept. 15, 2011), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1742564###; Ronald J. Mann & Jim Hawkins, *Just Until Payday*, 54 UCLA L. REV. 855, 857 (2007); Brian T. Melzer, *The Real Costs of Credit Access: Evidence from the Payday Lending Market*, 126 Q. J. OF ECON. 517, 518 (2011); Paige Marta Skiba & Jeremy Tobacman, *Do Payday Loans Cause Bankruptcy?* 1 (Vanderbilt Univ. Law and Econ. Research Paper Series, Paper No. 11-13, Feb. 23, 2011). On mortgages, see generally J. Michael Collins, *Exploring the Design of Financial Counseling for Mortgage Borrowers in Default*, 28 J. FAM. ECON. ISSUES 207 (2007); J. Michael Collins, Ken Lam & Chris Herbert, *State Mortgage Foreclosure Policies and Counseling Interventions: Impacts on Borrower Behavior in Default*, 30 J. OF POL’Y ANALYSIS & MGMT. 216 (2011). On subprime auto loans, see generally William Adams, Liran Einav & Jonathan Levin, *Liquidity Constraints and Imperfect Information in Subprime Lending*, 99 AMER. ECON. REV. 49 (2009). On auto-title lending, see generally Jim Hawkins, *Credit on Wheels*, 69 WASH & LEE L. REV. 535 (2012).

⁹ Daniel Kahneman, Jack L. Knetsch & Richard H. Thaler, *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. OF ECON. PERSPECTIVES 193, 194 (1991).

types of borrowers, called “hyperbolic discounters”¹⁰ by behavioral economists, may use sentimental items (such as wedding rings) rather than less sentimental items (such as electronics) to encourage themselves to return to repay the loan. Indeed, pawnshops accept almost anything of at least a couple dollars in value as a pledge, but many borrowers choose to pledge something of great importance to them.

A growing body of work in behavioral economics documents real-world evidence of hyperbolic discounting. To our knowledge, ours is the first work to add pawnshops to the ongoing discussion of intertemporal choice in markets.¹¹

¹⁰ Ted O’Donoghue & Matthew Rabin, *Choice and Procrastination*, 116 Q. J. OF ECON. 121, 125 n.5 (2001) (explaining that the term “hyperbolic discounting” is often used to describe how “a person’s relative preference for well-being at an earlier date over a later date gets stronger as the earlier date gets closer,” i.e., how people seek immediate gratification).

¹¹ Professors DellaVigna and Malmendier document self-control problems in exercising. See Stefano DellaVigna & Ulrike Malmendier, *Paying Not to Go to the Gym*, 96 AM. ECON. REV. 694, 695–96 (2006). For more recent work documenting self-control problems, see generally Heather Royer, Mark Stehr & Justin Sydnor, *Using Incentives and Commitments to Overcome Self-Control Problems: Evidence from a Workplace Field Experiment* (Oct. 28, 2011) (unpublished manuscript), available at <http://experiments.cob.calpoly.edu/seminars/Royer.pdf>. For work on self-control problems in credit markets, see generally David Laibson, Andrea Repetto & Jeremy Tobacman, *Estimating Discount Functions with Consumption Choices over the Lifecycle* (Nat’l Bureau of Econ. Research, Working Paper No. 13314, Aug. 2007), available at <http://www.nber.org/papers/w13314>. On credit cards, see generally Haiyan Shui & Lawrence M. Ausubel, *Time Inconsistency in the Credit Card Market* (Jan. 30, 2005) (unpublished manuscript), available at <http://www.ausubel.com/creditcard-papers/time-inconsistency-credit-card-market.pdf>. On payday loans, see generally Paige Marta Skiba & Jeremy Tobacman, *Paydays Loans, Uncertainty and Discounting: Explaining Patterns of Borrowing, Repayment, and Default* (Vanderbilt Law and Econ. Research Paper Series, Paper No. 08-33, Aug. 21, 2008), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1319751.

II. Regulation

Pawnshops are popularly considered to have usurious interest rates, but their fees are often low relative to those associated with alternatives such as payday loans,¹² tax refund anticipation loans,¹³ and rent-to-own agreements.¹⁴ All states allow pawnshops, and most *do* restrict the fees that can be charged through usury laws or laws regulating small loans.¹⁵ Table 1 provides a list of laws governing pawnshop interest rates by state. Beyond regulating fees, states can also force pawnshops to return any excess proceeds to the customer once they resell an item.¹⁶ In Texas, where our data are from, maximum interest rates are 20% per thirty days for loans up to \$150 and 15% per thirty days for loans larger than \$200.¹⁷

¹² Skiba & Tobacman, *supra* note 11, at 20 (documenting annualized interest rates for two-week-long payday loans of 468%).

¹³ Gregory Elliehausen, *Consumer Use of Tax Refund Anticipation Loans 2* (Georgetown Univ. McDonough Sch. of Bus. Credit Research Center, Monograph No. 37, Apr. 2005) (illustrating annualized interest rates for ten day loans as high as 162.43%).

¹⁴ Michael H. Anderson & Sanjiv Jaggia, *Rent-to-Own Agreements: Customer Characteristics and Contract Outcomes*, 61 J. OF ECON. & BUS. 51, 52 (2009) (referencing interest rates on such loans higher than 100%).

¹⁵ Joshua D. Shackman & Glen Tenney, *The Effects of Gov't Regulations on the Supply of Pawn Loans: Evidence from 51 Jurisdictions in the U.S.*, 30 J. OF FIN. SERV. RESEARCH 69, 81 (2006); Nancy PINDUS, DANIEL KUEHN & RACHEL BRASH, URBAN INST., STATE RESTRICTIONS ON SMALL-DOLLAR LOANS AND FIN. SERVS. 2004–2009: SUMMARY, DOCUMENTATION, AND DATA 1 (Urban Inst., Oct. 2010), available at <http://www.urban.org/publications/412305.html> (showing that forty states set interest rate caps on pawnshop loans).

¹⁶ This process rarely happens in practice. *But see* Shackman & Tenney, *supra* note 15, at 81 (listing states that have enacted such requirements).

