Received: 24 October 2016 | Revised: 21 January 2018 | Accepted: 9 February 2018

DOI: 10.1111/ijcs.12429

ORIGINAL ARTICLE

WILEY International Journal of Consumer Studies

Financial literacy and high-cost borrowing: Exploring the mechanism

Tae-Young Pak[1]

Department of Consumer Sciences, University of Alabama, Tuscaloosa, AL 35487

Correspondence
Tae-Young Pak, Department of Consumer Sciences, University of Alabama, Tuscaloosa, AL 35487.
Email: tpak@ches.ua.edu

Abstract

Recent studies have suggested that financial literacy is an important determinant of informed borrowing decisions. Despite the evidence that financially literate consumers are less likely to use alternative financial services, the mechanism through which financial literacy discourages demand for alternative financial services has yet to be fully understood. The previous studies proposed several explanations, such as the ability to undertake complex financial calculations and understand contract terms, to link financial literacy to savvy credit choices. This study evaluates the validity of this argument by examining whether or not financial knowledge plays a greater role in borrowing decisions where consumers are forced to rely on financial knowledge. It is assumed that consumers in an information-sparse environment have a greater incentive to utilize financial knowledge to infer the hidden cost of borrowing contracts. To test this argument, this study examines the extent to which information availability moderates the negative impact of financial knowledge on rent-to-own transactions. Information content is captured by state-level disclosure mandates for rental contracts, given that consumer in a loosely regulated state are exposed to less pricing information. The results illustrate that limited information strengthens the negative association between financial knowledge and rent-to-own transactions. This confirms the previous arguments that consumers are active thinkers who refer to financial knowledge to estimate the overall cost of borrowing.

KEYWORDS

Alternative financial services, disclosure mandates, financial literacy, information constraint, rent-to-own

1 | INTRODUCTION

The United States has witnessed growing demand for alternative financial services (AFS), such as check-cashing, payday loans, refund anticipation loans, rent-to-own and car title loans. For instance, the number of rent-to-own (RTO) contracts increased by 66% from 2.9 million in 2002 to 4.8 million in 2012 (APRO, 2015). Over the same period, the RTO industry expanded from 8,300 to more than 10,000 retail outlets, with the total industry revenue amounting to 8.5 billion dollars. Despite three-digit interest rates and high transaction fees, payday loan volume expanded six times since its inception in the early 1990s (Stegman, 2007). As of 2010, there were as many payday loan storefronts as McDonald's and Starbucks outlets combined (Skiba & Tobacman, 2015).

As high-cost borrowing methods emerge as an alternative source of consumer credits, the determinants of its demand have been the subject of intense exploration. While conventional economic theory posits rational consumers who smooth out marginal utility over their lifetime, the regulatory policies that build on this assumption turned out to be largely ineffective (Skiba, 2012). In light of such findings, a growing body of literature approached consumer credit use from a behavioural perspective. Skiba and Tobacman (2008) found that some individuals exhibit high discount rates over short horizons and relatively low discount rates over long horizons, and that this time inconsistency motivates the use of payday loans. Subsequent studies explained present-biased preferences and overborrowing using impatience (Meier & Sprenger, 2010), exponential growth bias (Stango & Zinman, 2009), optimism (Mann, 2013) and a lack of self-control (Heidhues & Koszegi, 2010).

An alternative strand of research that has drawn recent attention is the importance of financial literacy in borrowing decisions. Several mechanisms have been offered to explain AFS use in individuals with limited financial knowledge. First, a lack of financial knowledge makes consumers overlook overall financial burdens regarding lending contracts. A majority of financially inexperienced consumers are unable to discern compound interest from simple interest, and hence underestimate how quickly interest expenses accumulate over the lending period. Second, understanding the terms and conditions of the loan contracts require knowledge about consumer credit. AFS lenders often use their market power and credit knowledge to charge excessive transaction fees in ways that are not clearly disclosed to consumers. Borrowers without enough financial sophistication are less likely to recognize the hidden costs embedded in greedy borrowing contracts. Third, limited financial knowledge acts as an entry barrier to cheaper credit sources. Some habitual AFS borrowers continue to renew or roll over the high-cost loans, despite having access to more affordable financial services. Fourth, the judgment on personal debt position requires an understanding of mortgages and general financial statements. Misjudging relative debt burdens and repayment ability has been more commonly observed among individuals with poor financial knowledge.

Most of the discussions in the literature have focused on how financial literacy is correlated with financial outcomes without demonstrating the possible mechanisms. Especially missing from the extant literature is the role of financial knowledge when making a credit decision under information constraints. If the inability to calculate effective interest rates increases the likelihood of AFS use, financial sophistication should have limited impact on credit decisions when the full cost of the transaction is disclosed. This could be apparent because decision-making with complete information does not involve complex reasoning and information processing. Conversely, consumers in an information-sparse environment may draw upon their own financial literacy and infer the total cost. This process requires financial knowledge to understand the lending contracts, as well as numeracy to convert the payment schedule to a numeric figure.

The objective of this study is to assess the association between financial literacy and AFS use, with an emphasis on the moderating effect of information availability. This study claims that the impact of financial knowledge on credit decisions increases when less information is provided. Among a number of high-cost borrowing alternatives, RTO products provide the perfect setting to test this hypothesis. The overall cost involved in RTO contracts is known to be prohibitively expensive, but a majority of consumers are unaware of the greedy nature of rental agreements (Zikmund-Fisher & Parker, 1999). As RTO contracts are inherently complicated and multifaceted (Lacko, McKernan, & Hastak, 2002), regulatory attempts have leaned towards revealing the total cost of rental purchases by mandating the disclosure of annual percentage rate (APR) and miscellaneous charges (Nehf, 1991). While most states such as Maine and New York had implemented strict disclosure requirements (Beales, Eisenach, & Litan, 2012), several states in the US including Arkansas, Indiana, Oklahoma and Texas did not explicitly specify the items that should be disclosed on a contract and, therefore, created a loophole that could be exploited by RTO lenders (APRO, 2014). In such states, the RTO industry operated as a disguised instalment sale, providing little information and imposing extraordinary APRs on uninformed consumers (Anderson & Jackson, 2001).

To construct the policy measures, this study first reviews the state-level statutes on RTO transactions and identifies a set of disclosure requirements that vary across state borders. These policy indicators are merged with the data from the 2012 National Financial Capability Study, according to the state of residence, to proxy for information availability. The empirical strategy is to interact respondents' financial knowledge with the disclosure mandates of their primary residence and examine the extent to which a policy indicator attenuates the association between financial knowledge and RTO use. As the policy effect can be confounded by the general state-level regulatory sentiments towards AFS, empirical investigations include a series of subsample analyses and falsification tests for robustness checks.