¹⁷ *Texas Pawnshop Rate Chart*, TEX. OFFICE OF CONSUMER CREDIT COMM'R, http://www.occc.state.tx.us/pages/int_rates/pRate13.pdf (last visited November 20, 2012) (listing maximum legal rates from July 1, 2012 to June 30, 2013).

Table 1
Pawnshop Interest Rate Regulations

State	Interest Rates Per Month
Alabama	25% / mo
Alaska	20% / mo
Arizona	8% / mo
Arkansas	none
California	2.5% / mo
Colorado	local rules
Connecticut	3% / mo
DC	5% / mo
Delaware	3% / mo
Florida	25% / mo
Georgia	25% / mo
Hawaii	20% / mo
Idaho	none
Illinois	3% / mo
Indiana	3% / mo
Iowa	none
Kansas	10% / mo
Kentucky	2% / mo
Louisiana	10% / mo
Maine	25% / mo
Maryland	none
Massachusetts	3% / mo
Michigan	3% / mo
Minnesota	3% / mo
Mississippi	25% / mo
Missouri	2% / mo
Montana	25% / mo
Nebraska	none
Nevada	10% / mo
New Hampshire	none

New Jersey	4% / mo
New Mexico	max {7.50, 10%}
New York	4% / mo
North Carolina	2% / mo
North Dakota	reg. by municipalities
Ohio	5% / mo
Oklahoma	20% / mo
Oregon	3% / mo
Pennsylvania	2.5% / mo
Rhode Island	5% / mo
South Carolina	\$22.50/\$100 / mo
South Dakota	none
Tennessee	2% / mo
Texas	\$20 / mo
Utah	10% / mo
Vermont	3% / mo
Virginia	5% / mo
Washington	3% / mo
West Virginia	none
Wisconsin	3% / mo
Wyoming	20% / mo

Table 1 shows pawnshop laws by state as of 2011. The state laws on pawn shops come from individual state regulating insitutions.

Beyond these fairly standard regulations, however, pawnshops have received little attention from regulators in recent years. This is in stark contrast to other forms of prime and subprime credit such as credit cards, student loans, and payday loans, which have been explicitly identified by the new Consumer Financial Protection Bureau (“CFPB”) as areas of interest.¹⁸ Pawnshops, however, do not seem to be on the CFPB’s radar.¹⁹

¹⁸ See *Know Before You Owe: Credit Cards*, CONSUMER FIN. PROTECTION BUREAU, <http://www.consumerfinance.gov/credit-cards/knowbeforeyouowe>

The relative lack of regulatory attention given to pawnshops may be due to the phenomenon we document in this paper: consumers seem to avoid making big financial mistakes when using pawnshops. Something about the use of personal items (and particularly sentimental personal items) as collateral may distinguish these loans from credit cards, payday loans, and the like in terms of borrowers' repayment and default behavior.

III. Data

We use administrative records from a large, national pawnshop lender in the United States. Our data consist of 398,722 pawnslips from stores that operated in Texas from 1997–2002. From these slips, we can observe the size of the loan, whether the loan was defaulted on or repaid, and the nature of the pledge. The store categorizes the items into the following groups: Jewelry, TVs/Electronics, Tools/Equipment, Household Items, Sporting Equipment, Guns, Instruments, and Cameras/Equipment.²⁰ While our dataset is large and very detailed, one drawback is that it comes from Texas alone. Fortunately, we are able to rely on previous work documenting the surprisingly similar characteristics of pawnshop use across the United States as well as Sweden.²¹ Figure 1 and Table 2 provide basic summary statistics from our data. The typical loan is for \$79 and lasts for 109 days.

(last visited Nov. 25, 2012); *Know Before You Owe: Student Loans*, CONSUMER FIN. PROTECTION BUREAU, <http://www.consumerfinance.gov/students/knowbeforeyouowe> (last visited Nov. 25, 2012); Zixta Q. Martinez, *Share Your Input on Payday Loans for the Official Record*, CONSUMER FIN. PROTECTION BUREAU (Mar. 23, 2012), <http://www.consumerfinance.gov/blog/category/payday-loans/>.

¹⁹ There is no mention of “pawnshops” on the CFPB website. See CONSUMER FIN. PROTECTION BUREAU, <http://www.consumerfinance.gov/> (last visited Nov. 25, 2012).

²⁰ Pawnshops and other lenders now commonly offer “title loans,” with an automobile as a pledge. We do not have automobiles as pledges in our data. For more on title lending, see generally Hawkins, *supra* note 8; Nathalie Martin & Ozymandias Adams, *Grand Theft Auto Loans: Repossession and Demographic Realities in Title Lending*, 77 MO. L. REV. 41 (2012) (discussing demographic trends in auto-title lending).

²¹ Bos, Carter & Skiba, *supra* note 3, at 2.

Table 2: Summary Statistics

All Loans	
Percent Female	59.59%
Average Loan Duration	109 (140.2)
Average Loan Amount	79.5 (90.8)

Table 2 shows the percent of pawn loans taken out by females, the average and standard deviation (in parentheses) of the loan duration and loan amount. The sample of observations is from a pawnshop lender in Texas between 1997 and 2002.

Forty-nine percent of the pawnshop loans in the dataset are collateralized with jewelry, with over half of the items in the jewelry category consisting of rings, including both men's and women's class and wedding rings. The next most popular category of pledges is televisions and electronics, including satellite dishes, stereos, and CD players. Individuals also commonly pawn tools, household items such as small appliances, sporting equipment, guns, musical instruments, and camera equipment.

The value of collateral has a wide distribution: Guns have the highest average value, \$146, with instruments (\$117) and jewelry (\$96) coming in second and third, respectively. Statistics for all categories are shown in Table 3.

Table 3: Collateral by Category

Category	Number of Observations	Percentage of Observations	Average Loan Amount	Standard Deviation
Jewelry	199,288	49.98%	\$96.28	105.02
TVs / Electronics	126,297	31.68%	\$58.80	62.34
Tools / Equipment	31,600	7.93%	\$50.18	60.67
Household Items	10,552	2.65%	\$42.92	44.7
Missing	7,833	1.96%	\$63.75	72.54
Guns	7,734	1.94%	\$146.97	98.75
Instruments	7,700	1.93%	\$116.92	104.66
Camera / Equipment	4,052	1.02%	\$75.85	77.87
Misc.	3,666	0.92%	\$51.50	62.46

Table 3 reports the number of loans for each collateral category, the percentage of observations, and the average amount and standard deviation of the items pawned for each category. All amounts are in 2002 dollars. The sample of observations is from a pawnshop lender in Texas between 1997 and 2002.

The items pawned differ somewhat by the gender of the borrower. Jewelry is the most popular pledge for women, making up over 60% of the items pawned by women. Meanwhile, less than 35% of the items pawned by men are jewelry; men are more likely than women to pawn electronics and tools.

IV. Default

The probability of repayment varies by the type of collateral, the gender of the borrower, and the value of the item. Figure 2 depicts the probability of repayment and default by the category of collateral. Instruments, guns, and jewelry are associated with the highest probability of repayment and lowest probability of default. The pawning of tools, household items, and miscellaneous items

(including clothes and medical equipment) leads to the highest probability of default and lowest probability of repayment.²²

We explore default dynamics more precisely using an ordinary least squares regression, measuring the probability of default as shown in the following linear probability model:

$$Default_i = c + \beta Y_i + \gamma X_i + t + \epsilon_i$$

(Equation 1)

where $Default_i$ is an indicator variable that takes values 0 (repay) or 1 (default). Y is a vector of collateral categories (the category of camera equipment is omitted), X is a vector of demographic categories, c is a constant term, t represents month and year dummies, and ϵ_i is the error term. We cluster the standard errors at the individual level and then in other regressions, at the store level where appropriate. Results are shown in Table 4.

²² Here, as we cannot directly test for it, we abstract from any adverse selection in this market, such as borrowers having more information about their own default risks than the lender has. But we do not doubt asymmetries in information could be important here, as has been documented in the payday loan and subprime auto lending market. See Adams, Einav & Levin, *supra* note 8, at 75 (finding that adverse selection arises from asymmetric information about default risk in auto loan markets); Dobbie & Skiba, *supra* note 8, at 2 (finding “economically and statistically significant adverse selection into payday loans”).

Table 4

	(1)	(2)	(3)	(4)
Dependent Variable: Default				
Electronics	0.021 (0.0135)	0.0060 (0.0132)	0.021 (0.0139)	0.0060 (0.0131)
Guns	-0.041** (0.0161)	-0.0058 (0.0158)	-0.041** (0.0159)	-0.0058 (0.0159)
Household Items	0.055*** (0.0160)	0.041*** (0.0154)	0.055*** (0.0160)	0.041*** (0.0155)
Instruments	- 0.055*** (0.0172)	-0.038** (0.0177)	- 0.055*** (0.0186)	-0.038** (0.0166)
Jewelry	-0.028** (0.0136)	-0.046*** (0.0136)	-0.028* (0.0146)	-0.046*** (0.0132)
Tools	0.031** (0.0147)	0.036** (0.0151)	0.031** (0.0156)	0.036** (0.0144)
Female		0.054*** (0.0054)		0.054*** (0.0044)
White		-0.033 (0.0237)		-0.033 (0.0223)
Black		0.00053 (0.0240)		0.00053 (0.0220)
Hispanic		0.015 (0.0230)		0.015 (0.0221)
Loan Amount		- 0.00023*** (0.0000)		- 0.00023** * (0.0000)
Month x Year Effects		X		X
Cluster at Individual	X			X
Cluster at Store		X	X	
N	387,223	387,223	387,223	387,223
adj. R-sq	0.0032	0.0169	0.0032	0.0169

The category of camera equipment is omitted in the regressions, meaning results are interpreted as differences in other categories of collateral relative to camera equipment. As the results show, even after controlling for demographic characteristics (gender and race) and the loan size, borrowers pawning jewelry and instruments are the least likely to default. The pawning of household items or tools is more likely to result in default than pawning camera equipment. The coefficients on the merchandise categories are all statistically significantly different from each other at the 1% level, except for the coefficients on jewelry and instruments, which are statistically different at the 5% level. An interesting fact that we are not able to explore further here is that, controlling for loan characteristics, female borrowers are 5.4 percentage points more likely to default on their loans than male borrowers are.

Our findings show that when borrowers use items like jewelry or instruments—which may have intrinsic value greater than the market price—as collateral for a loan, they are more likely to repay the loan.²³ This is true even controlling for characteristics of the loan and borrower, and the value of the item. To investigate this result further, we narrow the field of jewelry down further to include only items that are the most likely to hold sentimental value: class rings, wedding rings, and engagement rings.

Borrowers may choose to pawn these types of items as a commitment mechanism to encourage themselves to repay the loan, as we discuss further in the section on theoretical underpinnings below. Alternatively, these items might be the only pledge available to the borrower at the time they want to borrow, but given that pawnshops accept nearly any type of collateral, we find this explanation unlikely. We examine the probability of repayment for “sentimental” and “non-sentimental” items, counting wedding rings,

²³ Interestingly, in the context of default on credit in Mexico, Professor Vissing-Jorgenson finds that when borrowers are using credit to *buy* luxury items, they are more likely to default on their loans. Annette Vissing-Jorgenson, *Consumer Credit: Learning Your Customer’s Default Risk from What (S)he Buys* 27 (Apr. 13, 2011) (unpublished manuscript), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2023238 (“I showed that high loss products tend to be luxuries and that consumers who tend to spend a lot on luxuries given their income on average are higher risk.”). This result indicates that credit providers may want to modify payments, interest rates, or both based on the items borrowers have purchased previously and the corresponding implications such items have about their credit risk.

class rings, engagement rings, and “mother’s” rings as sentimental items. As shown in Figure 3, when borrowers pawn sentimental items, they are less likely to default and are more likely to repay their loans.²⁴

We test the effects of sentimentality using regression analysis. Here, we regress the probability of default on the amount loaned, an indicator for each merchandise category, and month-year dummies (as in Equation 1). The results from this regression are presented in Table 5. Even when controlling for merchandise categories, gender, race, and loan amount, pawning a sentimental item decreases the probability of default by a significant amount: 6.2 percentage points. The statistical significance on the collateral categories and gender remain the same and the coefficients are similar. Pledging a specific item, for example a sentimental ring, further reduces the probability that the borrower defaults on the loan. In the next section, we discuss the economic theory behind our results.