An empirical analysis begins with the replication of previous findings. The results show that financially knowledgeable individuals are less likely to engage in RTO transactions (Lusardi & de Bassa Scheresberg, 2013), and that a disclosure mandate is an effective tool to curb the demands for RTO (McKernan, Lacko, & Hastak, 2003). As hypothesized, the negative association between financial knowledge and RTO use is much larger in regions where disclosure requirements are loosely defined. These results support the hypothesis that consumers are more likely to rest on financial knowledge under limited information. In other words, consumers are indeed "active thinkers" who attempt to make informed credit decisions using their financial sophistication.

2 | LITERATURE REVIEW

2.1 | Framework: Inference-formation with incomplete information

Previous studies in consumer research have examined how consumers utilize information when making purchase decisions (Huber & McCann, 1982; Kivetz & Simonson, 2000; Ross & Creyer, 1992; Simmons & Lynch, 1991). In the information integration model, consumers were assumed to value stimuli and integrate related attributes into an overall response using a subjective algebraic function (Anderson, 1974; 1996). For instance, consumers could assign the positive or negative weights to the stimuli depending on the favourability of attributes, and use the subjective algebraic function such as adding, averaging, weighted averaging and multiplying, to integrate the valuations (Ajzen & Fishbein, 1975; Troutman & Shanteau, 1976). Addition was found to be the most flexible form that accommodates most of the naive decision-makers. More complicated functional forms allow for each piece of information to be characterized by its importance concerning the dimension of the judgment.

Consumers in the information integration model were supposed to be passive and rely on the revealed information. This assumption, however, seemed quite restrictive because some people infer missing characteristics from the available information on similar attributes. One example presented by Huber and McCann (1982) is comfort and luxury of a vehicle. If luxury is unobservable and not well described,

consumers may turn to comfort to infer the value of luxuriousness. Likewise, the value of comfort might be deduced from luxury if luxuriousness is conveyed by superior coziness or by vehicle class in which the vehicle is classified. Meyer (1981) argued that consumers, as soon as they note the absence of information, form inferences regarding the missing attributes, and during this process, they refer to whatever available information cues related to the products. His results showed that consumers infer the missing attribute from a discounted average of other alternatives' attributes. Studies on information constraints such as Huber and McCann (1982), Johnson and Levin (1985), and Schmidt and Spreng (1996) reported similar inference formation that occurs with different functional forms.

Information could be given in a decision-making context or retrieved from memory by utilizing cognitive resources (Dick, Chakravarti, & Biehal, 1990). In general, information is displayed on the products and advertisements or implicitly conveyed by the price or by the type of stores in which the products are sold. In some markets where sellers have a dominant power, the government often mandated the provision of certain information to help consumers make informed decisions (Bertrand & Morse, 2011). Information is mostly given in the external environment but often comes from the personal memory of the past. Lynch and Srull (1982) stated that consumers' decisions can be classified as either stimulus-based, memory-based, or mixed. Stimulus-based decision refers to a situation where information is available and operates as external cues. Memory-based decision is an opposite concept where decision-making is based solely on internally available information. Mixed decision is a mixture of the two in which both internal memory and external information are combined for a decision. If a choice is made by the memory-based approach, the information is retrieved from the memory, and inferences are formed based on individual-specific cues. Given that information is generally incomplete, decision-making rests on both stimulus and memory and entails the integration of given information with memory retrieved from a memory network (Alba, Hutchinson, & Lynch, 1991).

The efficiency of this integration process depends on two types of memories; working memory and long-term memory. Working memory is explained as the outcome of the immediate conscious processing of current information. Long-term memory is based on the knowledge acquired from facts and procedures for doing things (Cowan, 1988; Haugeland, 1981). When evaluating products, consumers may analyse external stimuli (e.g., the attributes of the goods presented in numbers) using procedural information (e.g., the fundamental arithmetic operations) that can be retrieved from their long-term memory (Anderson, 2014). In the context of this study, certain domains of financial literacy, such as compound interest and inflation, are assumed to be the procedural understanding that affects the ease with which information can be processed.

2.2 | Financial literacy and credit choices: Finding the mechanism

It is widely acknowledged that financially knowledgeable consumers are more likely to make informed borrowing choices. Moore (2003) found that a majority of consumers who obtained predatory loans misunderstand the terms and conditions of the loan agreements. Lusardi (2011) reported that more than 20% of the title loan borrowers and 12% of the respondents with credit card balances fail to estimate the effective APR. A significant proportion of the mortgage borrowers could not even specify whether the interest rate is fixed or adjustable, and whether they hold interest-only mortgages or a mortgage with an interest-only option. While the payday borrowers in Lawrence and Elliehausen (2008) seemed to understand the predatory nature of high-cost borrowing alternatives, their estimated APR was still lower than the actual APR being charged.

Lusardi and Tufano (2015) focused on a particular domain of knowledge that concerns debt-related information. The authors found that almost one-third of American adults are debt illiterate and does not understand the fundamental concepts of loan features, such as time value of money and APR calculations. Debt illiteracy was significantly associated with costly credit card behaviours that incur unnecessary fees and transaction costs. Nearly 42% of credit card charges including late fees, over-the-limit fees and cash advances were paid by less literate credit card holders, even though they accounted for only 28.7% of all cardholders. Stango and Zinman (2009) showed that the cost of short-term debt is systematically underestimated when individuals, predominantly unsophisticated investors, treat the exponential nature of discounting as linear. Utkus and Young (2010) found that financially uninformed individuals are more likely to withdraw money from defined-contribution accounts and pay unnecessary taxes and penalties, despite the opportunity to withdraw tax-free later.

A growing body of literature found that the financially inexperienced often fail to find cheaper financing alternatives, and thus adhere to familiar but costly borrowing options (Huston, 2012; Lusardi & Mitchell, 2014). Despite the presence of cheaper and more affordable credit sources, almost all payday borrowers went through multiple cycles of refinancing and eventually got caught in a debt trap (Ernst, Farris, & King, 2004). Agarwal, Skiba, and Tobacman (2009) found that nearly two-thirds of payday borrowers had at least $1,000 of credit card liquidity on the day they took out their first payday loans. This was quite surprising because, assuming a two-week payday loan and a credit card rate of 18% APR, the payday users could save approximately $52 by borrowing from their credit cards. Instead of using lower cost credit options, they opted to extend a current payday loan that can double or triple the debt burden.