²⁴ Of course, pawnshops are popularly considered fences for stolen items and we cannot be certain of each pledge’s ownership. Some evidence suggests that only a small fraction of pawned items are repossessed by law enforcement because they were stolen. *See CASKEY, supra* note 1, at 37–38. However, Professor Miles finds evidence suggesting pawnshops do sometimes function as fences for stolen goods. Thomas J. Miles, Markets for Stolen Property: Pawnshops and Crime 6 (Jan. 24, 2008) (unpublished manuscript presented at the University of Michigan Law School Law and Economics Workshop), *available at* <http://www.law.umich.edu/centersandprograms/lawandeconomics/workshops/Documents/Winter2008/miles.pdf>. Further, because pawnshop borrowers must show a valid photo ID that is recorded with the pawnslip (and serial number of the pledge where possible), and pawnshops are required to regularly send all pawnslips to local police (usually every week), we feel confident that the vast majority of items pawned are pawned by their rightful owner. John P. Caskey, *Pawnbroking in America: The Economics of a Forgotten Credit Market*, 23 J. OF MONEY, CREDIT & BANKING 85, 89 n.6 (1991) (“Given the police report requirement, they also say it would not be in the interest of a thief to pawn a stolen good.”).

Table 5

	(1)	(2)	(3)	(4)
Dependent Variable: Default				
Sentimental	-0.090*** (0.0045)	-0.062*** (0.0046)	- 0.090*** (0.0044)	-0.062*** (0.0044)
Electronics		0.0064 (0.0131)		0.0064 (0.0132)
Guns		-0.0067 (0.0159)		-0.0067 (0.0158)
Household Items		0.041*** (0.0155)		0.041*** (0.0154)
Instruments		-0.038** (0.0166)		-0.038** (0.0177)
Jewelry		-0.038*** (0.0132)		-0.038*** (0.0136)
Tools		0.036** (0.0144)		0.036** (0.0151)
Female		0.053*** (0.0044)		0.053*** (0.0054)
White		-0.030 (0.0223)		-0.030 (0.0238)
Black		0.0010 (0.0220)		0.0010 (0.0241)
Hispanic		0.015 (0.0221)		0.015 (0.0231)
Loan Amount		-0.00023*** (0.0000)		- 0.00023** * (0.0000)
Month x Year Fixed Effects		X		X
Cluster at Customer Level	X	X		
			X	X
N	395,032	387,223	395,032	387,223
adj. R-sq	0.0021	0.0178	0.0021	0.0178

V. *The Rational Economics and Behavioral Economics of Pawnbroking*

In this section, we first evaluate our results relative to the standard rational framework used in economics to study choice involving decision-making over time.²⁵ We then step away from the standard assumptions of this classical rational model to explore behavioral economics models of decision-making, models which strive to be more realistic and more representative of human behavior. We evaluate all of these models relative to our evidence above on common drivers of default in the pawnshop market.

A. **Rational Model with Exponential Discounting**

The canonical model of rational choice in economics, the exponential discounting model, assumes that individuals act to maximize a utility function.²⁶ This utility function reflects levels of happiness coming from different potential choices at each point (or instant) in time. The utility at time t is represented as u_t . Time can be measured in years, months, days or even at an instant. For our purposes, days are a natural way to think about time units. We can represent any day's utility in this way, for an indefinite number of periods t . Individuals make choices by trading off these utilities over time. For example, an individual decides when to do her homework by comparing the utility of doing it today (time t) with the utility of doing it on any possible future date (so long as it meets certain constraints, like completing the homework assignment before the due date). Certain time periods may come with an extra cost: Doing homework on Friday night may come with extra disutility of missing a night out on the town with friends. These choices regarding how

²⁵ For a nice review of both the historical and more recent theory in psychology and economics on intertemporal choice, see generally Shane Frederick, George Loewenstein & Ted O'Donoghue, *Time Discounting and Time Preference: A Critical Review*, 40 J. OF ECON. LITERATURE 351 (2002).

²⁶ For the original foundations of this model see Paul Samuelson, *A Note on Measurement of Utility*, 4 REV. OF ECON. STUDIES 155, 156 (1937) ("During any specified period of time, the individual behaves so as to maximise the sum of all future utilities, they being reduced to comparable magnitudes by suitable time discounting."). For a review of work on discounted utility theory since then, see Frederick et al., *supra* note 25, at 356–360.

utility is traded off depend not just on such opportunity costs, but also in part on the extent to which borrowers discount future utilities.

A feature of this type of discounting is that it assumes borrowers correctly predict their future discounting, that is, that they are *time consistent*—meaning they know the choices that will give them the highest utility in terms of today, and when tomorrow comes they make those same choices. A drawback of exponential discounting, however, is that this strong assumption of individuals exhibiting time consistency is often at odds with the way people make choices in reality.²⁷ The exponential model assumes a consumer's discount rate between any two periods is constant, whether those two periods are today and tomorrow or 365 days and 365-plus-one days from now,²⁸ and, further, assumes that consumers know the rate at which they will discount any of these periods.²⁹ Time consistency precludes *any* procrastination or self-control problem.

A second drawback is how quickly utility gets discounted very heavily. Even for high values of the discount rate, typically denoted “delta” (indicating a very patient person), say 0.99, if one examines discounting at the daily level (which would be a reasonable way to consider the choices we explore here in credit markets), the borrower would care almost nothing about utility in one year. That utility would be discounted by 0.99^{365} which equals approximately 0.02, implying that borrowers care about utility in one year fifty times *less* than utility today!³⁰ For example, this consumer would be indifferent between receiving \$10 today and \$500 in a year. So exponential discounting may work well in theory (the time consistency aspect makes calculating the tradeoffs that consumers face very tractable) and in some contexts, but not well when shorter time frames are concerned.