2.3 | Financial literacy and high-cost consumer credit

A number of recent studies attributed the demand for AFS directly to limited financial knowledge. Lusardi and de Bassa Scheresberg (2013) demonstrated that respondents who correctly answered all three financial literacy questions on risk, interest rates and inflation are less likely to use high-cost borrowing. The negative association was particularly strong when the sample was limited to 18–34 years old, indicating a potential effectiveness of financial education for younger adults. Disney and Gathergood (2013) explored consumer credit portfolios including high-cost borrowing alternatives, and found that the

weighted APR is approximately 64% lower for the financially literate. Chatterjee (2013) confirmed a lack of financial knowledge among the AFS users and a similar negative association between financial literacy and the likelihood of using AFS. The negative effect of financial literacy was larger for pawnshop use, which is a more frequently used but relatively less expensive borrowing alternative. This may indicate that financial knowledge might be more efficient to curb the demand for a small dollar loan, whereas judicial and legislative approaches are relevant to regulating predatory borrowing alternatives (McKernan, Ratcliffe, & Kuehn, 2013).

3 | METHOD

3.1 | Data description

This study employs restricted data from the 2012 state-by-state National Financial Capability Study (NFCS), established by the Financial Regulatory Authority (FINRA) Investor Education Foundation.[1] The NFCS is a series of cross-sectional studies designed to track Americans' financial capability along with their demographic, behavioural and attitudinal characteristics. The survey instruments cover a wide range of financial topics, such as making ends meet, planning ahead, financial literacy and consumer credit use (Lusardi, 2011). Especially noteworthy is rich information on AFS usage. The subjects were asked of the number of times they had used a payday loan, auto title loan, refund anticipation loan, rent-to-own stores and pawnshop, over the last five years, with possible responses ranging from "never" to "4 or more times." While both 2009 and 2012 waves fielded information on AFS, this study uses only 2012 survey to rule out any confounding effect of the 2008 financial crisis. After dropping observations with missing values and non-responses, 20,959 observations are retained in the analytic sample (Appendix Table).

3.2 | Measures

3.2.1 | Financial knowledge

The NFCS assessed financial knowledge by asking five questions, each representing compound interest, inflation, bond prices, risk and portfolio diversification and mortgage amortization. Considering the varying difficulty of the survey instruments, the factor analysis is conducted on binary indicators of the correct responses, and iterated principal factor method is used to capture the shared variance (van Rooij, Lusardi, & Alessie, 2011). This approach yields factor loadings, which represent the extent to which each question contributes to the relative variation in one's financial literacy. The final measure of financial knowledge is constructed by normalizing this composite index on a 0–100 scale.

3.2.2 | RTO disclosures

As of 2012, forty-seven U.S. states have laws regulating RTO transactions in a way similar to leases. Several states such as New Jersey, North Carolina and Wisconsin do not distinguish RTO transactions from normal credit sales, and hence have no independent legal statutes that regulate rental-purchase agreements. Regulatory efforts have been paid to mandating retailers to disclose the total cost of the transactions, given the nature of the business imposing disguised instalment contracts on uninformed consumers. Before the implementation of these disclosure policies, the APR information was often not provided or presented in a non-standard way that considerably understates the actual costs. Previous studies generally illustrated the demand-reducing impact of disclosure mandates, reaching up to nearly 30% reduction in the probability of RTO use (Lacko, McKernan, & Hastak, 2002; McKernan, Lacko, & Hastak, 2003).

Specific details and the level of enforcements vary considerably across state borders. Currently, most RTO stores have been required to inform consumers of (a) the total dollar amount of the lease payments to acquire ownership and (b) a detailed payment schedule over the rental periods in a written agreement. A majority of 47 states required the sellers to take a proactive role and reveal additional information, such as the (c) fair market price of products, (d) total initial payment due before delivery and (e) disclosure of other possible charges. In several states, revealing pricing information was required on a written contract, but not on (f) in-store price tags (APRO, 2009; 2014). Throughout the section, we refer to state-by-state RTO rules and regulations compiled by the Association of Progressive Rental Organizations (APRO, 2009; 2014). The common disclosure items are selected by examining and comparing each state's statutory prohibitions on RTO transactions.

While the effectiveness of each regulatory component has yet to be fully understood, a mixture of these mandates offers an opportunity to compare the total cost of rental options to the alternatives, adding additional reference points in decision-making (McKernan, Lacko, & Hastak, 2003). This study assumes that the amount of pricing information provided to consumers is a function of how strictly disclosure policies were mandated in their state of residence. Therefore, the first disclosure indicator (called "disclosure on total cost") is coded one if a state had enacted a disclosure policy (a), (b), (c) and (d), and zero otherwise (Table 1). Thirty-one states fall into this category. Since this definition of policy indicator is arbitrary, the robustness of the policy effect is checked by defining and examining two additional policy indicators. The second policy indicator augments with a disclosure requirement of other possible charges. This measure equals one if a state is subject to disclosure policy (a) through (e), and zero otherwise. The third policy indicator assigns one to states that mandated in-store price tag disclosure, and zero to the rest, given that the information during shopping was particularly useful for consumers. Note that the policy indicators of this study are the empirical device that implements information constraints in a regression framework. One should not draw any strong policy implications from the subsequent analyses involving these policy measures.

3.2.3 | Empirical specifications

The baseline model relates the number of RTO transactions made by individual i living in state s to financial knowledge and the covariates in the following form of a linear model.

[1]Restricted access was granted by FINRA Investor Education Foundation as of January 21, 2015, through consent and agreement process.

TABLE 1 RTO use and policy indicators

State	Any RTO transactions (%)[a]	Mean RTO transactions[a]	RTO restrictions			Restrictions on other AFS		
			Disclosure on total cost[b]	Disclosure on total cost and other charges[b]	In-store price tag disclosure[b]	Prohibitions on payday loan[c]	Prohibitions on title loan[c]	Interest rate cap on pawnshop loan[c]
AL	16.1	2.1	0	0	0	0	0	1
AK	7.1	1.7	1	0	0	0	1	1
AZ	11.9	2.2	1	1	1	0	0	1
AR	15.3	2.2	0	0	0	1	1	1
CA	9.4	2.0	0	0	1	0	1	1
CO	9.0	1.9	0	0	0	0	1	1
CT	12.2	1.8	1	1	1	1	1	1
DE	8.2	2.0	1	0	1	0	0	1
DC	6.7	1.9	.	.	1	1	1	1
FL	9.0	2.1	1	1	0	0	0	1
GA	12.8	1.8	1	1	0	1	0	1
HI	4.6	1.5	1	0	0	0	1	1
ID	7.8	1.9	0	0	0	0	0	0
IL	10.4	2.0	0	0	1	0	0	1
IN	11.6	2.0	0	0	0	0	1	1
IA	7.6	2.2	1	1	0	0	0	0
KS	11.1	2.2	1	0	0	0	0	1
KY	15.9	2.0	1	0	0	0	0	1
LA	13.8	1.8	1	0	0	0	1	1
ME	11.2	2.4	1	0	1	1	1	1
MD	5.1	2.0	1	1	1	1	1	1
MA	8.0	2.0	0	0	0	1	1	1
MI	6.9	1.9	1	1	1	0	1	1
MN	3.7	1.9	1	1	1	0	0	0
MS	13.3	2.0	1	0	0	0	0	1
MO	13.7	1.9	0	0	0	0	0	0
MT	7.1	1.9	1	1	0	0	0	1
NE	9.3	2.0	1	0	0	0	1	0
NV	9.4	1.9	0	0	0	0	0	0
NH	5.0	2.4	1	0	1	1	0	0
NJ	5.5	1.7	.	.	.	1	1	1
NM	10.4	1.5	1	0	1	0	0	1
NY	13.6	2.4	0	0	1	1	1	1
NC	14.9	1.9	.	.	.	1	1	1
ND	8.3	1.7	1	0	0	0	1	0
OH	14.0	1.9	1	1	1	1	1	1

(Continues)

TABLE 1 (Continued)

State	Any RTO transactions (%)[a]	Mean RTO transactions[a]	RTO restrictions			Restrictions on other AFS		
			Disclosure on total cost[b]	Disclosure on total cost and other charges[b]	In-store price tag disclosure[b]	Prohibitions on payday loan[c]	Prohibitions on title loan[c]	Interest rate cap on pawnshop loan[c]
OK	18.5	1.8	0	0	0	0	1	1
OR	6.5	2.0	1	0	1	1	0	1
PA	10.1	1.9	1	1	1	1	1	1
RI	5.8	2.5	0	0	0	0	1	1
SC	13.3	1.8	0	0	0	0	0	1
SD	7.4	2.0	1	0	0	0	1	0
TN	14.4	2.1	1	0	0	0	0	1
TX	18.7	1.9	0	0	0	0	1	1
UT	8.7	2.2	1	0	0	0	0	0
VT	8.8	1.9	1	1	1	1	0	1
VA	10.1	2.1	1	0	0	0	0	1
WA	10.2	2.0	1	0	0	0	1	1
WV	13.2	2.2	0	0	1	1	1	0
WI	5.4	1.9	.	.	.	0	0	1
WY	11.1	1.8	1	0	1	0	1	1
Disclosure on total cost			31 states					
Disclosure on total cost and other charges			12 states					
In-store price tag disclosure			19 states					
Prohibitions on payday loan			16 states					
Prohibitions on title loan			27 states					
Interest rate cap on pawnshop loan			40 states					

[a]Authors' calculations from the National Financial Capability Study, weighted by national-level sampling weights.
[b]Data compiled by the authors based on the reports of Association of Progressive Rental Owners (APRO, 2009; 2014).
[c]Data comes from McKernan et al. (2013) and Pindus, Kuehn, and Brash (2010). For detailed discussion on data sources and compiling criterion, refer to the original sources.

$$Y_{i,s} = \varphi + \alpha K_{i,s} + X_{i,s}\omega + \varepsilon_{i,s} \quad (1)$$

In this equation, $Y_{i,s}$ is the number of RTO transactions in the last five years, ranging from never (= 0) to 4 or more times (= 4); $K_{i,s}$ is a factor score of objective financial knowledge; $X_{i,s}$ is individual or household-level covariates. The covariate matrix includes perceived financial knowledge, age, gender, race, marital status, household size, education background, employment status, risk tolerance, household income, precautionary saving, income shock and regional density of AFS industry.

Perceived financial knowledge is captured by the NFCS survey question, "On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?." Recent studies found that investors are likely to hold erroneous belief that they know more about financial issues than they, in fact, do know (Finke, Howe, & Huston, 2016; Pak & Chatterjee, 2016), and that this mismatch is responsible for suboptimal credit choice (Robb, Babiarz, Woodyard, & Seay, 2015). Therefore, controlling for this measure allows α to pick up the effect of objective financial knowledge, not the combined effect of both objective and subjective component. Risk tolerance is assessed by the survey question, "When thinking of your financial investments, how willing are you to take risks?," on a scale of 1 to 10 and assumed to capture the variation in RTO use explained by risk attitudes. Precautionary saving is one if respondents set aside rainy day funds that cover three months' worth of living expenses, and zero otherwise. Income shock is coded one for respondents with the experience of large income loss over the last 12 months, and zero for others.

The covariates also include an indicator for a regional density of AFS industry. Notice that unobserved geographic characteristics could be correlated with one's educational attainment or financial knowledge

while affecting the demand for AFS. It could be the case that predatory lenders operate in impoverished areas to prey on credit-constrained households, and at the same time disadvantaged living arrangements lead to the under-investment in education. A failure to account for such confounding factor would induce bias in the estimates of the interaction effect because both AFS use and regional characteristics might be correlated with state-level regulations. A simple remedy is to include a proxy for the geographic availability of AFS in each respondent's residence. Currently, two North American Industrial Classification System (NAICS) codes, Nondepository consumer lending (522291) and Other activities related to credit intermediation (522390), are reportedly related to personal credit industry (Bhutta, 2014). The number of establishments in those industries is obtained from Census ZIP Code Business Patterns (ZCBP) data, and cross-matched with the sample according to ZIP code.

To examine the moderating effect of a disclosure policy, Equation 1 augments with an interaction term between financial knowledge and a policy indicator. This equation is written in the following form,

$$Y_{i,s} = \varphi + \alpha K_{i,s} + \beta P_s + \gamma(K_{i,s} \cdot P_s) + X_{i,s}\omega + \varepsilon_{i,s}, \quad (2)$$

where P_s is a set of disclosure policy indicators. The empirical models are estimated by both ordinary least squares (OLS) and tobit model. Note that the frequency of RTO transactions is defined on a scale of 0–4, which is essentially a right-censored count data. While recent developments include a tobit-type estimator for censored counts (Terza, 1985), there has been no consensus on how to view and deal with censoring in count data models. One of the primary assumptions in Poisson regression is that the mean of response is equal to its variance. As a true variance will never be known with censoring, it is unclear which error structure should be assumed when relating the expected value of response to the linear predictors in the model. However, if most regressors are binary, linear models are supposed to yield plausibly accurate inferences (Wooldridge, 2010).