In light of these drawbacks, one wonders about the propriety of using such a model. Recall that this model, or a close cousin,

²⁷ See O'Donoghue & Rabin, *supra* note 10, at 125–26 (“[P]eople have self-control problems caused by a tendency to pursue immediate gratification in a way that their ‘long-run selves’ do not appreciate.”).

²⁸ Frederick et al., *supra* note 25, at 358 (“Constant discounting implies that a person's intertemporal preferences . . . confirm earlier preferences.”).

²⁹ *Id.* at 367.

³⁰ This is because $1/0.02 = 50$.

underlies just about all models of rational choice in economics.³¹ Like all models, exponential discounting is a simplification of the real world, and, though not always realistic in its predictions about behavior, it can be a nice starting point for thinking about choices over time.³² There is, however, overwhelming evidence refuting the exponential model.³³ Even Paul Samuelson himself, writing the canonical paper that works through the exponential discounting model, was forthcoming about its drawbacks and unrealistic predictions for behavior.³⁴ However, economists both of his time and today appreciate it as an excellent starting place to begin to think

³¹ See Stefano DellaVigna, *Psychology and Economics: Evidence from the Field*, 47 J. OF ECON. LITERATURE 315, 315 (2009).

³² For reviews of the empirical evidence on time inconsistency, see *id.*; Stephan Meier & Charles D. Sprenger, *Stability of Time Preferences* 1–41 (Institute for the Study of Labor (IZA), Discussion Paper No. 4756, 2010); Rabin, *supra* note 31, at 11–46; Frederick et al., *supra* note 25, and references therein. See also Jacob Goldin, *Making Decisions About the Future: The Discounted-Utility Model*, 2 MIND MATTERS: WESLEYAN JOURNAL OF PSYCHOLOGY 49, 49–56 (2007) (“The many disparate factors that can affect one’s willingness to trade off between current and future satisfaction—e.g., patience or impatience, imagination of the future, anticipation, and memory—are summarized by a single number in the DU model—the discount rate[;] . . . however, factors that promote simplicity may be detrimental to the model’s accuracy.”). Exponential discounting can include very high discount rates where consumers care very little about the future, but consumers’ exhibiting different short-run and long-run time preferences cannot be accounted for with an exponential discount rate alone. See David Laibson, *Golden Eggs and Hyperbolic Discounting*, 112 Q.J. OF ECON. 443, 445 (1997) (“Hyperbolic discount functions are characterized by a relatively high discount rate over short horizons and a relatively low discount rate over long horizons. This discount structure sets up a conflict between today’s preferences, and the preferences that will be held in the future.”).

³³ See DellaVigna, *supra* note 31, at 316–341 (“In the laboratory, individuals are time-inconsistent, show a concern for the welfare of others, and exhibit an attitude toward risk that depends on framing and reference point. They violate rational expectations, for example, by overestimating their own skills and overprojecting from the current state. They use heuristics to solve complex problems and are affected by transient emotions in their decisions.”).

³⁴ See Samuelson, *supra* note 26, at 155–61 (“Serious limitations of the . . . analysis . . . almost certainly vitiate it even from a theoretical point of view.”).

about tradeoffs over time. Recent alternatives do a good job of capturing more realistic factors that affect individuals' tradeoffs over time, such as self-control problems, procrastination, and a combination of long-run patience with short-run impatience. None of these factors fit neatly into exponential discounting.

Returning to the pawnshop context, what does exponential discounting imply given our data? To fit into the rational choice model, a borrower must experience additional disutility from having pawned an item of sentimental value, as the sentimental value increases the utility the borrower garners from having the item in her possession. The borrower is then more likely to repay the loan in order to prevent this additional disutility from extending longer—and even becoming permanent—if she defaults on the loan. Given this additional disutility, it is not clear why the borrower would then choose to pawn an item with sentimental value, assuming the borrower has other alternatives. Using a sentimental item as a commitment mechanism to repay the loan (as we discuss next), therefore, may be a better explanation for why borrowers pawn items with sentimental value and are more likely to repay them.

B. Self-control Model

The simplest and most popular alternative to the classic exponential discounting model of choice over time shares most of the original model's features. It merely relaxes the assumption about how individuals discount future periods. This simple permutation allows the model to capture elements such as procrastination, self-control, and even addiction.³⁵ This model is known as quasi-hyperbolic discounting³⁶ and adds an additional discount factor, β , to capture short-run time preferences. Having two discount rates in the model (beta and delta) reflects the idea that people have higher discount rates between two periods in the short-run (say, today and tomorrow) than between two periods in the long run (two consecutive days next year). Large amounts of evidence support the

³⁵ For an analysis of addiction, hyperbolic discounting, and smokers, see generally Jonathan Gruber & Botond Köszegi, *Is Addiction "Rational"?* *Theory and Evidence*, 116 Q.J. OF ECON. 1261 (2001).

³⁶ Note that "quasi" here refers to the fact that we are not using continuous time as in pure hyperbolic discounting, but discrete time units—a more plausible and tractable way to capture decisions over periods such as hours or days. See Laibson, *supra* note 32, at 450.

theoretical validity of hyperbolic discounting in consumer finance as well as other fields. Behaviors like simultaneously saving for retirement and borrowing on credit cards are accurately captured by this model.³⁷

Hyperbolic discounters can be either *naive* or *sophisticated* about their self-control problems.³⁸ “Naifs” fail to realize that they will have different discount rates in the short and long-runs and expect to be more patient in the future than they end up being (demonstrating a form of irrational behavior: time inconsistency). “Sophisticates,” on the other hand, realize they will have differing discount rates in the short-run and long-run and may seek commitment devices to combat their procrastination.³⁹