4 | RESULTS

4.1 | Summary statistics

Table 2 presents descriptive statistics of the sample, separating respondents who have rented-to-own in the past from those without such experience. Subjects are 49% men, 68% non-Hispanic White, 63% college educated and 55% married. Approximately 11% of the respondents used RTO products at least once over the last 5 years. Among those who used rental products, the average number of RTO transactions amounts to 1.97 with 53% using rental products more than twice. As with other high-cost borrowing alternatives, RTO products are more widely used in the lower socio-economic groups and ethnic minorities. Non-Hispanic Blacks and Hispanics combine for almost 35% of the respondents who have rented-to-own, while these two ethnic groups constitute only 24% of the non-users. The use of rental-purchase option is disproportionately higher for subjects who experienced income shocks and have no rainy day funds. Risk tolerance is 13% higher for RTO customers with a difference significant at the 5% level. The average financial knowledge score is 47.2 for RTO users and 64.4 for non-users.

TABLE 2 Descriptive statistics ($N = 20{,}959$)

	Never used RTO	Used RTO	Full sample
Financial literacy			
Financial knowledge (0–100)	64.4	47.2	62.5
Self-assessed financial knowledge (1–7)	4.17	4.17	4.17
Age (18–99)	47.3	37.3	46.2
Gender: male (0,1)	0.49	0.50	0.49
Race (0,1)			
NH White	0.69	0.60	0.68
NH Black	0.10	0.17	0.11
Hispanic	0.14	0.18	0.14
Others	0.07	0.05	0.07
Marital status (0,1)			
Married	0.56	0.49	0.55
Single	0.27	0.33	0.28
Separated	0.13	0.15	0.13
Widowed	0.04	0.03	0.04
Education (0,1)			
Less than high school	0.07	0.17	0.08
High school	0.28	0.33	0.29
Some college	0.38	0.33	0.37
College graduate	0.27	0.17	0.26
Number of children (0–4)	0.69	1.23	0.75
Employment status (0,1)			
Working	0.45	0.46	0.46
Self-employed	0.08	0.09	0.08
Retired	0.20	0.06	0.18
Not working	0.27	0.39	0.29
Household income (0,1)			
$<$ \$15k	0.13	0.18	0.13
$\geq$ \$15k and $<$ \$25k	0.11	0.19	0.12
$\geq$ \$25k and $<$ \$35k	0.11	0.15	0.11
$\geq$ \$35k and $<$ \$50k	0.15	0.16	0.15
$\geq$ \$50k and $<$ \$75k	0.20	0.16	0.19
$\geq$ \$75k and $<$ \$100k	0.12	0.07	0.12
$\geq$ \$100k and $<$ \$150k	0.12	0.05	0.11
$\geq$ \$150k	0.06	0.04	0.06
Risk tolerance (1–10)	4.71	5.31	4.77
Income shock (0,1)	0.28	0.50	0.30
Hold emergency saving (0,1)	0.44	0.31	0.42
Region-specific covariate			
Number of AFS establishments (per zip)	2.75	3.41	2.83
Proportion of RTO users and non-users (0,1)	0.89	0.11	
Average frequency of RTO use (0–4)		1.97	

Note. Descriptive statistics are weighted by NFCS national-level sampling weights.

TABLE 3 Models for RTO use: primary specification

Dependent variable:	Frequency of RTO transactions (0–4)			
	Linear (OLS) (1)	Linear (OLS) (2)	Linear (OLS) (3)	Linear (OLS) (4)
α: Financial knowledge (/10)	−0.026*** (0.002)	−0.033*** (0.004)	−0.029*** (0.003)	−0.029*** (0.003)
β_1: Disclosure on tot. cost	−0.031*** (0.010)	−0.101*** (0.031)		
β_2: Disclosure on tot. cost and other charges			−0.090*** (0.031)	
β_3: In-store price tag disclosure				−0.048* (0.029)
γ_1: $\alpha \times \beta_1$		0.011*** (0.004)		
γ_2: $\alpha \times \beta_2$			0.009** (0.004)	
γ_3: $\alpha \times \beta_3$				0.007** (0.004)
Self-assessed fin. knowledge	0.021*** (0.004)	0.021*** (0.004)	0.021** (0.004)	0.021*** (0.004)
Number of children	0.050*** (0.006)	0.050*** (0.006)	0.050*** (0.006)	0.050*** (0.006)
Risk tolerance	0.015*** (0.002)	0.015*** (0.002)	0.015*** (0.002)	0.015*** (0.002)
Income shock	0.132*** (0.012)	0.132*** (0.012)	0.133*** (0.012)	0.133*** (0.012)
Hold emergency saving	−0.012 (0.009)	−0.012 (0.009)	−0.012 (0.009)	−0.011 (0.009)
No. of AFS establishments	0.003** (0.001)	0.003** (0.001)	0.002** (0.001)	0.003** (0.001)
R^2	0.084	0.084	0.084	0.083
Observations	20,959	20,959	20,959	20,959
Linear restrictions (*F* test)				
H_0: $\alpha+\gamma_1=0$		−0.022*** (0.002)		
H_0: $\alpha+\gamma_2=0$			−0.020*** (0.003)	
H_0: $\alpha+\gamma_3=0$				−0.022*** (0.003)

Notes. Significance levels are indicated by *, ** and *** for 10, 5 and 1 percent significance level, respectively. Robust standard errors are reported in parentheses. Regression models include all demographic and socioeconomic covariates described in Table 2. Frequency of RTO transactions (0–4) denotes the number of RTO transactions in the past five years, ranging from never (= 0) to four or more times (= 4).

4.2 | Estimation results

Table 3 displays the OLS estimates when the outcome variable is the frequency of RTO use. The regression models include the full set of covariates, and standard errors estimates are robust to heteroscedasticity. For the sake of brevity, estimates for demographic controls are omitted. The coefficient estimates generally carry the expected sign. The RTO use is positively associated with household size, willingness-to-bear financial risks and income shock, but negatively related to

emergency saving. The impact of total cost disclosure is negative and different from zero at the 1% level, showing the effectiveness of disclosure mandates for curbing RTO use. Consistent with Robb, Babiarz, Woodyard, and Seay (2015), subjective financial knowledge is predictive of a greater RTO use. More importantly, the coefficient estimate on objective financial knowledge is negatively significant at the 1% level. The parameter estimate indicates that a 10 point increase in financial knowledge on a scale of 0–100 is associated with 0.026 times less use of rental products. Evaluated at the sample mean, this represents approximately 14% decrease (mean RTO use = 0.189).

The model in column (2) augments with the interaction between actual financial knowledge and a disclosure mandate. The interaction effect carries a positive sign and offsets the impact of financial knowledge. In states with total cost disclosure laws, the association between financial knowledge and RTO use shrinks from −0.033 to −0.022, representing almost 30% decrease. The *F* test result at the bottom panel show that financial knowledge is still a major determinant of RTO use for those subject to strict regulations. The models in columns (3) and (4) refit the baseline model with alternative policy indicators. These models interact objective financial knowledge with a "disclosure on total cost and other charges" and "in-store price tag disclosure" as described in Table 1. The association of financial knowledge with RTO use shrinks by the same amount as in column (2), while the interaction effects remain positive and significant at the 5% level. Overall, these patterns suggest that information disclosure significantly dampens the effect of financial knowledge on lowering RTO use.

Linear models as in Equations 1 and 2 assume that all zero and nonzero outcomes are generated by a single data generating process (DGP). This assumption is often unrealistic if there are substantive and statistical reasons to believe that some zeros (i.e., those who never used RTO) are generated by densities different from other zeros and nonzero outcomes. In a typical RTO transaction, consumers get immediate access to household goods in exchange for a low weekly or monthly payment. As this feature of the rental contract is attractive to those who cannot afford a significant down payment, RTO has been a popular option for credit-constrained consumers (McKernan, Lacko, & Hastak, 2003; Swagler & Wheeler, 1989). Studies such as Banerjee and Mullainathan (2010) and Shah, Mullainathan, and Shafir (2012) showed that deprivation induces over-commitment to present reward or hypervigilance to meet daily needs, leading to overborrowing in poverty. These results suggest that RTO users are likely to be different from non-users in unobserved ways, and, therefore, there might be two separate DGPs. Thus, a suitable approach is to jointly model a mixture of discrete and continuous outcomes by estimating a two-part model. This model specification consists of two parts: (a) a logit model for a binary outcome of RTO use (0,1) and (b) OLS or other flexible specifications for nonzero outcomes conditional on a positive use (1–4).

Table 4 presents the estimation results from the two-part models. Columns (1) and (2) display the logit and OLS estimates, and column (3) shows the tobit estimates that account for right-censoring. In the first column, the estimate of α remains negative and significant at the 1% level. However, the interaction effect carries the opposite sign and is no longer different from zero. In the next column, the estimate on γ is positive and marginally significant at the 10% level. These two models indicate that moderating effect of information is significant on the continued use of rental products but not on the likelihood of entering RTO market. The tobit estimates in column (3) show qualitatively the same results. The coefficient estimates on the regressors carry the same sign with similar effect size. This is not a complete surprise because only 11% of the positive outcomes belong to the top category.

In Table 5, a series of falsification tests are conducted using state-level prohibitions and price cap on other high-cost borrowing alternatives. Although a wide array of control variables are included in the baseline models, it remains unclear whether the RTO policy indicators

TABLE 4 Models for RTO use: Alternative specifications

	Used RTO or not (0,1)	Conditional RTO transactions (1–4)	
Dependent variable:	Logit (MLE) (1)	Linear (OLS) (2)	Tobit (MLE) (3)
α: Financial knowledge (/10)	−0.131***	−0.044***	−0.050***
	(0.014)	(0.014)	(0.016)
β_1: Disclosure on tot. cost	−0.174*	−0.184*	−0.0191
	(0.103)	(0.102)	(0.119)
γ: $\alpha \times \beta_1$	−0.003	0.035*	0.038*
	(0.017)	(0.018)	(0.020)
Self-assessed fin. knowledge	0.089***	0.023	0.025
	(0.022)	(0.019)	(0.021)
Number of children	0.201***	0.021	0.025
	(0.023)	(0.022)	(0.026)
Risk tolerance	0.069***	0.011	0.011
	(0.010)	(0.010)	(0.012)
Income shock	0.564***	0.151***	0.172***
	(0.053)	(0.049)	(0.056)
Hold emergency saving	−0.253***	0.019	0.026
	(0.059)	(0.061)	(0.070)
No. of AFS establishments	0.014***	−0.003	−0.002
	(0.005)	(0.005)	(0.006)
R^2		0.045	
Log-likelihood	−5,667		−3,173
Observations	20,959	2,025	1,737
Right-censored observations			288
Linear restrictions (*F* test)			
H_0: $\alpha+\gamma=0$		−0.009	−0.012
		(0.012)	(0.014)

Notes. Significance levels are indicated by *, ** and *** for 10, 5 and 1 percent significance level, respectively. Robust standard errors are reported in parentheses. Regression models include all demographic and socioeconomic covariates described in Table 2. Used RTO or not (0,1) is a binary variable indicating whether the respondent used any RTO product in the past five years or not. Conditional RTO transactions (1–4) show how many RTO transactions are made conditional on the RTO use.

TABLE 5 Falsification test

	Frequency of RTO transactions (0–4)			
Dependent variable:	**Linear (OLS) (1)**	**Linear (OLS) (2)**	**Linear (OLS) (3)**	**Linear (OLS) (4)**
α: Financial knowledge (/10)	−0.023*** (0.002)	−0.025*** (0.003)	−0.023*** (0.004)	−0.027*** (0.003)
β_1: Payday loan prohibited	0.064** (0.030)			−0.058 (0.050)
β_2: Title loan prohibited		0.017 (0.027)		−0.051 (0.032)
β_3: Interest rate cap on pawnshop			0.031 (0.033)	
γ_1: $\alpha \times \beta_1$	−0.0055 (0.0035)			0.009 (0.006)
γ_2: $\alpha \times \beta_2$		−0.0001 (0.003)		0.008** (0.004)
γ_3: $\alpha \times \beta_3$			−0.003 (0.004)	
γ_4: $\beta_1 \times \beta_2$				0.183*** (0.062)
γ_5: $\alpha \times \beta_1 \times \beta_2$				−0.024*** (0.008)
R^2	0.082	0.082	0.082	0.083
Observations	22,735	22,735	22,735	22,735
Linear restrictions (*F* test)				
H_0: $\gamma_1+\gamma_2+\gamma_5=0$				−0.006 (0.005)

Notes. Significance levels are indicated by *, ** and *** for 10, 5 and 1 percent significance level, respectively. Robust standard errors are reported in parentheses. Each regression model includes all socioeconomic and confounding covariates described in Table 2. Frequency of RTO transactions (0–4) denotes the number of RTO transactions in the past five years, ranging from never (= 0) to four or more times (= 4).

capture information availability or simply proxy for unobserved state-level legal sentiments towards alternative lending industry. For instance, several states in the northeast region such as Maine, Maryland and Pennsylvania have strongly regulated AFS industry, whereas some other states have been less restrictive and allowed more options to consumers. Intuitively, if the estimates in the previous tables are due to information constraints related to RTO transactions, the interaction terms involving policy indicators for other AFS should not be significantly associated with the demand for RTO products. To implement such falsification tests, additional state-level policy indicators are defined for (a) statutory prohibitions on a payday loan, (b) car title loan and (c) interest rate caps on pawnshop charges (McKernan, Ratcliffe, & Kuehn, 2013). The first three columns in Table 5 interact the indicator for objective financial knowledge with these policy measures. The fourth column includes a three-way interaction between financial knowledge, payday loan prohibitions and title loan prohibitions. The estimates show that the interaction terms in the first three columns do not carry the expected sign, and *t* values are too small to reject the null hypothesis of no significance. A three-way interaction in column (4) is significantly different from zero, but the linear restriction involving financial knowledge remains insignificant. Therefore, these suggest that the moderation effect of disclosure mandates is captured primarily by information constraints on RTO products and not confounded by unobserved regional heterogeneity in legal sentiments.