³⁷ See, e.g., Bhutta, Skiba & Tobacman, *supra* note 8, at 14 (finding hyperbolic discounting present in payday loan context); Kristopher Gerardi et al., Financial Literacy and Subprime Mortgage Delinquency 14 (Apr. 2010) (unpublished manuscript) (on file with Federal Reserve Bank of Atlanta), available at <http://ssrn.com/abstract=1600905> (applying a discount factor to measure time and risk preferences among subprime mortgage borrowers); David Laibson, Andrea Repetto & Jeremy Tobacman, *A Debt Puzzle* 3–4 (Nat’l Bureau of Econ. Research, Working Paper No. 7879, 2000); Sera Linardi & Tomomi Tanaka, *Competition as a Savings Incentive: A Field Experiment at a Homeless Shelter* 10–11 (U. of Pittsburgh, Dep’t of Econ., Working Paper No. 484, 2012) (demonstrating how time discounting affects saving habits of individuals staying at a homeless shelter); Stephan Meier & Charles Sprenger, *Present-Biased Preferences and Credit Card Borrowing*, 2 AM. ECON. J. APPLIED ECON. 193, 193 (2010). See generally DellaVigna, *supra* note 32. Of course, hyperbolic discounting, while it improves on the realism of exponential discounting, is also a very stylized theory of decision-making and can fail to capture many critical factors of decision making.

³⁸ See O’Donoghue & Rabin, *supra* note 10, at 126 (“Two extreme assumptions have appeared in the literature: *sophisticated* people are fully aware of their future self-control problems and therefore correctly predict how their future selves will behave, and *naive* people are fully *unaware* of their future self-control problems and therefore believe their future selves will behave exactly as they currently would like them to behave.”) (emphasis in original).

³⁹ The classic example of a commitment device was when, in Homer’s *Odyssey*, Odysseus asked his crew to tie him to the mast of his ship to help himself avoid jumping into the dangerous waters when he was tempted by the call of beautiful sirens ashore. See JOHN MALCOLM DOWLING & YAP CHIN-FANG, MODERN DEVELOPMENTS IN BEHAVIORIAL ECONOMICS 90 (2007) (“Tying oneself to the mast such as Ulysses is an example of

Turning back to our analysis of pawnshop borrowers, our results appear to be consistent with sophisticated hyperbolic discounting. The differing repayment rates for sentimental items and non-sentimental items with a similar objective value do not seem to fit into a model of exponential discounting, which would assume that the simple cost of replacing a collateralized item (be it a TV or wedding ring) should in large part determine repayment rates. However, were borrowers to have especially high affection or sentimentality for a particular item, they may also be more likely to redeem that item, regardless of the item's replacement cost and relative consumption value (that is, how much utility they receive from using it).

Classically, under exponential discounting, a loan collateralized with a \$100 TV and a loan collateralized with a \$100 wedding ring would not necessarily have different repayment rates. Sentimental items (like the wedding ring) seem to work as a natural commitment device: the idea of losing an important item helps motivate the borrower to repay. Our results, which show that borrowers are more likely to make good on pawnshop loans that are secured by sentimental items, are consistent with the idea that borrowers are sophisticated about their future discounting and choose pledges to help them repay their loan, just like Odysseus tying himself to the mast.⁴⁰

Here, we cannot precisely determine whether borrowers' discount rates and predictions about those rates, or, alternatively, a

external commitment . . ."). More recently, websites like stickK.com offer commitment devices, as does "Clocky" (an alarm clock on wheels). See STICKK, <http://www.stickk.com> (last visited Nov. 14, 2012); *Clocky*, NANDA HOME, <http://www.nandahome.com/products/clocky/> (last visited Nov. 14, 2012). Naïfs (and sophisticates) can of course be partially or fully naive. For simplicity, we limit our analysis to the extreme cases here. *But see* O'Donoghue & Rabin, *supra* note 10, at 122 ("Economists have been predisposed to focus on complete sophistication; but since our results show that *any* degree of naïveté can yield different predictions than complete sophistication, our analysis suggests that restricting attention to complete sophistication could be a methodological and empirical mistake even if people are mostly sophisticated." (emphasis in original)). For a review of the evidence on commitment devices, see DellaVigna, *supra* note 32, at 318–24.

⁴⁰ See DOWLING & CHIN-FANG, *supra* note 39, at 90.

rational form of sentimentality or affect,⁴¹ is driving the pattern we see in repayment behavior. Further, heterogeneity among borrowers is impossible for us to parse out with our existing data. Borrowers may be a mix of naïfs, sophisticates, and rational actors, and each type of borrower may choose to pawn different items.

C. Loss Aversion

Alternatively, or in addition, loss aversion,⁴² another popular and robust behavioral anomaly, may be responsible for high repayment rates when sentimental items are involved. A model that

⁴¹ Note that, classically, feelings like sentimentality and affection are outside a rational model. But modern models of choice do often allow for choice involving some emotional component. For more on adding affect into decision making, see Mark J. Browne, Christian Knoller & Andreas Richter, *Behavioral Bias, Market Intermediaries and the Demand for Bicycle and Flood Insurance* 18 (Munich Risk and Ins. Ctr., Working Paper No. 10, 2012) (“[P]eople are more willing to purchase insurance for an object, the more affection they have for the object.”).

⁴² Loss aversion has been documented extensively and popularly in the class mugs experiment, Daniel Kahneman et al., *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 J. OF POL. ECON. 1325, 1342 (1990) (finding that “the value that an individual assigns to such objects as mugs, pens, binoculars, and chocolate bars appears to increase substantially as soon as that individual is given the object”), although there has been considerable work on the topic since then. We do not actually have many people pawning mugs in our data. More recently, loss aversion has been documented outside the lab among cab drivers. See Colin Camerer et al., *Labor Supply of New York City Cabdrivers: One Day at a Time*, 112 Q.J. OF ECON. 407, 408 (1997) (finding negative wage elasticities reflecting that “drivers tend to quit early on high wage days and to drive longer hours on low wage days”); accord Ernst Fehr & Lorenz Goette, *Do Workers Work More if Wages are High? Evidence from a Randomized Field Experiment*, 97 AM. ECON. R. 298, 300 (2007) (documenting loss aversion among bike messengers). For a helpful review of this empirical literature, see generally Lorenz Goette et al., *Loss Aversion and Labour Supply*, 2 J. OF THE EUR. ECON. ASS’N 216 (2004). For modeling specifics, see David Bowman, Deborah Minehart & Matthew Rabin, *Loss Aversion in a Consumption-Savings Model*, 38 J. OF ECON. BEHAV. & ORG. 155, 156–64 (1999) and Botond Köszegi & Matthew Rabin, *A Model of Reference-Dependent Preferences*, 121 Q.J. OF ECON. 1133, 1137–1155 (2006). See DellaVigna, *supra* note 32, 325–30; and Bowman, *supra*, at 164–67, for a review of the literature.