5 | CONCLUSION

This study was motivated by a recent discussion that financial knowledge leads to informed borrowing decisions by enhancing their ability to estimate actual cost of borrowing. As an indirect test of this hypothesis, a moderation analysis is devised to examine if financial knowledge plays a greater role in curbing AFS use in an information-sparse condition. Since a consumer infers missing information using their background knowledge, this approach shows us whether or not consumers indeed rely on financial knowledge to estimate overall borrowing expenses.

The empirical analysis used variation in the RTO disclosure mandates to capture regional differences in information availability. Exploiting the nature of RTO business to conceal actual costs, consumers in a loosely regulated state were assumed to be exposed to less information relevant to decision making. The state-level indicator for disclosure mandates was used as an empirical device to identify respondents with limited information and, therefore, have more incentives to use financial knowledge. Consistent with the hypothesis, the results showed that the negative impact of financial knowledge on RTO use is more pronounced for consumers subject to less stringent disclosure mandates. Further analyses showed that this moderating effect of information is only significant for the continued use of rental products, not for (first-time) rental market participation. It appears that limited information triggers inference-formation process using financial knowledge, and that the proposed mechanisms, such as incapacity to do a simple calculation or to understand loan terms, are responsible for limited financial knowledge leading to costly borrowing behaviours. This study calls for future research to develop a more nuanced understanding of how information availability affects the interactions between financial literacy and other domains of financial behaviours.

These results have indicated that financial education could supplement regulatory policies through consumer empowerment. One of the key predictions from this study is that financial knowledge acts as a self-protecting mechanism in a regulation-sparse environment. Even though only limited pricing information is provided, financially literate consumers will be able to recover actual cost and switch to cheaper borrowing options. That is, financial education would lower the risk of getting exploited by predatory lenders.

This investigation gives additional policy options to federal and state government. Small-dollar loans fill the short-term credit needs of credit-deprived consumers and often improve their financial well-being (Zinman, 2010). Strict regulations could have shrunk the overall market size and increased the search costs for those who would benefit from small-dollar loans. By incorporating financial education into the regulatory initiative, the government will be able to maximize consumer benefits while minimizing welfare losses from regulations.

ORCID

Tae-Young Pak http://orcid.org/0000-0003-2380-7256

REFERENCES

Alba, J. W., Hutchinson, J. W., & Lynch, J. G. (1991). Memory and decision making. In H. Kassarjian & T. Robertson (*Eds.*), *Handbook of consumer behavior* (pp. 1–49). Englewood Cliffs, NJ: Prentice Hall.

Agarwal, S., Skiba, P. M., & Tobacman, J. (2009). Payday loans and credit cards: New liquidity and credit scoring puzzles?. *NBER Working Paper No. 14659*. Cambridge, MA: National Bureau of Economic Research.

Ajzen, I., & Fishbein, M. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Anderson, N. H. (1974). Cognitive algebra: Integration theory applied to social attribution. *Advances in Experimental Social Psychology*, *7*, 1–101.

Anderson, N. H. (1996). *A functional theory of cognition*. Hillsdale, NJ: Erlbaum.

Anderson, N. H. (2014). *Contributions to information integration theory* (vols. *1*, *2*, *3*). Hillsdale, NJ: Erlbaum.

Anderson, M. H., & Jackson, R. (2001). A reconsideration of rent-to-own. *Journal of Consumer Affairs*, *35*, 295–306.

Association of Progressive Rental Organization. (2009). Rent-to-own's state economic impact and statutes. Retrieved from https://www.rtohq.org/state-associations/state-economic-impact-and-statutes/ (accessed on May 18, 2015).

Association of Progressive Rental Organization. (2014). Rent-to-own rules and regulations. Retrieved from https://www.rtohq.org/uploads/PDF/RTORulesRegs_APRO2014.pdf (accessed on May 18, 2015).

Association of Progressive Rental Organization. (2015). The rent to own industry: An overview. Retrieved from https://www.rtohq.org/about-rent-to-own/ (accessed on May 18, 2015).

Banerjee, A., & Mullainathan, S. (2010). *The shape of temptation: Implications for the economic lives of the poor (NBER Working Paper No. 15973)*. Cambridge, MA: National Bureau of Economic Research.

Beales, H. J., Eisenach, J. A., & Litan, R. E. (2012). Consumer welfare implications of regulating rent-to-own transactions. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2060984 (accessed on March 17, 2015).

Bertrand, M., & Morse, A. (2011). Information disclosure, cognitive biases, and payday borrowing. *The Journal of Finance*, *66*(6), 1865–1893.

Bhutta, N. (2014). Payday loans and consumer financial health. *Journal of Banking and Finance*, *47*, 230–242.

Chatterjee, S. (2013). Borrowing decisions of credit constrained consumers and the role of financial literacy. *Economics Bulletin*, *33*, 179–191.

Cowan, N. (1988). Evolving conceptions of memory storage, selective attention, and their mutual constraints within the human information-processing system. *Psychological Bulletin*, *104*(2), 163–191.

Dick, A., Chakravarti, D., & Biehal, G. (1990). Memory-based inferences during consumer choice. *Journal of Consumer Research*, *17*, 82–93.

Disney, R., & Gathergood, J. (2013). Financial literacy and consumer credit portfolios. *Journal of Banking and Finance*, *37*, 2246–2254.

Ernst, K., Farris, J., & King, U. (2004). *Quantifying the economic cost of predatory payday lending*. Durham, NC: Center for Responsible Lending.

Finke, M. S., Howe, J. S., & Huston, S. J. (2016). Old age and the decline in financial literacy. *Management Science*, *63*, 213–230.

Haugeland, J. (Ed.). (1981). *Mind design*. Cambridge, MA: MIT Press.

Heidhues, P., & Koszegi, B. (2010). Exploiting naivete about self-control in the credit market. *The American Economic Review*, *100*, 2279–2303.