includes loss aversion (or the “endowment effect,”⁴³ a closely related concept) typically focuses on a decision at one point in time and abstracts from discounting over time, as with the models above.⁴⁴ Also, as in the other models, borrowers maximize a utility function but with loss aversion affecting choices. Loss aversion is the effect whereby losses (relative to some reference point) “loom larger”⁴⁵ than gains. For example, the utility loss associated with losing \$10 is larger than the utility gain of winning \$10. Typically, this gap is measured to be about two, meaning losing \$10 feels about twice as bad as winning \$10 feels good.⁴⁶

Recent evidence suggests different types of items are more likely to be subject to loss aversion than others.⁴⁷ Given this existing empirical evidence, we would predict that sentimental items are subject to loss aversion to a greater extent than items with pure consumption value (that is, those items providing utility solely based on the use derived from it, like watching a TV or printing documents with a printer). Therefore, in our context, a model of loss aversion in decision-making with respect to pawn contracts implies higher repayment rates for items that people feel loss averse towards. Reclaiming an item allows the borrower to avoid that *extra* negative utility associated with losing an item (beyond the normal utility loss associated with forgoing the consumption value of the item). Loss aversion is an intuitive and likely important component of borrower behavior in the pawnshop context.

The extent to which loss aversion is relevant in pawnbroking, however, turns on the relevant reference point, which we are unfortunately unable to determine in our data. Reference points are some neutral point around which choices are framed by the decision maker. A natural reference point and the one that is most often assumed in behavioral economic models is the status quo, i.e.,

⁴³ See Kahneman et al., *supra* note 42, at 1326 (“[T]he increased value of a good to an individual when the good becomes part of the individual’s endowment [is] the ‘endowment effect.’”).

⁴⁴ *See id.*

⁴⁵ See Dan Ariely, Joel Huber & Klaus Wertenbroch, *When Do Losses Loom Larger than Gains?*, 42 J. OF MARKETING RES. 134, 134–138 (2005).

⁴⁶ See Camerer et al., *supra* note 42, at 411–12, for a review of the evidence on the coefficient of loss aversion.

⁴⁷ For more on what people are loss averse about and when, see generally George F. Loewenstein, Christopher K. Hsee, Elke U. Weber & Ned Welch, *Risk as Feelings*, 127 PSYCHOL. BULL. 267 (2001); Sarah F. Brosnan et al., *Endowment Effects in Chimpanzees*, 17 CURRENT BIOLOGY 1704 (2007).

whatever situation you are currently in: You currently either own a mug, or you do not own a mug. Other possibilities for reference points are (a) goals (I want to run a marathon under four hours.); (b) past experiences (I ran a marathon in under four hours when I was 25.); (c) social comparisons (My brother ran a sub-four marathon and I'd like to beat him.); and (d) expectations (I can probably finish the marathon in four hours.). In a model that includes loss aversion, changes relative to the reference point result in a change in utility. For example, if you ran a marathon in 4:05 with a goal of breaking four hours, you would feel loss averse because you were below your reference point. However, if you ran a marathon in 4:05 with a goal of 4:15, you would not feel this extra disutility. The same outcome (a 4:05 marathon) comes with different utilities depending on the reference point. Where pawnshop borrowers' reference points are calibrated such that they expect to lose their pledge, borrowers will not feel this extra disutility when they default. If their reference point is owning and using their pledge, however, they would feel this extra utility loss if they default.

The most robust model of loss-averse behavior is found in Professors Köszegi and Rabin's article entitled *A Model of Reference-Dependent Preferences*.⁴⁸ Köszegi and Rabin identify a specific reference point around which people feel loss averse. Their reference point is defined to take into account individuals' expectations as well as a number of other factors. The model then predicts how individuals will make choices by maximizing a utility function that consists of two parts: a traditional, rational part; and the less conventional loss-averse component derived from utility gains or losses due to ending up above or below the reference point. Determining the reference point in pawnbroking could be a fruitful area for future research, but for now, we cannot directly test the extent to which people are loss averse without more direct evidence on the reference point.

D. Discussion

Using only our loan records data, we cannot fully determine whether pawnshop users are hyperbolic discounters, loss averse, fully rational, or some combination of these factors. Nevertheless, our results comport with the type of discounting shown among

⁴⁸ Köszegi & Rabin, *supra* note 42, at 1137.

sophisticated hyperbolic discounters. The data do suggest that people choose to pawn sentimental items. Since almost anything is accepted by pawnbrokers, why pawn your wedding ring? We view such behavior as suggestive evidence that borrowers exploit sentimental items to combat their (accurate) prediction that they may not have the self-control to pay back their loans and may be tempted to default. A sentimental item will be harder to replace (Try explaining to your wife what happened to your wedding ring!) and thus provides a better commitment device than a similarly valued but fungible item, such as tools or a TV. Additional research, perhaps experimental in nature, is needed on this topic to fully disentangle which kind of borrowers pawnshop users are.

VI. Conclusion

In this paper, we use transaction data to study the behavior of customers patronizing pawnshops. We present new evidence on the dynamics of repayment and default for loans secured by different types of collateral at pawnshops. We are the first, to our knowledge, to study borrower activity in the world of pawnbroking from a behavioral economics perspective.

We view pawnshops as a potentially attractive alternative to other forms of high interest credit.⁴⁹ Pawnshops offer simple transactions in which anyone can participate. No credit is needed and no credit check is conducted.⁵⁰ Interest rates on pawnshop loans are lower than those associated with many other types of credit, even mainstream credit. The combination of the existing regulations on interest rates and what appears to be consumers' self-governing repayment behavior or "self-regulation" seems to work well in this market.