Huber, J., & McCann, J. (1982). The impact of inferential beliefs on product evaluations. *Journal of Marketing Research*, *19*, 324–333.

Huston, S. J. (2012). Financial literacy and the cost of borrowing. *International Journal of Consumer Studies*, *36*(5), 566–572.

Kivetz, R., & Simonson, I. (2000). The effects of incomplete information on consumer choice. *Journal of Marketing Research*, *37*, 427–448.

Johnson, R. D., & Levin, I. P. (1985). More than meets the eye: The effect of missing information on purchase evaluations. *Journal of Consumer Research*, *12*, 169–177.

Lacko, J. M., McKernan, S. M., & Hastak, M. (2002). Customer experience with rent-to-own transactions. *Journal of Public Policy and Marketing*, *21*, 126–138.

Lawrence, E. C., & Elliehausen, G. (2008). A comparative analysis of payday loan customers. *Contemporary Economic Policy*, *26*, 299–316.

Lusardi, A. (2011). *Americans' financial capability (NBER Working Paper No. w17103)*. Cambridge, MA: National Bureau of Economic Research.

Lusardi, A., & de Bassa Scheresberg, C. (2013). *Financial literacy and high-cost borrowing in the United States (NBER Working Paper No. w18969)*. Cambridge, MA: National Bureau of Economic Research.

Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, *52* (1), 5–44.

Lusardi, A., & Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. *Journal of Pension Economics and Finance*, *14*, 332–368.

Lynch, J. G., & Srull, T. K. (1982). Memory and attentional factors in consumer choice: Concepts and research methods. *Journal of Consumer Research*, *9*, 18–37.

Mann, R. (2013). Assessing the optimism of payday loan borrowers. *Supreme Court Economic Review*, *21*(1), 105–132.

McKernan, S. M., Lacko, J. M., & Hastak, M. (2003). Empirical evidence on the determinants of rent-to-own use and purchase behavior. *Economic Development Quarterly*, *17*, 33–52.

McKernan, S. M., Ratcliffe, C., & Kuehn, D. (2013). Prohibitions, price caps, and disclosures: A look at state policies and alternative financial product use. *Journal of Economic Behavior & Organization*, *95*, 207–223.

Meier, S., & Sprenger, C. (2010). Present-biased preferences and credit card borrowing. *American Economic Journal: Applied Economics*, *2*, 193–210.

Meyer, R. J. (1981). A model of multiattribute judgments under attribute uncertainty and informational constraint. *Journal of Marketing Research*, *18*(4), 428–441.

Moore, D. L. (2003). *Survey of financial literacy in Washington state: Knowledge, behavior, attitudes, and experiences (Working Paper No. 03-39)*. Pullman, WA: Washington State Department of Financial Institutions.

Nehf, J. P. (1991). Effective regulation of rent-to-own contracts. *Ohio State Law Journal*, *52*, 751–845.

Pak, T. Y., & Chatterjee, S. (2016). Aging, overconfidence, and portfolio choice. *Journal of Behavioral and Experimental Finance*, *12*, 112–122.

Pindus, N., Kuehn, D., & Brash, R. (2010). *State restrictions on small-dollar loans and financial services, 2004–2009: Summary, documentation, and data* (Urban institute report No. 412305). Washington, DC: Urban institute.

Robb, C. A., Babiarz, P., Woodyard, A., & Seay, M. C. (2015). Bounded rationality and use of alternative financial services. *Journal of Consumer Affairs*, *49*, 407–435.

Ross, W. T., & Creyer, E. H. (1992). Making inferences about missing information: The effects of existing information. *Journal of Consumer Research*, *19*, 14–25.

Schmidt, J. B., & Spreng, R. A. (1996). A proposed model of external consumer information search. *Journal of the Academy of Marketing Science*, *24*, 246–256.

Shah, A. K., Mullainathan, S., & Shafir, E. (2012). Some consequences of having too little. *Science (New York, N.Y.)*, *338*(6107), 682–685.

Simmons, C. J., & Lynch, J. G. (1991). Inference effects without inference making? Effects of missing information on discounting and use of presented information. *Journal of Consumer Research*, *17*, 477–491.

Skiba, P. M. (2012). Regulation of payday loans: Misguided. *Washington and Lee Law Review*, *69*, 1023–1050.

Skiba, P. M., & Tobacman, J. (2008). *Payday loans, uncertainty and discounting: Explaining patterns of borrowing, repayment, and default (Working paper* No. 08–33). Nashville, TN: Vanderbilt University.

Skiba, P. M., & Tobacman, J. (2015). *Do payday loans cause bankruptcy? (Vanderbilt Law and Economics Research Paper Number 11–13)*. Unpublished manuscript.

Stango, V., & Zinman, J. (2009). Exponential growth bias and household finance. *The Journal of Finance*, *64*, 2807–2849.

Stegman, M. A. (2007). Payday lending. *The Journal of Economic Perspectives*, *21*(1), 169–190.

Swagler, R. M., & Wheeler, P. (1989). Rental-purchase agreements: A preliminary investigation of consumer attitudes and behaviors. *Journal of Consumer Affairs*, *23*, 145–160.

Terza, J. V. (1985). A Tobit-type estimator for the censored Poisson regression model. *Economics Letters*, *18*(4), 361–365.

Troutman, C. M., & Shanteau, J. (1976). Do consumers evaluate products by adding or averaging attribute information? *Journal of Consumer Research*, *3*, 101–106.

Utkus, S. P., & Young, J. A. (2010). *Financial literacy and 401 (k) loans (Working Paper* No. 2010-28). Philadelphia, PA: The Wharton School, University of Pennsylvania.

van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. *Journal of Financial Economics*, *101*, 449–472.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. Cambridge, MA: MIT Press.

Zikmund-Fisher, B. J., & Parker, A. M. (1999). Demand for rent-to-own contracts: A behavioral economic explanation. *Journal of Economic Behavior & Organization*, *38*, 199–216.

Zinman, J. (2010). Restricting consumer credit access: Household survey evidence on effects around the Oregon rate cap. *Journal of Banking & Finance*, *34*, 546–556.

How to cite this article: Pak T-Y. Financial literacy and high-cost borrowing: Exploring the mechanism. *Int J Consum Stud*. 2018;42:283–294. https://doi.org/10.1111/ijcs.12429

APPENDIX: Sample selection

Sample description	Number of observations
Participants in 2012 state-by-state NFCS	25,509
Excluding missing values in financial knowledge (objective and subjective)	24,386
Excluding missing values in the frequency of RTO transactions	24,252
Excluding missing values in risk tolerance	23,691
Excluding missing values in income shock	23,341
Excluding missing values in precautionary saving	22,735
Excluding missing values in RTO policies	20,959