While we cannot say for sure what behavioral factors are at play, repayment rates on pawnshop loans, particularly those secured by sentimental items, are high. Some combination of sentimentality, loss aversion, and discounting seems to help borrowers make good on their pledges. A deeper welfare analysis is difficult for us to

⁴⁹ A main alternative is payday loans. For an overview of payday loans and their consequences, see generally Melzer, *supra* note 8; Adair Morse, *Payday Lenders: Heroes or Villans?*, 102 J. OF FINANCIAL ECON. 28 (2011); Skiba & Tobacman, *supra* note 8. Craigslist is a natural alternative to pawnshops, but we know of no research on this market.

⁵⁰ See Caskey, *supra* note 24, at 90

conduct without additional data, but we are convinced that pawnshops can be a good alternative source of credit.⁵¹ Further research on pawnbroking and its customers will give policymakers, consumers, and academics a better grasp of this ancient and yet still popular and important institution.

Figure 1: Collateral by Category, Number of Observations

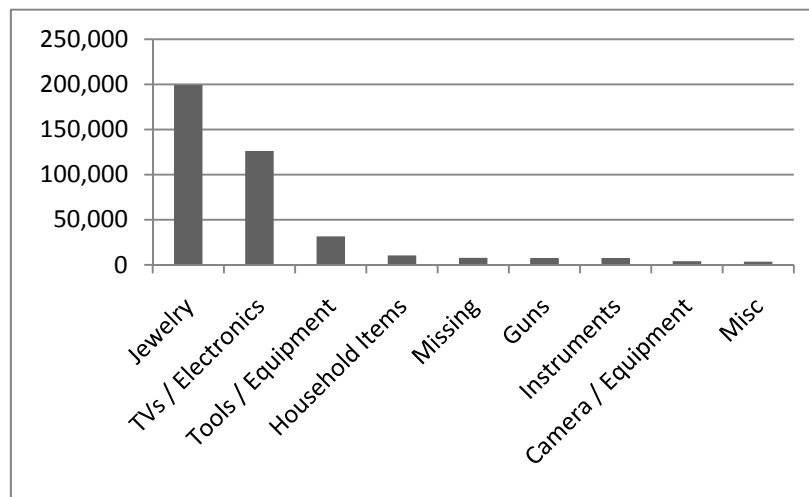


Figure 1 shows the number of loans taken out using each category of collateral between 1997 and 2002 in a sample of observations from a pawnshop lender in Texas.

⁵¹ See Bos, Carter & Skiba, *supra* note 3, at 1 (“[P]eople who are excluded from the credit supplied through the regular banking system have to rely on alternative financial services like those supplied by the pawnbroking industry.”).

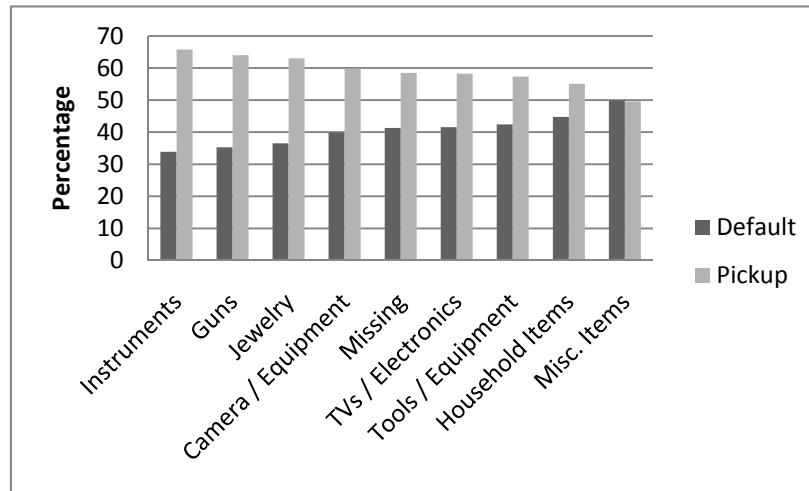
Figure 2: Probability of Default by Collateral Category

Figure 2 shows the percentage of loans in each collateral category where the borrowers defaulted or picked up the loan. The sample of observations is from a pawnshop lender in Texas between 1997 and 2002.

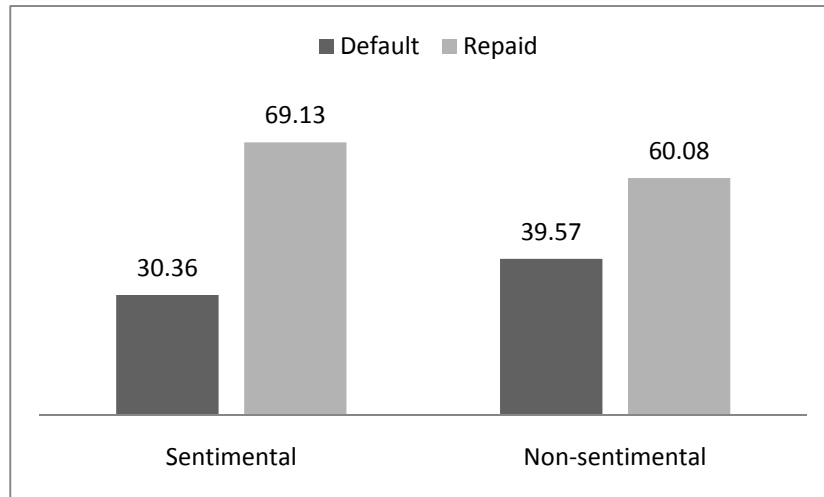
Figure 3: Default Rates on Sentimental Items

Figure 3 depicts the fraction of pawnshop loans that borrowers default on when the loans are collateralized with items that are sentimental and when they are collateralized with items that are non-sentimental. Sentimental items include wedding rings, engagement rings, class rings, and “mother’s rings.” The sample of observations is from a pawnshop lender in Texas between 1997 and 2002.